Capacity Building for the Efficient Utilization of Biomass for Bioenergy and Food Security in the Greater Mekong Subregion (TA7833-REG)

Progress Report (October – December 2014)

Landell Mills
DEVELOPMENT CONSULTANTS

Key Project Data

Name of Project:	Capacity Building for the Efficient Utilization of Biomass for Bioenergy and Food Security in the Greater Mekong Subregion (TA7833-REG)
Contractor(s):	***Landell Mills Limited (LML)***, Bryer-Ash Business Park, Trowbridge, Wiltshire, BA14 8HE, UK. +44 1225763777 (landell-mills.com). *In consortium with:* ***Nexus Carbon for Development (Nexus)***, #33 E3 Sothearos Blvd, Corner St. #178, Phnom Penh, CAMBODIA (nexus-c4d.org)
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Disclaimer

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Contents

Abbreviations and Acronyms

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

1. Introduction

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 54 months (July 2011 to December 2015). 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 1st 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).

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 December 2014, as well as a work plan for the remaining period of the contract (current end date of 12th June 2015).

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 through sharing national experiences with institutional processes and mechanisms for introducing and operating regulatory and non-regulatory approaches for biomass related technologies while ensuring their compatibility with international trade obligations. The primary focus of the TA strategy for output 1 shifted during the extended inception phase away from a purely regional harmonization approach to one of building national level awareness, priorities and institutions that are being shared and discussed collectively through regional forums and sharing of outputs. The change responds to a common concern expressed by the government counterparts that harmonization from regional to national level was simply unacceptable and that the process need to build a national position that could then be modified or adapted in response to regional benefits and opportunities.

The strategy for this output has therefore been modified which created greater ownership but significantly increases the complexity of what is being delivered through the TA due to the range of priorities and the potential scope for some of these i.e., climate friendly rice standards, as well as the vastly differing institutional contexts that the three countries are required to operate within and the limitations over the process for decision making. The TA offers technical input and the institutional knowledge of what is being developed regionally and internationally along with a process through which priorities are shaped and developed.

Using these national programs as a basis for regional learning and sharing is the critical step in achieving the overall output. The overall output as stated has not changed in principle however the indicator targets of the output have been modified.

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.

A significant constraint for piloting business models is the inability of ADB to use TA funds in a manner that is similar to their usual sovereign lending products and as such the provision of TA funds for government expenditures is simply not possible. Further, many of the business models will build around revolving funds or alternative credit systems that cannot be piloted over a 1 or 2 year TA program. The other challenge is to move away from a supply push for technology to one of demand creation for the use of technology outputs which fundamentally changes the manner in which upscaling is organized.

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. Videos and biobriefs will be used to reach stakeholders. Capacity building for ADB investment preparation will also be provided.

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

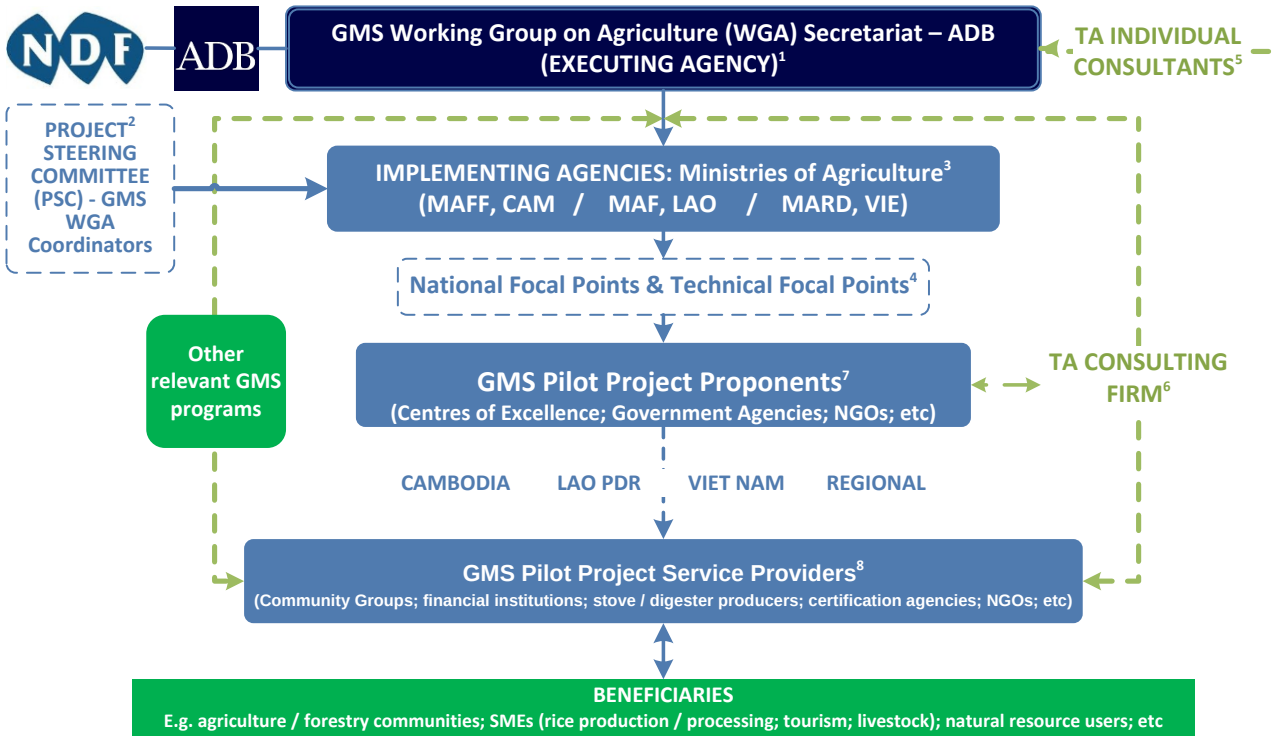
Knowledge products on the utilization of biomass for bioenergy and food security (i.e. agricultural production) will be developed to promote knowledge transfer and cooperation between more advanced GMS countries and CLV.

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 . 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).

Table 1: Government counterpart agencies and personnel for TA7833

ROLE	NAME	POSITION
Cambodia		
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)
GMS-WGA National Secretariat Specialist	*Mr. NAT Chan Tola*	*Individual consultant contracted by ADB, to help co-ordinate all activities under CASP II's TAs including TA7833.*

ROLE	NAME	POSITION
National Focal Point (NFP)	Dr. Sar Chetra	Department of Animal Health & Production, MAFF
Technical Focal Points (TFP)	Biogas - Mr. Chea Sokhom	Chief of Animal Production Office and Biogas, DAHP, MAFF
	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)1
Lao PDR		
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	Director of Economic Integration Division, Department of Planning and Cooperation, MAF
GMS-WGA National Secretariat Specialist	*Sengphet (Anna) Lattanavong*	*Individual consultant contracted by ADB, to help co-ordinate all activities under CASP II's TAs including TA7833.*
National Focal Point (NFP)	Mr. Inthadom AKKHARATH	Director of Economic Integration Division, Department of Planning and Cooperation, 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 Technical Agriculture Systems Training Centre, Department of Agriculture Extension and Cooperatives (DAEC), MAF
	Biofuel - Mr. Khamphone MOUNLAMAI	Deputy Director of Research Management Division (NAFRI)
	ICS - Mr. Boualom XAYSANAVONG	Technical staff, Institute of Renewable Energy, Ministry of Energy & Mines (MEM)
	Standards - Ms. Nisith KHAMMOUNHEUANG	Head of Standards Division, Ministry of Science & Technology (MoST)
Viet Nam		
GMS-WGA Coordinator	Mr. Tran Kim Long	Director General, International Cooperation

[1] *www.isc.gov.kh*

ROLE	NAME	POSITION
		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)
GMS-WGA National Secretariat Specialist	*Ms. Truong Thi Van Anh*	*Individual consultant contracted by ADB, to help co-ordinate all activities under CASP II's TAs including TA7833.*
Coordinator National Focal Point (CNFP)	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 LCASP 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 number of individual consultants located in the WGA Secretariat at the EOC in Bangkok to work with the TA7833 consultant team, and with other projects. To date, inputs from such consultants to TA7833 have been limited. The role of the public private partnership expert was providing a promising platform on which TA7833 and EOC could develop joint programs. Unfortunately this position has stopped, although there are plans for joint co-operation on the production of a number of deliverables with a Carbon Finance specialist who has recently been employed.

The GMS EOC in Bangkok serves as a facility for the dissemination of data through its website.

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 . Currently, technologies and the required skills for the conversion of agricultural and forestry residues into bioenergy carriers like biogas, wood or straw-based pellets / briquettes and biochar have been promoted by a range of stakeholders and donors with mixed results. Some of the initiatives have entered into upscaling, whilst others remain in various stages of technology readiness and are present only 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.

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.

2. Summary of Progress Against the Design and Monitoring Framework

Table 2: Summary of Progress against the DMF

INTERVENTION LOGIC	PROGRESS TO DATE	PLANNED ACTIVITIES (JAN 2015 – JUNE 2015)
IMPACT: IMPROVED USE OF BIOMASS IN CAMBODIA, LAO PDR AND VIET NAM **By 2020:** - 5% increase in production of clean bioenergy from biomass (2011 baseline: 0.1%) - 5% increase in use of by-products of bioenergy systems (bio-slurry and biochar) (2011 baseline: 0%)	Achievement of the impact (and measuring of performance) is outside the scope of the project. However, it is clear that the impact is still relevant and that the project outcome and outputs will contribute to the impact, particularly increase in the use of by-products of bioenergy systems (bio-slurry and biochar).	
OUTCOME: EFFICIENTLY OPERATING PILOT PROJECTS IN BIOMASS USE By 2014: 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	The pilot projects will be assessed and used as a basis for preparing proposals for future investment modalities (to be funded through a future ADB loan or other potential investors). Early discussions with the government and ADB however resulted in the project dropping research into investment modalities for certified biofuel. Pilots, for which investment modalities will be prepared, cover the following: • Biogas and bioslurry (OVI – two in Cambodia and Lao PDR; Pilot Projects – two in Laos PDR and Vietnam) • Biochar (OVI – three in Cambodia, Lao PDR, and Viet Nam; Pilot Projects - three in Cambodia, Lao PDR, and Viet Nam) • Improved cookstoves (OVI – two in Lao PDR and Vietnam; Pilot	Continue pilot projects and prepare final reports. National workshops planned for mid-late March to disseminate results and lessons learned.

INTERVENTION LOGIC	PROGRESS TO DATE	PLANNED ACTIVITIES (JAN 2015 – JUNE 2015)
crops in (Cambodia, the Lao PDR, and Viet Nam)	Projects – three in Laos, Cambodia and Vietnam) • Organic crops (OVI – three in Cambodia, Lao PDR, and Viet Nam; Pilot Projects – four in Cambodia, Laos PDR and Vietnam) All projects are progressing well. Those in Vietnam are nearing completion. E.g. EPRO has delivered its final report. The NCG pilot in Laos should be finished by March 2015 as planned. The pilots in Cambodia should be finished by mid-late March.	
OUTPUT 1: ENHANCED REGIONAL COOPERATION IN BIOENERGY DEVELOPMENT TO FOSTER AND SAFEGUARD FOOD SECURITY Mechanism tested for harmonizing at least three bioenergy standards[2] and certification systems, and a common method of assessing greenhouse gases	See below. Work undertaken on 3 standards, and recommendations for one other. Work not undertaken on a common method for assessing greenhouse gases as methodologies are already present and it depends on the technology used. Plus there is no regional laboratory that can do the analysis. However, carbon pathways will be examined through life cycle analysis work that will also be linked to the work of Janis Trebecis (direct hire carbon financing consultant) and his carbon financing in agriculture program including the work being supported on carbon accounting.	See below
1.0 Holding of regional forums to facilitate high-level dialogue within the region on bioenergy and food-security policy issues	Harmonization Roadmap devised and agreed at 1st GMS Forum in Nanning, China, in July 2012, as initial mechanism for facilitating dialogue and ultimate adoption of common standards. See p12 of 'Report on Proceedings'._While benefits of harmonization agreed, priority set on developing national level regulatory framework. 3 National policy forums (May 2013) - 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.	Regional workshop (forum) between NPIs/TFPs/NFPs from each country from 5th-6th February in Cambodia (and planning meetings before then in Cambodia and Laos) in order to discuss standard development progress in each country, prepare a roadmap for the roll-out of each standard (certification, labelling, traceability, inspection), and discuss possibilities for harmonization. Results of discussions to be presented at the final

[2] 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.

INTERVENTION LOGIC	PROGRESS TO DATE	PLANNED ACTIVITIES (JAN 2015 – JUNE 2015)
	Reports on the 3 national policy forums submitted. Following these forums, TORs prepared and agreed for policy working groups in each country to prepare policy road maps for standards, certification and labeling for biomass related technologies and climate friendly agriculture based on the national forums. WGs formed. WG meetings held in Laos and Cambodia. See 1.1. The following priorities were identified in the first WGs on a demand-led basis: • Cambodia – standards for organic rice and biodigesters; • Laos PDR – standards for organic rice and biofertilizer; In Cambodia a draft standard for organic rice and biodigesters has been developed and is going through the final stages (see work plan). The organic rice standard in Laos is at a similar stage and should be ready by end January. Constraints have been identified in the development of a biofertiliser standard in Laos so a biobrief on constraints and recommendations will be prepared instead. Key issues for constraints include (i) the need to finalize and ratify the organic produce standard, (ii) ensure ASAEN requirements are fully incorporated, (iii) assess the compliance requirement for biofertilizers as this standard will operate under the fertilizer regulations requiring annual registrations and testing (true to type) – International biofertilizier standards would currently be unable to be supported through existing analytical capability effectively prohibiting all local biofertilizers from commercial sale. Work in Vietnam stopped due to lack of agreement on achievable activities and the progression of an existing draft biofertilizer standard through the existing Government process.	conference in Laos in March. 2 government staff from Myanmar will be invited as observers.
1.1 Testing of mechanisms to facilitate adoption of common set of sustainable indicators, bioenergy and	To date a draft standard for organic agricultural produce and organic rice standard in Cambodia has been developed. In Laos the organic produce and rice standard is currently in the last	Finalise standard approval process in Cambodia and Laos as per the work plan. Regional workshop (forum) between

INTERVENTION LOGIC	PROGRESS TO DATE	PLANNED ACTIVITIES (JAN 2015 – JUNE 2015)
trade standards, certification systems an eco-labeling	step of independent government review. The first draft of a standard for biodigesters in Cambodia has been completed and the initial consultation completed The scope of a draft standard for biofertilizers in Laos was presented and discussed in Laos and used to define the scope of biofertilizer formulations in the Laos pilot program As a result of the work on a standard in Laos, rice husks biochar and mixed biomass converted into biochar adopted in Laos PP; and 4 Formulations of Biochar Organic Fertilizers designed for practicing at LPP testing and demo.	NPIs/TFPs/NFPs from each country from 5th-6th February in Cambodia in order to discuss standard development progress in each country, prepare a roadmap for the roll-out of each standard (certification, labelling, traceability, inspection), and discuss possibilities for harmonization. Results of discussions to be presented at the final conference in Laos in March.
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	Regional Conference held in Hanoi in Dec 2013.	2nd Regional conference planned to be held in Laos on 5th and 6th March
OUTPUT 2: PILOT TESTED CLIMATE FRIENDLY BIOMASS INVESTMENT PROJECTS FOR WIDER IMPLEMENTATION 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	While climate-friendly biomass investment projects will be pilot-tested for wider implementation, the OVIs will not be achieved as stated. This is because the project is testing business models for future scale-up, not to construct a specific number of bio-digesters, biochar kilns, or improved cookstoves, or to test these particular technologies. Thus the indicators are not realistic, or in line with what the project is trying to achieve. Additional remarks on these indicators is as follows: <u>Bio-digesters:</u> 500 biodigesters is optimistic given that the ADB has existing lending products in place for biodigesters in Viet Nam and the assessment of biodigesters in Cambodia and Laos is negative <u>Biochar</u> Biochar and bioslurry technologies are assessed to be too immature and as such the targets for their adoption in the DMF are considered too optimistic. 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. i.e. there is a need for both biochar and bioslurry is to shift the focus from which technology to product development and formulation linked to fertilizer supply chains.

600 biochar kilns is simply unsupportable – there is no local production of kilns that has a commercial basis. Kiln technology and feed stocks are not well known and the benefits of biochar may not warrant the investment of resources. Further, the international experience with biochar is to move away from high volume soil amendments to incorporation of biochar into nutrient products where the biochar changes the characteristics of the biochar through reduced volatilization and provides potential water and nutrient release benefits lowering overall demand for nutrients.

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.

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.

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. The focus should maybe move away from technology of production to how to build supply chains – a key finding from the assessment of climate friendly value chains in GMS

ICS

A program target to upscale 75,000 cook stoves in the three countries far exceeds both the resources available and the likely uptake rate – further it would exceed the ICS stove producer capacity.

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.

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.

The target of introducing at least 300 farmers to sustainable certification standards is unrealistic since the process of agreeing and ratifying a standard and then setting up the certification systems to support this is beyond the timescale of the TA. Instead the TA will develop standards and then a roadmap for their uptake. See output 1 above.

INTERVENTION LOGIC	PROGRESS TO DATE	PLANNED ACTIVITIES (JAN 2015 – JUNE 2015)
2.0 Conduct biomass assessment and development of criteria for selection of pilot project areas by 2012	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.	None. Activity completed.
2.1 Implementation of pilot projects in lower cost biogas technologies as investment options involving use bioslurry for high vale crop production	• Priority topics by country agreed • Terms of reference for feasibility studies prepared and approved by ADB and IAs. • 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 Namese contractor for Bioslurry and Biochar work but was not approved by government • 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 • FS in Cambodia and Viet Nam contracted and final reports accepted • Rapid appraisal of options undertaken in Laos • Value chain business models for potential upscaling case studies identified • Procurement using a shopping and RFP modality approved by ADB • TORs approved for proposed pilots • All pilot projects contracted and underway • Baseline data collected • 1st final report approved	• Continue implementation and monitoring of pilot projects. • Pilot project final reports
2.2 Conduct of reviews to identify appropriate biochar, ICS and biofuel investment modalities by 2012 and implementation of pilot project by 2014	• Summary reviews of ICS, Biochar, the private sector, financing modalities, and the institutional frameworks in CLV completed. • Technology commercialization status assessment based on NASA's Technology Readiness Levels (TRL) completed and included in inception report – highlighting the immature nature of biochar and bioslurry technologies for widespread up-scaling. • Biofuel technology has been dropped based on TA team findings and CLV Government skepticism.	• Once pilot projects finished and assessed, recommendations for future ADB investment for scale-up included in final report • The final report from ICS Viet Nam has just been approved. The findings are mostly positive and the women's Union has already extended its

INTERVENTION LOGIC	PROGRESS TO DATE	PLANNED ACTIVITIES (JAN 2015 – JUNE 2015)
	• Biochar testing and analysis report (including risk analysis) submitted • Financing modalities report finalized • Further dialogue on the design of rice straw kilns for turning surplus straw to biochar in the field immediately after harvesting has proposed alternate designs for inclusion in pilot program	program into new districts and also continued to order stoves beyond the life to pilot contract. The farmers' union modality simply did not work as well and will not continue. • Progress on biofertiliser in Cambodia. Field inspection of demonstration plots and farmer interviews indicate strong interest in the use of the formulations with significant gains over farmer practice plots and control farm performance. • Laos progress as reported is somewhat more advanced with harvesting near completion – results are mixed but positive. Vegetable crop – second growth cycle is currently underway. • Viet Nam results will be provided in the next 3 weeks the gains in Viet Nam are somewhat smaller
OUTPUT 3: ENHANCED CAPACITY FOR EFFICIENT USE OF BIOMASS 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)	To date, training initiatives have increased the capacity of 4712 trainees (121% of target) including 298 government officials (60% of target), 858 service providers (215% of target), and 3556 lead farmers (119% of target). Of the trainees 2387 have been women (51% which is just below the target of 55%). Evaluation sheets show that the majority have been satisfied with the training received and expect it to increase their capacity.	Attempt to reach target through additional training as below.

INTERVENTION LOGIC	PROGRESS TO DATE	PLANNED ACTIVITIES (JAN 2015 – JUNE 2015)
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)	Training programs undertaken – see section 3 below	• Continue dissemination of biobriefs • Finalise videos and disseminate
3.1 Conduct training in the implementation of the investment project by 2014	None	Training on ADB investment preparedness / project preparation in March 2015.
3.2 Conduct of training in the use of biomass to enhance food security and soil carbon sequestration by 2014	Training programs undertaken – see section 3 below	• Continue dissemination of biobriefs • Finalise videos and disseminate
OUTPUT 4: DEVELOPMENT AND DISSEMINATION OF KNOWLEDGE PRODUCTS 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
4.0 Development of methodology for assessing and prioritizing the use of biomass for energy and food security by 2012 and dissemination of the	A biomass resource availability report has been prepared. Field work for life cycle analysis and least cost assessment, which will be used as a way to help prioritise the use of biomass, is being	Finalise life cycle analysis and least cost assessment report. Prepare a biobrief on its use, and on the results, and disseminate. Present findings at the final

INTERVENTION LOGIC	PROGRESS TO DATE	PLANNED ACTIVITIES (JAN 2015 – JUNE 2015)
methodology through regional forums, training, and capacity building by 2014	undertaken.	conference.
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 • Baseline and on-going monitoring requirements specified in pilot project TORs • Baseline data collected	Analyse data
4.2 Conduct key studies such as life cycle assessments, least cost options, and eco-labeling by 2013	Lifecycle analysis and least cost assessments underway. Study on eco-labelling submitted (Oct 2013)	See 4.0 above.
4.3 Publication of compendium of good practices in biomass use and booklets containing information on different models of ICS biochar kilns and bio-digesters by 2014	A number of KPs have been produced and disseminated while others are planned. This list is provided, with those submitted highlighted in italics **The Context** • *Agriculture, Food Security and CC in GMS* • *Agricultural Biomass Resource Assessment in CAM, LAO and VIE* • Report on impact of CC on biomass resource availability in GMS **Biochar** • *Soils and Biomass Amendments* • *Biochar* • *Biochar testing and analysis report (including risk analysis)* • *Relevant Pilot Feasibility Study Reports* • Relevant Pilot Final Reports plus Exec Summary of Pilot Final Reports **Biogas and bioslurry** • *Relevant Pilot Feasibility Study Reports* • Biogas / Bioslurry	Complete reports as listed on the left Prepare introductory note for the compendium of KPs.

INTERVENTION LOGIC	PROGRESS TO DATE	PLANNED ACTIVITIES (JAN 2015 – JUNE 2015)
	• Relevant Pilot Final Reports plus Exec Summary of Pilot Final Reports **ICS** • *Relevant Pilot Feasibility Study Reports* • ICS • Relevant Pilot Final Reports plus Exec Summary of Pilot Final Reports **The Regulatory and Enabling Framework** • *An overview of international standards and certification systems on bioenergy and climate-friendly agriculture (see output 1)* • Review of relevant national laws, regulations, policies and plans (see output 1) **Scaling-Up** • *Business Models for the Scaling-Up of CFA VCs in GMS* • Common sets of Sustainability Indicators • CFA value chains • Lifecycle analysis and least cost assessment report • Final Report We propose that the above KPs are included (together with the bio-briefs) as a compendium on the WGA site (and packaged in CDs for distribution with some hard copies for the IAs). Introductory text will provide an intro to each section / report.	
4.4 Analysis of potential climate change scenarios and their likely impact on the availability of different type of biomass and assessment of	None	Prepare a report which estimates how climate change scenarios (based on UNFCC forecasts) will impact on the biomass availability (e.g. in the rice sector)

INTERVENTION LOGIC	PROGRESS TO DATE	PLANNED ACTIVITIES (JAN 2015 – JUNE 2015)
need for the development of alternative biomass sources by 2013		as identified in the 'Agricultural Biomass Availability in the GMS' report.

3. Details of Project Progress and Planned Activities

A work plan for activities and inputs from January to June 2015 is provided in **Appendix 3**. In addition, to ensure that we have adhered to the original TOR, we have done an analysis of progress against TOR statements in **Appendix 2**.

3.1. Output 1: Mechanisms for Enhancing Regional Cooperation and Development of Bioenergy and Food Security Harminized

3.1.1. Project Progress

To date a draft standard for organic rice (ORS) in Cambodia has been developed; while a draft standard for organic rice in Laos is nearing finalisation (using the Cambodia one as a template). A draft standard for biodigesters in Cambodia has also been developed.

The Cambodia bodigester standard is partly based on the Vietnam biodigester standard. Any new project could consider developing a Laos biodigester standard based on the Vietnam and Cambodia ones to foster harmonisation.The Cambodia biodigsester standard could be implemented by the Energy Dept which has a stronger remit.

The justification for the Laos ORS is the Laos Policy 2020 which envisages 70,000 organic farmers. So far 9 associations have called for this standard.

As a result of the work on a standard in Laos, rice husks biochar and mixed biomass converted into biochar have been adopted in the Laos PP; and four Formulations of Biochar Organic Fertilizers designed for practicing at LPP testing and demo sites.

Work in Vietnam stopped due to lack of agreement on achievable activities.

3.1.2. Planned Activities (January – June 2015)

A regional forum (see details and agenda in **Appendix 5**) is planned from 5th-6th February in Cambodia in order to to discuss standard development progress in each country, prepare a roadmap for the roll-out of each standard (certification, labelling, traceability, inspection), and discuss possibilities for harmonization. Results of discussions to be presented at the final conference in Luang Prabang in Feb/March.

There is a need to finalise the report on National Legislation and Policy Review.

3.2. Output 2: Mechanisms for Scaling-Up Biomass Investment Projects for Bioenergy and Food Security Demonstrated through Pilot Projects

3.2.1. Project Progress

All pilot projects have started and a number of milestones have been met. Details of progress are shown in **Appendix 4**. This highlights that most of the activities under each Pilot have now been completed, with most pilots expected to be completed successfully and on-time (Cambodia pilots delayed till mid-March 2015). Specific reports (mid-term reports and one final report) on each pilot are available on request.

Regular monitoring trips have been conducted to the pilots by the National Project Implementation specialists, as well as the international team, in order to verify progress and check on the quality of outputs. So far we have been happy with both the progress and the quality on the majority of pilots, although there remain some concerns on PP#1: Improved Cook Stove Up-scaling in Cambodia, and PP#3: Demonstration of Biofertiliser and Biochar Soil Amendments in Vietnam.

The table below provides details of progress against payment deliverables. 70% of the payment deliverables have now been achieved.

Linked to this output, additional biochar analysis has been undertaken at the University of Edinburgh as due diligence to identify potential silicosis risk from the production, handling and use of rice husk biochar, and a report submitted.

Anecdotal evidence from the pilots suggests that they are already having a behavioural / attitude change. E.g. Farmers in Cambodia are wanting to know where they can buy biofertiliser as used in the trials; women's unions in Vietnam are continuing the ICS purchase and selling and have expanded to other districts. Many of the challenges in scaling-up seem to be on the supply rather than demand side.

Workshops will be organised in each country in March or April to disseminate the findings from the pilots to a wider audience including research organisations.

Table 3: Pilot Project Output and Payment Tracking Sheet

Contract	Contractor	Start / End Date	Schedule of Payments	Amount (US$)	% of Contract	Output approved	Amt Invoice paid
CAMBODIA							
PP#1: Improved Cook Stove Up-scaling	**Mekong TT**	17.2.2014 / 30.11.2014	Contract signing	8,175	15%	Y	8,175
			Approval of work plan (5 weeks after contracting) Including disbursement of $28,000 revolving fund to ICS producers and women groups for ICS sale incentives (After contract signed with ICS producers and women group)	16,350	30%	Y	16,350
			Approval of Mid-Term Report – by end of Month 3 Output 1: Contracts with suppliers and capacity strengthening revolving grants awarded Stove producer linkages to Womens unions established Output 2: Womens Unions letter of agreement completed Capacity strengthening and awareness raising undertaken	13,625	25%	Y	13,625
			Submission of Draft Final Report including training summary and pilot evaluation report	10,900	20%		
			Approval of Final Report	5,450	10%		
				54,500			**38,150**
PP#2: Farm Demonstration of Biofertilizers for Upscaling Investment	**CelAgrid**	07.02.2014 / 30.12.2014	Contract signing	10,754	15%	Y	10,754
			Approval of work plan (5 weeks after contracting)	17,924	25%	Y	17,924
			(i) Approval of Mid-Term Report (ii) TULD Kilns operating (iii) Farm Demonstrations established and Training program tested and being implemented (iv) Farm demo monitoring framework agreed and operating	17,924	25%	Y	17,924
			Submission of Draft Final Report including product testing findings, and training evaluation report	14,339	20%		

			Approval of Final Report	10,755	15%		
				71,696			**46,602**
PP#3: Production and Testing of Biofertilizers	**Mekong Carbon**	06.02.2014 / 30.11.2104	Contract signing	10,338	15%	Y	10,338
			Approval of work plan (5 weeks after contracting)	17,230	25%	Y	17,230
			Approval of Mid-Term Report – App product formulations and supporting lab tests	17,230	25%	Y	17,230
			Submission of Draft Final Report including product testing findings, and training evaluation report	13,784	20%		
			Approval of Final Report	10,339	15%		
				68,921			**44,798**
VIET NAM							
PP#1: Improved Cook Stove Use	**EPRO**	15.12.2013 / 15.10.2014	Contract signing	9,977	15%	Y	9,070
			Approval of work plan	23,280	35%	Y	24,187
			Approval of Mid-Term Report (Mth 6)	19,954	30%	Y	19,954
			Submission of Draft Final Report	6,652	10%	Y	6,652
			Approval of Final Report	6,652	10%	Y	6,652
				66,515			**66,515**
PP#2: Bioslurry Management	**CARES** and S**EDCC**	28.2.2014 / 30.10.2014	Contract signing	11,407	15%	Y	11,407
			Approval of work plan (5 weeks after contracting)	22,814	30%	Y	22,814
			Approval of Mid-Term Report – and delivery of knowledge product, production of bioslurry compost products and the design of crop demonstration program	19,011	25%	Y	19,011
			Submission of Draft Final Report including crop demonstration findings, and training evaluation report	11,407	15%		
			Approval of Final Report	11,407	15%		
				76,046			**53,232**

PP#3: Demonstration of Biofertiliser and Biochar Soil Amendments	**COTDEP**	1.3.2014 / 30.12.2014	Contract signing	12,898	15%	Y	12,898
			Approval of work plan (5 weeks after contracting)	21,496	25%	Y	21,496
			Approval of Mid-Term Report – App product formulations and supporting lab tests	25,795	30%	Y	25,795
			Submission of Draft Final Report including product testing findings, and training evaluation report	17,197	20%		
			Approval of Final Report	8,599	10%		
				85,985			**60,189**
LAO PDR							
#PP1: Cluster Biomass Technology and Biofertilisers	**NCG**	10.02.2014 / 31.03.2015	Contract signing	34,855	15%	Y	34,855
			Approval of work plan (5 weeks after contracting)	69,709	30%	Y	69,709
			Approval of Mid-Term Report – App product formulations and supporting lab tests	46,473	20%	Y	46,473
			Submission of Draft Final Report including product testing findings, and training evaluation report	58,091	25%		
			Approval of Final Report	23,237	10%		
				232,365			**151,037**
Total				**656,028**			**460,523**
%							**70%**

3.2.2. Planned Activities (January – June 2015)

Planned activities are as follows:

- Continue pilot project implementation
- Continue monitoring implementation
- Analyze results
- Workshops to disseminate results in March or April

3.3. Output 3: Strengthened Capacity of Project Stakeholders for the Efficient Use of Biomass

3.3.1. Project Progress

i) Stand-alone training and study-tours

See tables 6 and 7 below.

Biochar Training in Vietnam (December 2014)

ii) Training under the pilot projects

See table below.

iii) Bio-Briefs

A series of two-page Bio-Briefs are being developed and disseminated in hard- and e-copy, with the purpose of raising the awareness levels of select groups within GMS government and civil society stakeholders and to build their familiarity with a number of interrelated subjects covering climate change, climate-friendly agriculture, food security, biomass and bioenergy. The following biobriefs have been completed and disseminated to date.

Table 4: List of biobriefs completed and disseminated

Topic	Date	Main Source Doc (Author Initials)	Links
1. Overview of TA7833-REG	Dec 2013	N/A	***ENG VIE CAM LAO***
2. Climate change in the GMS (overview)			
Climate change in the GMS (CAM)	Dec 2013	KP#1 (GM)	***ENG CAM***
Climate change in the GMS (LAOS)	Dec 2013	KP#1 (GM)	***ENG LAO***
Climate change in the GMS (VIE)	Dec 2013	KP#1 (GM)	***ENG VIE***
3. Climate Change & Agriculture in the GMS	Dec 2013	KP#1 (GM)	***ENG VIE CAM LAO***
4. Food Security in the GMS	April 2014	KP#1 (GM)	***ENG VIE CAM LAO***
5. Biomass resource availability in the GMS	Dec 2013	Agri Biomass Resource Assessment in CLV (SS)	***ENG VIE CAM LAO***
6. Healthy Soils	Aug 2014	Soils and Biomass Amendments KP (SS)	***ENG CAM VIE LAO***
7. Soils and Biomass Amendments	Oct 2014	Soils and Biomass Amendments KP (SS)	***ENG CAM VIE LAO***

iv) Videos

A Training Video Series has been started which aims to address the following two principle capacity development requirements:

- Enhancing target farmers' understanding of the true value of biomass resources, knowledge of various resource use options and confidence in applying this knowledge within biomass use;
- Enhancing target stakeholders' understanding of successful approaches for scaling-up the dissemination of improved cookstoves (ICS).

Production is underway on a practical Training Video Series focused on the 'Biomass for Healthy Soils, Crop Production and Bioenergy'.

The video series aims to strengthen the practical knowledge of target beneficiaries in the GMS in managing agricultural biomass resources and bioenergy technology in a more efficient and sustainable manner. The videos are designed to address key capacity development requirements by enhancing target farmers': i) Understanding of the true value of biomass resources, ii) Knowledge of various options for efficient utilization of biomass, and; iii) Confidence in applying this knowledge in crop / bioenergy production.

The four-part video covers: a) Healthy Soils; b) Biomass for Energy; c) Biomass for Crop Production; d) Biofertilizers.

The intended use of the videos is as visual training resources within facilitated government (e.g. extension staff) and non-government training initiatives (external to TA7833). The series is intended to be interspersed with hands-on field training and demonstrations.

A subcontractor has been engaged and detailed scripts developed in partnership with the IAs, TA team, pilot project service providers and key stakeholders. Field shooting was undertaken during the repoporting period.

A full terms of reference, copies of the scripts, and details on the videos planned are available on request.

3.3.2. Planned Activities (January – June 2015)

i) Stand-alone training and study-tours

ADB investment project preparation (training on investment modalities and undertaking PPTAs) – particiopants, budget, agenda, date and venue to be confirmed

ii) Training under the pilot projects

Continue as planned

iii) Biobriefs

Prepare and disseminate additional biobriefs. Note the following list is tentative only and may be revised as reports and outputs are produced.

Table 5: Planned Biobriefs

Topic	Main Source Doc (Author Initials)
8. Biochar: Overview	Biochar KP (SS)
9. Biochar: Technology options & readiness levels	Biochar KP (SS)
10. Biochar: Applications	Biochar KP (SS)
11. Biochar: TA7833 test results & OHS	Analysis of GMS Biochar Samples (SS)
12. Standards & Certification#1	An overview of sustainable standards and certification systems (DPB), national policies and legislation KP (DPB) and using the draft standards prepared under output 1 as examples
13. Standards & Certification#2	An overview of sustainable standards and certification systems (DPB), national policies and legislation KP (DPB) and using the draft standards prepared under output 1 as examples
14. Intro to LCA (what is it, basic methodology, and why it can be of use to policy makers)	Life Cycle Analysis Report (AC)
15. Results of the LCA (one biobrief or one per pathway or one per country)	Life Cycle Analysis Report (AC)

16. Standards: Biochar (Global progress and application/constraints for GMS)	
17. Biogas: Overview	Biogas KP (JY)
18. Biogas: Technology options & readiness levels	Biogas KP (JY)
19. Biogas: Efficient bioslurry management	Biogas KP (JY)
20. Improved Cookstoves: Intro and Impact	ICS KP (EB updated by AW)
21. Improved Cookstoves: Technology options & readiness	ICS KP (EB updated by AW)
22. Climate-friendly value chains	CFA value chains KP (LS)
23. Pilot Project Results - ICS	Pilot final reports (Sub-contractors)
24. Pilot Project Results - Biofertilisers	Pilot final reports (Sub-contractors)
25. Pilot Project Results - Biogas	Pilot final reports (Sub-contractors)

iv) Videos

Continue to supervise video production. See work plan.

v) Annual conference

Organise the second annual regional conference on household bioenergy and food security in Luang Prabang at the end Feb/early March 2015. See details and agenda in **Appendix 6**.

Table 6: Stand-alone training and study-tours to date

EVENT	LOCATION	DATES	NO. OF TRAINEES BY TYPE (FARMERS, GOVERNMENT OR SERVICE PROVIDERS) (AND NO. OF WOMEN)	EVALUATION FEEDBACK
Awareness-raising activities were initiated through inception workshops (Cambodia and Lao PDR) and a stakeholder meeting in Viet Nam.	CLV	February 2012	Government and service providers (not disaggregated - approximately 50:50) 121 total • 60 government • 61 service providers • (39 women)	Report available
Support for attendance of the TFP-Biochar from CLV at the International Biochar Initiative (IBI) Congress	Beijing, China	Sept 2012	3 Government (0 women)	Report available
Regional Workshop & Study Tour on Efficient Utilization of Biomass for Biochar Production & Application Biochar. See Report on Proceedings.	Siem Reap, Cambodia	04-07 March 2013	Government and service providers (not disaggregated – approximately 50:50) 33 total • 16 government • 17 service providers • (6 women)	Report available
Study-tour and training on biochar	China	Oct 2013 (x days)	6 Government (0 women)	Report available
1st regional conference on Efficient Utilization of Biomass for Bioenergy & Food Security in the Greater Mekong Subregion. Copies of presentations are available at: *https://drive.google.com/folderview?id=0B1wKP1C0cX-jLWJTNU54SXFKbUk&usp=sharing*	Hanoi, Vietnam	16th-18th Dec 2013	Government and service providers (approximately 50:50) 122 total • 61 government • 61 service providers	Report available

			• (34 women)	
Training session on the application of the FAO's Bioenergy and Food Security (BEFS) Analytical Framework and Tool Box[3]. Held at the regional conference	Hanoi, Vietnam	18th Dec 2013	Government and service providers (approximately 50:50) 27 total • 13 government • 14 service providers • (5 women)	Not available
Training in Cambodia for participants from CLV on how to develop knowledge and consensus on procedures and ingredients for specifying 4-5 biofertilizer products in terms of their ingredient mixes and formulations to be used in the pilot farm demonstration programs.	Cambodia	March 2014 (4 days)	11 Government (2 women)	Cambodia and Laos pilots have applied biochar organic fertilizers (4 formulas) following the training
Training on Vegetable – Nutrient Planning and Management Using Biochar in Takeo	Takeo, Cambodia	23 – 26 June 2014	59 Farmers (53 women)	• SATISFIED: 39 participants • GOOD: 20 participants • UNSATISFIED: 0 participants
Training on Vegetable – Nutrient Planning and Management Using Biochar in Battambang	Battambang, Cambodia	2 – 5 July 2014	60 Farmers (including 54 women)	• SATISFIED: 39 participants • GOOD: 21 participants • UNSATISFIED: 0 participants
Field day in Battambang	Battambang, Cambodia	August 11, 2014	63 total • 58 farmers • 2 government staff	On Vegetable production

[3] *www.fao.org/bioenergy/foodsecurity/befs*

			• 3 service providers • (39 women)	
Field day in Takeo	Takeo, Cambodia	August 26, 2014	90 total • 84 farmers • 2 government staff • 4 service providers • (61 women)	On Vegetable production
Biochar training in Laos	Vientiane province	24-25 Nov. 2014	24 total • 5 farmers • 10 government • 9 service providers • (7 women)	• SATISIFED: 15 participants • GOOD: 9 • UNSATISIFED: 0
Biochar training in Cambodia	Takeo, Cambodia	November 27-29, 2014	32 total • 30 farmers • 1 government • 1 service providers • (12 women)	• SATISFIED: 30 participants • GOOD: 23 participants • UNSATISFIED: 0 participants
Field day in Battambang	Battambang, Cambodia	December 05, 2014	69 total • 57 farmers • 6 government • 6 service providers • (34 women)	
Biochar training in Vietnam	Hanoi	December 16-18, 2014	25 total • 17 government officers	• SATISFIED: 22 participants • GOOD: 3 participants

			• 8 from service providers • (8 women)	• UNSATISFIED: 0 participants
Field day in Takeo	Takeo, Cambodia	December 26, 2014	55 total • 50 farmers • 1 government staff • 4 service providers • (36 women)	
Total			800 trainees of which: • 209 government • 188 service providers • 403 farmers • 390 women (49%)	

Table 7: Pilot Project Training Events to date

PILOT PROJECT	TRAINING	DATES	NO. OF TRAINEES BY TYPE (FARMERS, GOVERNMENT OR SERVICE PROVIDERS) (AND NO. OF WOMEN)	EVALUATION FEEDBACK
Cambodia				
PP#1: Improved Cook Stove Up-scaling (Mekong TT)	ICS technical training for ICS enhancement(Coaching monthly quality control by GERES)	May – Sep 2014	18 ICS producers (Service providers) (9 women - wives)	
	ICS user training on different kinds of ICS and different biomass use (Contracted training by GERES)	04 15 August 2014	44 people (Women groups) (farmers) (all women)	
	Women Groups to open bank account (coaching)	Sep 2014	44 people (Women groups) (farmers) (all women)	
	Training on financial bookkeeping for women groups (coaching)	Sep 2014	44 people (Women groups) (farmers) (all women)	
PP#2: Farm Demonstration of Biofertilizers for Upscaling Investment (CelAgrid)	Orientation staff and training on farmer field school on methodologies and techniques, facilitation and communication skills, vegetable and rice production, fertilization and fertilizer rates and biochar	19 – 23 May 2014	12 Farmers (4 women)	
	15 Farmer field school on vegetable in 15 villages.	2nd week of June 2014	271 Farmers (214 women)	Pretest: 23-59% of participants had good scores, 26-47% passed the test and 15-30% failed the test Post-test: 100% of participants had good scores
	13 Farmer field school on rice	1st week of September	275 farmers (193 women)	Pre-test: 40-100% of participants got good scores, 4- 31% passed the test and 4- 40% failed the test

	Biochar Making and Application in Agricultural Crops (2days training at DAE where participants can visit the workshop where kilns are produced and 3days practice in Samroung village – production of biochar.)	7 – 11 September 2013	30 mainly government although some farmers (2 women) (GDA Officers, DAEng, NEDO, ADB project staff, Farmers)	
	Operation and maintenance of TLUD kilns for farmers' groups in Takeo province (3 days training of which participants had 1day visit to Samroung village that received 3kilns already and 2days theory plus practice	2nd week of June	30 Farmers (11 women)	
PP#3: Production and Testing of Biofertilizers (Mekong Carbon)	No training			
Vietnam				
PP#1: Improved Cook Stove Use (EPRO)	Training in marketing, communication skills and efficient biomass use for union reps, showrooms and stove producers	?	28 service providers (including 15 women)	
PP#2: Bioslurry Management (CARES)	2 Training courses on biogas technology and its benefits	March 2014	30 people/each (8 women) i.e. 60 farmers (16 women)	- SATISFIED: 48 participants - GOOD: 12 participants - UNSATISFIED: 0
	2 Training courses O&M biogas digester	June 2014	30 people/each (8 women) i.e. 60 farmers (16 women)	- SATISFIED: 50 participants - GOOD: 10 participants - UNSATISFIED: 0
	2 Training courses on Bioslurry utilization	August and September 2014	30 people/each (7 women) i.e. 60 farmers (14 women)	- SATISFIED: 46 participants - GOOD: 14 participants - UNSATISFIED: 0

	2 Training courses on composting and business skills	July and August 2014	31 people/each (7 women) i.e. 62 farmers (14 women)	- SATISFIED: 54 participants - GOOD: 8 participants - UNSATISFIED: 0
PP#3: Biochar based soil amendments (COTDEP)	4 TOT on kiln design (DK-TR1) and operation to produce biochar	May and June 2014	200 Farmers (50 person/each and totally 107 women)	- SATISFIED: 148 participants - GOOD: 52 participants - UNSATISFIED: 0
	4 Training courses on operation of biochar kiln and application in An Giang	July 2014	37 Farmers (5 women) 34 Farmers (2 women) 47 Farmers (5 women) 40 Farmers (4 women)	- SATISFIED: 102 participants - GOOD: 56 participants - UNSATISFIED: 0
	4 Training courses on operation of biochar kiln and application in Hanoi	August 2014	200 Farmers (50 person/each and totally 107 women)	- SATISFIED: 130 participants - GOOD: 70 participants - UNSATISFIED: 0
Lao PDR				
PP#1: Biomass Utilization Cluster Pilot Upscaling				
Output#1 ICS program: scaling up ICS use in project clusters				
A#1.1 Scaling up ICS use and Education Campaign	Hands-on/OJT ICS production focus on Super Stoves and Work Bank Stoves Hands-on/OJT rice husks stove production and small wood residue	July	1 local producer and 4 labors, 0 women (Service providers) 1 local producer and 6 labors (Service providers)	Difficult to produce with high standards Price still high

	Hands-on/OJT biomass stove production		1 local producer and 3 labor (Service providers)	Price still high
A#1. 2 ICS use and education program	ICS demonstration and efficient use of biomass for bioenergy	July	18 people including 8 women (Service providers)	Agreed on 4 types of ICSs
A#1.3 ICS Business planning	ICS Sale projection and Incentive –Based Systems	July	7 women (LWU) (Service providers)	Business plan
A#1.4 ICS Inventory	ICS Shop design and Promotion Campaign	July	7 women (LWU, service providers) and 3 ARMI/NCG staff	Good fashion Good start
A#1.5 Practical knowledge transfer	ICS practical training and marketing /after sale services	Aug	49 people, including 46 women (cost sharing workshop) (LWU) (service providers)	Sale techniques applied
A#1.6 ICS sale recording	Monitoring and ICS users survey	Aug	7 women (LWU) (service providers)	Sale recording and monitoring
A#1.7 Biomass stoves (metal)	Rice husks stoves and other biomass stoves promotion	Aug	1 local producer / inventor and 6 labors, 0 women (service providers)	Good quality Price still high
Output#2: Biomass for bio- fertilizers and soil amendments				
A#2.1 Biochar and Biochar Organic Fertilizers	How to make biochar and effective use for soil improvement Organic farming by using biomass for BOF	Aug	19 people, including 3 women (farmers)	Learning by doing and applied
A#2.2 Biomass feedstock and soil conditions	Biomass feedstock and soil samples collection and analysis - Healthy Soil Requirements	July	35 Veggies growers (farmers) (28 women) 7 rice farmers (4 women)	Test results have been used
A#2.3 Cross-study tour	GAP practices and Organic Vegetables and Market Places	Aug	20 veggies and rice farmers, including 12 women	Lessons learnt and applied
A2.4. BOF – Volunteer Soil Doctor	BOF/BCF and Use Theory on good soil and Biomass/BOF for	Aug	22 farmers, including 10 women (plus two women trainers)	Learning by doing at farm levels

	healthy soil			
A2.5 Biochar Organic Fertilizers	How to produce BOFs and Processing and Application	Aug	31 farmers, including 16 women	Want to apply
A#2.5 MEKSAVAN Enterprise	On the job-training /learning by doing: BOF Formulation 1	Aug	22 farmers (compost makers), including 15 women	Want to apply
A#2.6 KONGKHAM Enterprise	On the job-training/learning by doing – kilns and machines tested to produce BOF Formulations 2	Aug	14 farmers, including 7 women	Eager to use BOF
A#2.7 Compost at fields	How to make compost in the fields / practices at KM 52	Aug	18 people (farmers), including 12 women	6 families applied
A#2.8 Biogas composite digesters	Installation, Use, Operation and Maintenance	Aug	12 families 72 persons (farmers) (34 women)	Good performance
A#2.9 Veggies demo	28 green houses installation	Aug	28 women and family members (farmers)	Good performance
A#2.10 Rice fields demo	7 plots preparedness	Aug	7 women and family members (farmers)	Good performance
A#2.11 Application and follow up	Routine and periodical learning by practicing / hands-on advice	Started from July onwards	Demo. plots (44 locations) owners and their family members, more are women (say 80% i.e. 35) (farmers))	Case-on-case basis applied
A#2.12 TVD series review meeting	Disseminate and review TVD synopses Parts A, B, C and D at central level	3 July	14 government officials (4 women)	Consensus on proceedings
A#2.13 Hands-on Biogas Composite Digesters	OJT learning by doing with farmers participation and contribution – BCD O&M	26-28 July	24 farmers (6 women)	Active participants Want to use biogas
A#2 14 TVD series review meeting	Disseminate and review contents of TVD series production at pilot clusters	22 Aug.	29 mainly farmers (14 women)	Understandings and consensus to proceed
A2# 15 OJT Pest-Control Techniques	Organic / Botanical Pest-Control Approaches and Methodologies	4-7 Sept.	18 families in 3 villages of pilot cluster (mainly farmers)s (18 women)	Learning by doing applied

A#2 16 Mid-Term Performance Review	Lao Pilot Interim Performance Review Meeting	16 Sept.	33 persons (mixture – say 11 gov, 11 service providers and 11 farmers) (14 women)	Satisfaction
A2#17ICS Education/ demonstration program	Sale promotion and demonstration of ICS, with Organic Vegetables Produce and Sale, BOF use and replication / introduction	Sept.	At clusters level: 21 persons (estimate at 7 government, 7 service providers and 7 farmers) (20 women) At district level on spec. events: 250 farmers(165 women)	Good satisfaction
A2#18 OJT Soil Test	OJT on soil test (NPK and PH) after first cycle of veg. production	Sept.	At farm levels (6 farmers (3 women) (and two local staff)	Being applied at other farms
A#2.19 2nd cycle organic veg. Production	OJT 2nd cycle cropping of veggies production with more than 5 varieties	Oct	At farm level: 60 farmers (27 women) 60 families of beneficiaries	Replication of BOF Rotation Derversification Satisfaction Want to continue
A#2.20 Sale promotion and exhibition	Sale promotion campaign and exhibition of Non-Chemical Vegetables, Biochar and Biofertilizer Utilization	Oct	At market place KM 52, Cultural Festival 450 participants (250 women) LWU, Users, Consumers, Service Providers (approximate at 50% farmers (225) and 50% service providers (225))	Good products Need more awareness raising program on Organic Farming
A#2.21 Spec. Review Workshop	Laos Organic Rice Standard - Tech. Review	Nov.	At central level: 30 persons (9 women) Tech. staff, services providers, traders (approximate at 50% government (15) and 50% service providers (15))	Satisfaction Refined first draft in Lao and English
A#2.22 Biochar Training Course	Biochar and Bio-Fertilizers Production and Application	Nov	At Pilot Clusters Level: 24 persons (7 women). Famers	Satisfaction Application Adjustment needed
A#2.23 Demonstration of	Original pellet machine trial /use and	Nov.	At Meksavan BOFE: 24 participants (7 women)	Satisfaction Operational Manual

Pellet machine use and maintenance	maintenance training		Producers, Farmers, End-Users. Assume 50% farmers (12) and 50% service providers (12)	
A#2.24 OJT compost making	Review compost making and adjustment	Nov.	At 6 villages: 60 farmers (20 women) 60 families members	Adjust ingredients/composition Adjust application ratio Want to produce more BOF
A#2.25 OJT veg. plantation techniques	OJT land preparing , BOF application Ratio adjustment, transplanting techniques with rotation / diversification	Nov.	At LPP plot areas: 170 participants (60 women) LWU, Farmers, Tech. Staff (assume 70% farmers (119) and 30% service providers (51))	Satisfaction Need more varieties Knowledge refreshed Want to sell veg. At good price / organic market
A#2.26 OJT veg. Harvest techniques	Routine and periodical learning by practicing / hands-on advice	Nov.	At LPP plot areas: 144 participants (54 women) LWU, Farmers, Traders, Consumers, Tech. Staff. Assume 70% farmers (101) and 30% service providers (43)	Follow up needed Data recorded Pack/transport for market
A#2.27 OJT veg. Germinating techniques	OJT vegetable effectively germinating round 3 (third cycle with more than 5 varieties by the project support and 5 varieties by farmers needs)	Nov.	At LPP plot areas: 57 participants (20 women) Farmers families, tech.staff	Reliable method of germination New varieties needed Market demand
A#2.28 OJT organic rice harvest techniques	OJT harvest techniques, record, keep, storage	Nov.	AT LPP plot areas: 26 participants (10 women) LWU, Farmers families, tech.staff . Assume 50% farmers (13) and 50% service providers (13)	Rice production evaluation
A#2.29 OJT New pellet machines use and maintenance	2 BOF Enterprises and workers/labour learning by doing	Nov.	At Meksavan and Konglham Enterprises: 11 participants (2 women). Service providers	Moisture contents to be kept at appropriate percentage Want to produce BOF in pellet forms
A#2.30 Routine practices on vegetable plantation	Hands-on practices of vegetable plantation round 3 / rotation / diversification techniques	Dec.	At LPP areas: 180 participants (80 women) LWU, Farmers families, tech. staff, surrounding villagers	Organic methods of pest control More varieties needed Satisfaction

round 3				Optimistic Adjust BOF application ratio
A#2.31 Routine practices of BOF production	Hands-on practices of BOF production and processing (crushing ,filtering, mixing , turning over ,pellet making)	Dec.	At 2 BOF Enterprises: 60 participants (10 women) Farmers, Tech. Staff, Workers. Assume 50% farmers (30) and 50% service providers (30)	Quality of BOF Standardization
A#2.32 Routine practices of round 4 vegetable production	Refresh-Hands- on practices learning by doing (germinate , BOF applying, transplanting) – new varieties/diversification	Jan. 2015	At LPP areas: 126 participants (45 women) Farmers, LWU, Tech. Staff, Surrounding villagers. Assume 50% farmers (63) and 50% service providers (63)	Satisfaction Expansion of land areas Adjust BOF application ratio More benefit
A#2.33 BOF improving meeting	Tech. Review Meeting on BOF standards, lab. Tests requirement - evaluation	Jan. 2015	At DALAM and Central Lab. Of NAFRI: 12 participants (3 women) Government staff	Better understanding Lessons learnt for improvement Heavy metal tests requirement
A#2.34 BOF meeting on feedbacks from tech. Review	Feedbacks meeting for farmers and BOF Entrepreneurs – quality control – standards F1 and F2 for production and processing	Jan. 2015	At LPP areas: 34 participants (10 women) LWU, Producers, Farmers, Emd-Users, Tech. Staff (Assume 50% farmers (32) and 50% service providers (32))	Standards F1 and F2 Quality Control Pelletizing Lab. Tests for heavy metal
A#2.35 Cross study	Farmers to Farmers Visit and experience sharing	Jan. 2015	At LPP areas: 33 persons (10 women) LWU, Veg. growers, tech. staff.	Good lessons learnt from each other Market potential Price Quality products
Total			3912 trainees of which: • 89 government staff • 670 service providers • 3153 farmers	

			• 1997 women (51%)	

Thus in total there has been 4712 trainees approximately 298 of which have been government staff, 858 service providers, and 3556 farmers. 2387 have been women (51%).

3.4. Output 4: Knowledge Products Developed and Disseminated

3.4.1. Project Progress

Knowledge products are being prepared which will eventually feed into a compendium to be developed at the end of the project. So far the following have been disseminated (according to the following general headings):

The Context

- Agriculture, Food Security and CC in GMS
- Agricultural Biomass Resource Assessment in CAM, LAO and VIE

Biochar

- Soils and Biomass Amendments
- Biochar
- Biochar testing and analysis report (including risk analysis)
- Relevant Pilot Feasibility Study Reports

Biogas and bioslurry

- Relevant Pilot Feasibility Study Reports

ICS

- Relevant Pilot Feasibility Study Reports

The Regulatory and Enabling Framework

- An overview of international standards and certification systems on bioenergy and climate-friendly agriculture (see output 1)

Scaling-Up

- Business Models for the Scaling-Up of CFA VCs in GMS

These can be accessed, together with other project reports and the biobriefs at: https://drive.google.com/folderview?id=0B1wKP1C0cX-jdUhvMDNvcmEyZHc&usp=sharing

Field work has been undertaken in CLV for the preparation of a lifecycle analysis and least cost assessment report.

3.4.2. Planned Activities

Finalise and submit the following KPs:

- Biogas / Bioslurry
- ICS
- Review of relevant national laws, regulations, policies and plans (see output 1)
- Report on impact of CC on biomass resource availability in GMS
- Pilot Final Reports plus Exec Summary of Pilot Final Reports
- Common sets of Sustainability Indicators
- CFA value chains
- Lifecycle analysis and least cost assessment report
- Final Report

We propose that the above KPs are included (together with the bio-briefs) as an electronic compendium on the WGA site (and packaged in CDs for distribution with some hard copies for the IAs). Introductory text will provide an intro to each section / report.

4. Project Management

4.1. Summary of Consultant TA Team

Only those experts (the core team) with inputs remaining, and who will continue to work on the project, are included below.

Table 8: International staff engaged on TA7833 (contract variation#4)

NAME	SPECIALIST POSITION	TOTAL INPUTS (MONTHS)	INPUTS UTILIZED (MONTHS)	INPUTS REMAINING (MONTHS)
INTERNATIONAL				
Lindsay SAUNDERS*	Team Leader	13.52	9.30	4.22
Greg MUNFORD	Capacity Building & Distance Learning Specialist	5.45	3.58	1.87
Simon SHACKLEY	Biomass / Biochar Technology Specialist	5.03	4.05	0.98
Abbie CLARE	Biomass / Biochar Technology Specialist	2.75	0	2.75
Stephen JOSEPH	Biofertiliser Specialist	2.7	1.82	0.88
NATIONAL				
Li Thi THOA	Vietnam National Project Implementation Specialist (NPI)	22.995	20.29	2.71
Bounthavy CHALEUNPHONH	Laos National Project Implementation Specialist (NPI)	22.0	17.0	5.0
Mao Moni RATANA	Cambodia National Project Implementation Specialist (NPI)	22.91	17.91	5.0

**Note that the above inputs utilised and remaining are as of end November 2014 except for Mr Saunders (till end December 2014)*

4.2. Project Reimbursable Expenditure

Table 9: Summary of TA7833-REG Project Reimbursable Expenditure (US$)

CATEGORY	Budget (VO#4)	DISBURSED	BALANCE
1200 Equipment	32,391	27,391	5,000

1300 Seminars, Workshops & Training	428,451	206,137	222,314
1400 Studies, Surveys & Reports	925,000	673,719	251,281
TOTAL	**1,385,842**	**907,247**	**478,595**

Note the above table shows expenditure to date, not amounts invoiced to or paid by ADB.

5. Implementation Issues, Lessons Learnt and Recommendations

The major lessons learned during the implementation of the TA are presented in the following table.

Table 10: Issues Encountered, Recommendations and Remedial Actions

ISSUES ENCOUNTERED	RECOMMENDATIONS & REMEDIAL ACTIONS
Regional cooperation Lack of operational procedures for ADB implementation and procurement in Regional Technical Assistance Projects	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. SOPs have been under preparation by the ADB TA7833 Regional Cooperation Specialist, but despite repeated requests the TA team has not yet received these. 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
Implementing Agency engagement 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.	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.
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.	Enhancing opportunities for communication and collaboration are considered prime approaches for enhancing engagement.
TA Team leadership 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.	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.
Intermittent inputs do not work effectively	The TA team was resourced with a large number of

	experts in each country but most of these were part time. Part time work may appear to be attractive but for most nationals it is in fact extremely difficult to organize and then manage time inputs to enable a genuine team participation and approach. The team has operated far more smoothly since the reduction in the number of experts and the increased duration of inputs. A key lesson for future TAs is the need for a national coordinator to be full time to ensure that programs and processes are being sustained.
Immature technologies The ToR specify up-scaling of a wide range of technologies, however many of these are not sufficiently mature for up-scaling.	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. Biochar and bioslurry technologies are also assessed to be too immature and as such the targets for their adoption in the DMF are considered too optimistic. 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. 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.
Technology adoption indicators are not realistic For example, the DMF indicates the following: Construction of at least 500 bio-digesters, 600 biochar kilns, and 75,000 improved cookstoves	A program target to upscale 75,000 cook stoves in the three countries far exceeds both the resources available and the likely uptake rate – further it would exceed the ICS stove producer capacity 500 biodigesters is optimistic given that the ADB has existing lending products in place for biodigesters in Viet Nam and the assessment of biodigesters in Cambodia and Laos is negative 600 biochar kilns is simply unsupportable – there is no local production of kilns that has a commercial basis. Kiln technology and feed stocks are not well known and the benefits of biochar may not warrant the investment of resources. Further, the international experience with biochar is to move away from high volume soil amendments to incorporation of biochar into nutrient products where the biochar changes the characteristics of the biochar through reduced volatilization and

	provides potential water and nutrient release benefits lowering overall demand for nutrients.
Scale of technology	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. 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. 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. The focus should maybe move away from technology of production to how to build supply chains – a key finding from the assessment of climate friendly value chains in GMS
Donor crowding within the ICS sector	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. 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.
Innovative financing mechanisms 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 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	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 projects and their implementation. Private-sector stakeholders and financing institutions will continue to be targeted for relevant awareness-raising and capacity building activities so as to raise the profile and confidence levels of potential future investors re. TA7833-relevant themes.

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.	One option of output based funding is for new product formulation for biochar supply chain development. An important question to be asked is can an ADB TA operating for 2-3 years be expected to pilot innovative financing arrangements that require new or reformed institutions to operate them, and can a TA flow funds into such institutions in a cost effective and transparent manner
Focus on standards and certification	The TA team has adapted its approach and has focused on areas where the government has requested assistance i.e. demand-led. This has led to improved engagement, ownership and results, particularly in Laos and Cambodia. In Vietnam the scope of work could not be agreed due to concerns that the request for project assistance (for an SRI standard) may be outside the scope of the project given the complexities.
ADB procurement	A critical, if not unique, experience of the TA7833 is the ability to use ADB procurement modalities in a manner that enables implementation of a pilot program. Many contracts for services are small, target local service providers and are as such unattractive to these firms due to the cost of competing compared to the potential benefits. The TA ToR indicated the use of innovative PPP modalities. Achieving these through a TA financing modality is remarkably difficult, time consuming and uncertain. Differing interpretation of rules and processes has resulted in repeat actions and time delays.

Appendix 1: Design and Monitoring Framework

Design Summary	Performance Targets & Indicators with Baselines	Data Sources & Reporting Mechanisms	Assumptions and Risks
Impact Improved use of biomass in Cambodia, the Lao PDR, and Viet Nam	By 2020: 5% increase in production of clean bioenergy from biomass (2011 baseline: 0.1%) 5% increase in use of by-products of bioenergy systems (bio-slurry and	Project baseline and benchmark surveys Periodic surveys and annual reports of agriculture and energy ministries of Cambodia, the Lao PDR, and Viet	**Assumptions** The governments of Cambodia, the Lao PDR, and Viet Nam remain committed to regional cooperation in clean bioenergy and food security. **Risk**
Outcome Efficiently operating pilot projects in biomass use	By 2014: 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	Project completion report Annual reports from agriculture ministries of Cambodia, the Lao PDR, and Viet Nam	**Assumptions** The central and provincial governments remain committed to working with the poor in remote areas. **Risk** Pilot projects are not successfully implemented.

[4] a Ministry of Agriculture, Forestry and Fisheries (Cambodia); Ministry of Agriculture and Forestry (Lao PDR); and Ministry of Agriculture and Rural Development (Viet Nam)

Outputs	By 2014:		**Assumptions**
1. Enhanced regional cooperation in bioenergy development to foster and safeguard food security	Mechanism tested for harmonizing at least three bioenergy standards5 and certification systems, and a common method of assessing greenhouse gases	Consultants' reports and document records of agriculture ministries of Cambodia, the Lao PDR, and Viet Nam Agricultural household survey reports of Cambodia, the Lao PDR, and Viet Nam Benefit and impact monitoring reports Project review missions	The consulting team is given timely access to records, information, personnel, and relevant geographic sites. Local officials, technicians, and lead farmers are available to participate in training Development partners and the private sector are keen to participate in the TA activities. **Risks** Cambodia, the Lao PDR, and Viet Nam cannot agree on harmonized standards and certification systems
2. Pilot-tested climate-friendly biomass investment projects for wider implementation	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		
3. Enhanced capacity for efficient use of biomass	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)		
4. Development and dissemination of knowledge products	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		

[5] 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 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	Total cost: $4.6 million equivalent

Appendix 2: Progress against the TOR

TOR STATEMENT	ADDRESSED BY THE TA?
Background	
The subject regional capacity development technical assistance (R-CDTA) aims to improve utilization of biomass in Cambodia, Laos PDR and Viet Nam (CLV). This will be achieved through:	
(i) harmonization of sustainable standards, certification systems, and other mechanisms to enhance regional cooperation on bioenergy development with food security ensured;	**Partially.** Standards are being developed but at a national level, although these are shared so that some harmonisation is achieved. Regional dialogue has helped to further potential harmonization in the future.
(ii) implementation of pilot projects to demonstrate mechanisms for scaling up biomass investment projects for bioenergy or food security;	**Yes.** 7 pilot projects are on-going, demonstrating a variety of mechanisms for scaling up
(iii) capacity-building support for project stakeholders; and	**Yes.** A variety of capacity-building events have been undertaken.
(iv) knowledge products and awareness campaign.	**Yes.** Knowledge products and biobriefs have been prepared, and videos and a compendium are being planned.
The mechanisms for scaling up demonstrated under the R-CDTA are expected to lead to ensuing ADB investment projects in Cambodia, Laos, and Viet Nam.	**Yes.** The final report will provide ADB with recommendations for investment projects which can then be subject to PPTAs
ADB will engage an international consulting firm …. to:	
(i) strengthen institutional linkages and mechanisms for regional cooperation on bioenergy and food security;	**Partially.** Forums have been organized to promote regional co-operation. Government stakeholders have preferred to concentrate at the national level however.
(ii) provide technical support for designing and implementing pilot studies, undertaking studies and building capacity; and	**Yes.** Feasibility studies for pilots were undertaken to aid design. Support is now being provided in implementation.
(iii) monitor and report on the R-CDTA activities and outputs.	**Yes.** Quarterly reporting, plus specific progress reports on pilot activities.

Expected Outputs and Activities (to be undertaken by the R-CDTA firm)	
i. **Inception phase:** a. Map existing implementation structures for efficient utilization of biomass for bioenergy and food security. Where none exist, map potential partners/NGOs/centers of excellence and provide recommendations on organizations with the requisite expertise to carry out specific work packages under the TA. Provide recommendations on the advantages and disadvantages of both existing and new implementations structures, outlining challenges, capacity issues, etc. and how can they be addressed or mitigated.	**Yes.** See inception report.
ii. **Component 1: Enhanced regional cooperation on bioenergy development that safeguards and fosters food security.** Activities to be conducted include but are not limited to:	
a. Organize and convene annual regional forums to facilitate regional high-level policy dialogue on bioenergy and food-security issues with the objective of enhancing regional approach to development through activities such as harmonizing regulatory frameworks and developing common standards, certification systems, methodologies, monitoring and evaluation systems, etc.	**Yes.** Forums have been organized to promote regional co-operation. Government stakeholders have preferred to concentrate at the national level however.
b. Review and evaluate existing laws, regulations, indicators, standards, certification and accreditation systems, IT traceability and eco-labeling systems with the purpose of developing and testing appropriate mechanisms to facilitate adoption of common sets of sustainable indicators, bioenergy and trade standards, certification systems and eco-labeling systems among GMS countries, in particularly CLV countries by 2012. Constraints and interventions required for collection of critical mass of eco-products for export from the region.	**Partially.** Regulatory framework has been reviewed. Policy working groups set-up to determine priorities for action in each country. Based on this 3 standards (2 in Cambodia and 1 in Laos) have been developed, and a roadmap is being created for ensuring their take-up (i.e. systems for certification, labelling, traceability and inspection). Report on common sets of sustainable indicators to be produced.
c. Organize and convene annual international workshops on household bioenergy and food security to foster exchange of information, particularly from advanced GMS countries to CLV. The first forum will be conducted in 2011 to gather knowledge and assemble best practices related to standards, technologies, and business models, which will inform the design and implementation of pilot projects and knowledge products under the R-CDTA. Subsequent forums will disseminate findings from R-CDTA experience, research and analysis and strengthen the network of practitioners developed under the R-CDTA.	**Yes.** Forums organized in China, Vietnam, and in 2015 in Laos. Separate national forums in CLV also organised.
iii. **Component 2: Pilot testing of scaling up climate-friendly biomass investment projects.** The consulting firm will oversee the design and implementation of at least 10 pilot	**Yes**. Although at least 10 investment modalities will still be assessed, the type of investment modality differs slightly in

gender-responsive investment models in CLV countries. Pilot projects will test investment modalities for scaling up successful small-scale project and should include private sector participation. For mature technologies with ongoing government programs, the firm will build upon existing implementation structures which may involve subcontracting of NGOs to dry run the activities as an ADB investment project. For technologies that require further study, Centers of Excellence may be engaged to conduct research and evaluate technologies and identify institutional arrangement under the government system to scale-up as pilot investment project. The firm will represent ADB in calling for proposals on studies and pilot programs, develop criteria for selection of new technologies and organize stakeholder consultation to prioritize and agree on the priorities and appropriate parties to be subcontracted. Where activities are sub-contracted, the firm will manage this process and oversee the deliverables of subcontracted entities in accordance with ADB Guidelines on the Use of Consultants. The firm will build upon the works of the GBEP in the monitoring and evaluation, including utilizing indicators developed by GBEP and other regional institutions. At the minimal, the following pilot projects and related activities will be pursued:	terms of numbers per country and technology. This is because they have been prepared in a participatory manner and based on feasibility and need in each country, following discussions, and feasibility studies (plus a rapid appraisal) in each country. • Cambodia: - PP#1: Improved Cook Stove Up-scaling - PP#2: Farm Demonstration of Biofertilizers for Upscaling Investment - PP#3: Production and Testing of Biofertilizers • Vietnam: - PP#1: Improved Cook Stove Use - PP#2: Bioslurry Management - PP#3: Demonstration of Biofertiliser and Biochar Soil Amendments • Laos: - #PP1: Cluster Biomass Technology and Biofertilisers For monitoring and evaluation GBEP indicators have not been used as these have not been relevant.
a. Household biogas with bioslurry extension. All CLV countries have existing national programs to promote domestic biogas, but biogas installations remain costly and continue to rely on substantial subsidies. R-CDTA consultants will identify less costly biogas technologies and will support development of standards on domestic biogas. An implementation model will be developed to pilot test at least 500 low cost biogas plants in each country, with linkages to micro-finance or local financial institutions and carbon revenue. Pilot activities will also support extension programs in each country to test an appropriate investment modality for using bioslurry from biogas digesters in lieu of chemical fertilizers to produce higher value organic and bio-intensive agriculture products. It is envisioned that SNV Netherlands Development Organization, which presently provides technical assistance to the ongoing national biogas programs in Cambodia and Lao PDR, would be subcontracted to implement the biogas with bioslurry extension projects.	**Yes**, although not in Cambodia, and the mechanisms used are different to that stated in the TOR. E.g. SNV has not been subcontracted. In terms of the target indicator, while climate-friendly biomass investment projects will be pilot-tested for wider implementation, the target will not be achieved as stated. This is because the project is testing business models for future scale-up, not to construct a specific number of bio-digesters, biochar kilns, or improved cookstoves, or to test these particular technologies. Thus the indicator of 500 biodigesters is not realistic, or in line with what the project is trying to achieve. In addition, the target of 500 biodigesters is optimistic in any case given that the ADB has existing lending products in place for biodigesters in Viet Nam and the assessment of biodigesters in Cambodia and Laos

	is negative.
b. Biochar. Existing methods for producing and utilizing biochar at the household level, such as biochar kilns and improved biochar cookstoves, will be reviewed, appropriate technologies identified for larger scale dissemination in CLV, and investment models, which include private sector service providers for kiln and stove production, pilot tested in each country. Since biochar as a soil amendment can also displace fertilizer to produce high-value organic crops, biochar pilot activities should also link to inclusive supply chains for higher value organic crops (see below). In addition, carbon sequestration impacts of biochar will be evaluated and possibility of carbon financing will be explored.	**Yes**. Biochar pilots are being implemented in each country. The carbon sequestration impacts of biochar have been noted in a knowledge product, while life cycle analysis will determine the carbon emissions of different technology pathways. Possibilities for carbon finance are being explored by an individual carbon finance consultant hired directly by ADB. On carbon financing – see below.
c. Improved cookstoves (ICS). Various ICS models will be reviewed to identify models appropriate for large-scale dissemination in CLV countries. If pre-feasibility analysis suggests a need for public financing for ICS dissemination in Lao PDR and Cambodia, pilot projects will be developed to test a model for national ICS programs involving the public and private sectors and to prepare for larger scale investment. Output-based contract to private sector will be explored. Through pilot projects, link with ongoing regional programs to support ICS dissemination, such as sending project developers to attend the GERES Stove Academy in Cambodia. Evaluation will be also conducted on best strategy to establish stove testing facility at regional, national or local level. If regional level will be best option, the possibility of establishing a regional stove testing facility at the Asian Institute of Technology or another appropriate regional institution will be established.	**Yes**. ICS pilots are being implemented in each country. The Global ICS Initiative including SNV and SNV in Laos and Cambodia has concluded that a stove testing facility would not be viable for a financial viewpoint so this activity will not be pursued.
d. Biofuels. Based on a review of best practices for intercropping jatropha on marginal lands in integrated farming systems, develop pilot project for smallholder farmers to test use of jatropha seed for local consumption as biodiesel and oil cake residue as organic fertilizer. Support certifying farmers using the Roundtable for Sustainable Biofuel standard and link to activities to strengthen inclusive supply chains (below).	**No**. 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.
e. Inclusive supply chains. Conduct a value chain analysis to identify appropriate interventions along the supply chain from farmer to consumer to support development of more inclusive supply chains for high value organic products and sustainably grown biofuels in CLV linked to cross-border trade. Integrate inclusive supply chains into pilot projects for biogas with bioslurry extension, biochar, and biofuels and link to activities related to harmonization of standards under Output 1. It is envisaged that the TA activities will build upon works done by certification related agencies (e.g. CEDAC in Cambodia, Profile in Lao PDR, ADDA in Viet Nam) or other social enterprises.	**Yes**. 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. 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. Preparation of standards under Output 1 is linked to the ork

	undertaken in Output 2.
f. Carbon financing. Biogas, biochar, ICS, and sustainably grown biofuels can be eligible for carbon financing if the applications displace or sequester greenhouse gas emissions. Carbon revenue can be used to bring down the cost of the technology, improve quality, displace donor-funded subsidies, or contribute to long-term sustainability of large-scale dissemination programs. For all projects, the costs and benefits of obtaining carbon financing should be assessed, and, where appropriate, carbon finance should be pursued.	**No**. Carbon financing options will not be explored due to the time needed. The TA is limiting its financing modalities to a focus on the use of output-based financing to offset the business and market risk of initiatives. An ADB individual consultant is investigating carbon finance options however, and will use data from the project in his work, including discussions with team members.
iv. **Component 3: Capacity for efficient utilization of biomass enhanced.** The consulting firm, on its own or through entities sub-contracted and managed by the firm, will assess the needs of and provide gender-sensitive capacity building support to participating central and local governments, service providers, communities and women's groups, to strengthen institutional and technical manpower to scale up biomass investment and to ensure sustainable uptake by rural communities following the withdrawal of external support. Specific activities include but are not limited to:	
a. Through a participatory process including women, assess target groups' needs and design and implement gender-sensitive training programs, including distant learning modalities, to train at least 500 government officials at central and local levels, 400 service providers, and 3000 farmers on various applications for efficient use of biomass. Training may be conducted as part of the pilots implemented through the TA (as described above). At least 30% of individuals trained should be women.	**Yes**, although distance learning activities have been put on hold, except for the production of DVDs through a filming programme. Training has been conducted as part of the pilots, through in-country training events, and through overseas study-tours. Specific training events have specifically targeted women.
b. Assess the needs of various stakeholders involved in the implementation of pilot projects and provide necessary support to build capacity for implementing ensuing investment projects.	**Yes**. On-going training has been provided to pilot project stakeholders. Training will be provided on investment implementation modalities at the end of the project.
v. **Component 4: Knowledge products developed and disseminated.** The consulting firm will undertake a variety of activities to develop a body of knowledge on the efficient utilization of biomass for bioenergy and food security and disseminate findings. Linkages with regional centers of excellence will be created to promote knowledge transfer and cooperation between more advanced GMS countries and CLV. Distant learning materials such as self-learning CD or DVD will be developed and disseminated for each target group of stakeholders and distant learning modalities will be implemented to provide mentoring where feasible. Specific activities include but are not limited to:	
a. Develop a common methodology for assessing the supply and prioritizing the use of	**Yes.** A biomass resource availability report has been prepared.

biomass for energy and food security, building upon the work done by international agencies such as the Global Bioenergy Partnership (GBEP).	Field work for life cycle analysis and least cost assessment, which will be used as a way to help prioritise the use of biomass, is being undertaken.
b. Establish a monitoring and evaluation framework for pilot projects implemented under the TA, including baseline and follow up surveys, including post training evaluation assessment.	**Yes**. M&E system in place for each pilot.
c. Compile research and prepare knowledge products on various topics including life-cycle assessments and least cost options for various biomass technologies, and eco-labeling.	**Yes**. Various KPs produced.
d. Conduct awareness campaigns for pilot activities targeting key stakeholders, including women's groups, service providers, and end users.	**Yes**. Through training events and dissemination of 'bio-briefs'
e. Gather and publish a compendium of good practices on biomass utilization, highlighting elements necessary for effective gender mainstreaming, and publish booklets evaluating different models of ICS, biochar kilns, and biodigesters.	**Yes**. To be produced in 2015. Decision pending as whether to produce as an on-line database of resources.
f. Conduct analysis of potential climate change scenarios and their likely impacts on the availability of different types of biomass and assess if development of alternative biomass sources will be required.	**Yes**. A report is being prepared which estimates how climate change scenarios (based on UNFCC forecasts) will impact on the biomass availability (e.g. in the rice sector) as identified in the 'Agricultural Biomass Availability in the GMS' report
g. Develop distant learning materials for capacity building and awareness campaign of different targeted stakeholders, including translating materials into local language where appropriate. Engage farmers in training material development for extension, including DVD making by farmers.	**Partially**. Biobriefs and KPs translated and disseminated. Videos/DVDs being produced for farmers in the local language.

Appendix 3: Work Plan (January – June 2015)

		Tasks and Activities	2015 Jan	Feb	Mar	Apr	May	June
Output 1: Enhanced regional cooperation in bioenergy development to foster and safeguard food security								
1.1 Identify & recommend policy, standards and indicators for bioenergy technologies & climate-friendly agriculture								
	i	***Development of national standards***						
		Cambodia						
		Organic Rice Standard						
		Preparation of draft organic rice standard (through policy working groups)	Done					
		Final draft sent to General Department of Agric for technical review	Done					
		Make changes based on GDA comments (give deadline to GDA for comments)	Done					
		Draft roadmap for implementation of ORS						
		Translate into Khmer language then send to GDA to send to MAFF Technical Review Committee to finalise						
		GDA-MAFF organise a workshop to discuss final version	Under government control					
		GDA-MAFF send to Cambodia Institute of Standards for adoption	Under government control					
		Biodigester Standard						
		Preparation of draft biodigester standard (through policy working groups)	Done					
		1st workshop to discuss draft	Done					
		Update draft	Done					
		2nd workshop to discuss updated draft (on 16 Dec 14 in Kep province)	Done					
		Draft roadmap for implementation of ORS						
		Translate into Khmer language and send to Dept of Animal Health and Production for technical review						
		Additional steps to adopt the standard	Under government control					
		Laos						
		Organic Rice Standard						
		Preparation of draft organic rice standard (through policy working groups)	Done					
		Technical Committee meeting on 1st draft (18th Nov 14)	Done					
		Update draft	Done					
		Public hearing workshop (9th Dec 2014)	Done					
		Update followiong workshop	Done					
		Distribute to Technical Committee members	Done					
		Technical Committee meeting on draft final (9th Jan 15)						
		Update based on comments						
		Draft roadmap for implementation of ORS						
		Submit final version via Technical Committee to MAF Magt Board for approval						
		Biofertiliser Standard						
		Discussion on a biofertiliser standard (through policy working groups)	Done					
		Report on constraints to a biofertiliser standard and next steps (from the forum below)						
	ii	***Facilitation of regional dialogue on policy and standards for climate-friendly agriculture, bioenergy & food security***						
		GMS Forum on Policy, Standards & Indicators for Bioenergy, Food Security & Climate-Friendly Agriculture	Done					
		GMS Forum on developing national roadmaps for standards implementation and regional dialogue (5th-6th Feb)						
1.2 Inform & enhance biomass, bioenergy & food security policy dialogues relating to standards operationalization & quality control								
	i	***Review of international standards and certification systems on bioenergy and climate-friendly agriculture***	Done					
	ii	***Review of relevant national laws, regulations, policies and plans***						
		Study implementation (take from inception report and updates/extras from NPIs)	Done					
		Draft Report	Done					
		Review and completion						
		Delivery of knowledge product						

	Tasks and Activities	2015																			
		Jan				Feb				Mar				Apr				May				June	
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2
Output 2: Pilot-Tested Climate Friendly Investments for wider Implementation																							
2.1 Selection of Priority Technologies		Done																					
2.2 Pilot Feasibility studies and due diligence		Done																					
2.3 Pilot implementation and monitoring																							
i	***Definition of terms of reference***	Done																					
ii	***Procure/approve/contract implementation service providers (CQS/SSS)***	Done																					
iv	***Pilot implementation (will include a training element for farmers/communities/gov)***																						
v	***Analysis of Biochar Samples (incl H&S risks from crystalline silica)***	Done																					
vi	***Final Report Review and Consultation (good exec summaries)***																						
vii	***Dissemination of results at national workshops***																						

	Tasks and Activities	2015 Jan 1	2	3	4	Feb 1	2	3	4	Mar 1	2	3	4	Apr 1	2	3	4	May 1	2	3	4	June 1	2
Output 3: Enhanced Capacity for Efficient Use of Biomass																							
3.1 Develop and deliver awareness-raising program																							
i	***Develop & deliver awareness-raising material on efficient use of biomass for bioenergy & food security***																						
	Collation and consolidation of existing resources																						
	Finalise list of target agencies and individuals																						
	Plan awareness-raising program strategy and plan																						
	Biobriefs: Prepare and disseminate bio-briefs/spotlight on….(taken from KPs - see 4.3)																						
	1. Project Overview (Greg)																						
	2. Climate change in the GMS (4 - Overview, CAM, VIE and LAOS) (Greg)																						
	3. CC & Agriculture in the GMS (Greg)																						
	4. Food Security in the GMS (Greg)																						
	5. Biomass Resources Availability in the GMS (Greg)																						
	6. Healthy Soils (Greg)																						
	7. Soils and Biomass Amendments (Greg)																						
	8. Biochar: Overview (Greg)																						
	9. Biochar: Technology options & readiness levels (Greg)																						
	10. Biochar: Applications (Greg)																						
	11. Biochar: TA7833 test results and OHS (Greg)																						
	12. Standards and Certification (Simon)																						
	13. Standards and Certification (Simon)																						
	14. Lifecycle analysis: Introduction (Abbie)																						
	15. Lifecycle analysis: Results (Abbie)																						
	16. Standards: Biochar (Global progress and application/constraints for GMS) (Simon S)																						
	17. Biogas: Overview (Alex)																						
	18. Biogas: Technology options & readiness levels (Alex)																						
	19. Biogas: Efficient bioslurry management (Alex)																						
	20. ICS: Intro and impact (Alex)																						
	21. ICS: Technology options & Readiness (Alex)																						
	22. Climate-friendly value-chains (Alex)																						
	23. Pilot results: ICS (Alex)																						
	24. Pilot results: Biofertilisers (Alex)																						
	25. Pilot results: Biogas (Alex)																						
	Preparation of videos																						
	Prepare training video plan	Done																					
	Prepare scripts	Done																					
	Video production (shooting in country - Camb, Laos, Vietnam)	Done																					
	Delivery of 1st edit																						
	LML comments																						
	Update and delivery of 2nd edit																						
	LML comments																						
	Delivery of final version																						
	LML delivery of final videos in 7 languages																						
3.2 Develop and deliver capacity building program																							
	Biochar - IBI Congress, Beijing	Done																					
	Biochar study tour - Siem Reap	Done																					
	ICS - GACC Forum, Phnom Penh	Done																					
	Biochar study tour - PRC (and follow-on events in each country led by study-tour participants)	Done																					
	BEFS Approach - w. conference 2013, Viet Nam	Done																					
	Biofertiliser training, Cambodia	Done																					
	Biochar training and field practise (gender), Cambodia	Done																					
	How to enhance biochar through best practise (by S Joseph) - Laos and Cambodia	Done																					
	How to enhance biochar through best practise (by S Joseph) - Vietnam	Done																					
	ADB investment project preparation (training on investment modalities and undertaking PPTAs)																						
3.3 Organize annual international conference on the utilisation of biomass for bioenergy and food security																							

	Tasks & Activities	2015																			
		Jan				Feb				Mar				Apr				May				June	
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2
OUTPUT 4: DEVELOPMENT & DISSEMINATION OF KNOWLEDGE PRODUCTS																							
4.1 Studies and Assessments for Development and Dissemination of Knowledge																							
i	***Agricultural Biomass Resource Assessment in CLV***	Done																					
ii	***Complete a lifecycle analysis and least costs assessment of different biomass pathways***																						
	Preparation of methodology and workplan	Done																					
	Field work and data collection in Laos (21st-29th Nov)	Done																					
	Field work and data collection in Vietnam (30th-6th Dec)	Done																					
	Field work and data collection in Cambodia (7th-22nd Dec)	Done																					
	Report writing																						
4.2 Compile compendium of best practice in efficient utilization of biomass																							
	Overview/Intro/Context paper for the Compendium																						
	Compile compendium in hard copy and on WGA site																						
4.3 Develop & disseminate knowledge products to support efficient biomass utilization technology *(Knowledge products feed into awareness raising (b*																							
	Devise knowledge product development and dissemination plan - Greg	Done																					
	An overview of international standards and certification systems on bioenergy and climate-frier	Done																					
	Pilot Feasibility Study Reports - Contractors	Done																					
	Agricultural Biomass Resource Assessment in CAM, LAO and VIE - Simon S (see above)	Done																					
	Agriculture, Food Security and CC in GMS - Greg Munford	Done																					
	Business Models for the Scaling-Up of CFA VCs in GMS - Jason Yapp	Done																					
	Soils and Biomass Amendments - Simon Shackley	Done																					
	Biochar testing and analysis report (including risk analysis) - Simon Shackley	Done																					
	Biochar (and biofertiliser) - Simon Shackley	Done																					
	Biogas / Bioslurry - Jason Yapp																						
	Review of relevant national laws, regulations, policies and plans (see output 1) - Donah P																						
	ICS - Ewan/Alex (GERES and SNV to peer review)									***Update***													
	Report on impact of CC on biomass resource availability in GMS - (TBD)																						
	CFA value chains - Lindsay																						
	Lifecycle analysis and least cost assessment report - Abbie (see above)																						
	Pilot Final Reports plus Exec Summary of Pilot Final Reports - Contractors																						
	Common sets of Sustainability Indicators - Lindsay (/Janis)																						
4.4 Final Behavioural Impact Survey (in change in behaviour, attitude and understanding of trainees and pilot participants)																							
	Develop (TOR and draft questionnaire)																						
	ADB approval and procurement																						
	Survey by individual sub-contractor (one in each country)																						
	Data analysis and report by team																						
	Review and submission																						

Appendix 4: Pilot Project Implementation Progress

1. CAMBODIA

1.1 PP#1: Improved Cook Stove Up-scaling (Mekong Think Tank Co. Ltd (MTT))

i) Introduction

The pilot will seek to increase ICS uptake and supply in two districts: S'Ang district in Kandal province and Sandan district in Kompong Thom province. The pilot will support existing ICS stove producers located close to the pilot sites to increase production through the use of a revolving grant. The pilot will work with 4 existing ICS producers to produce the stoves for the pilot project. Stoves to be distributed in each pilot location will be supplied by 2 ICS producers that are located near the pilot places and each will receive a revolving grant to expand their production of up to $5,000 per ICS producer. The grant will be revolved back to the ICS producer association to ensure production capacity is improved and it is available only if stove Quality Control systems of the stove producers association are applied – this would again be an output based payment but advancement is 50% up front and 50% based on increased production level.

The Pilot will also promote ICS use through increased awareness and education through demonstration of new ICS by the local women's union or other women's group. The women's group will form direct agreement with the stove producers and are expected to build demand for ICS and also provide additional competition within the supply chain to ensure lower prices to consumers. The unions will receive a grant to purchase their initial sales stock on which they will also receive commission. The combination of grant and commission will enable subsequent orders and continued activities.

The women saving group or female group of forest community members are both potential partners and will require training and education on ICS – with demonstration. It is proposed that the group receive commission as an output based incentive for each ICS sale amounting 7% – 10 % of retail price – effectively lowering local retail prices and adding competitive forces with existing resellers. To help for their investment, the group will receive advance cash flow of $5,000 per each to order ICS stoves. Through purchase direct of producers the groups will also make their commission on each stove.

Another distribution channel is the existing retailers in each pilot location. They can be found in village market or commune or district downtown. They use their own capital to order stoves and sell them for their income. They will receive benefit from the pilot project on support on the awareness and education in the market place on ICS advantages. The Womens group could choose to work through local retailers.

Two distribution models in each location will be arranged using (i) women's group and (ii) existing retailers. The performance from these two groups will be compared as part of the pilot monitoring.

Outputs will be as follows:

- Output 1: Reliable ICS supply Chain Established – Output Indicators: ICS producer contracts and ICS availability in pilot districts

- Output 2: Increased Uptake of ICS in two districts – Output indicators: Two women's Groups contracted to ICS suppliers, a minimum of 500 ICS stoves purchased in each district with at least 70% of all capacity building and awareness raising participants are female
- Output 3: Pilot Assessment and Reporting - Output Indicator – Monthly reports, Project completion report

ii) Progress

All activities have been undertaken except data analysis and final report writing.

1.2 PP#2: Farm Demonstration of Biofertilizers for Upscaling Investment (CelAgrid)

i) Introduction

The pilot seeks to demonstrate the range of products formulated under the pilot: Biochar/bioslurry/other biomass/ and inorganic materials (clays, etc.) - value added product development and testing. The products formulated and produced will be demonstrated in farmer demonstration plots that have agronomic support in their design monitoring and measurement. Further the pilot will work closely with the Department of Agricultural Engineering (DAE) of General Directorate of Agriculture (GDA) of MAFF to introduce, train and monitor the production of biochar using mobile low cost TLUD kilns. The biochar produced will then be mixed with manure or NPK for application to vegetables or rice within the Farm Demo plots.

The outputs will be:

- A detailed design of farm demonstration programs within 1 month of contracting that completes all pilot activities within 10 months and is approved by TA 7833 for Inception milestone.
- Identify farmer groups and communes in Takeo for trialling of 10 pyrolysis drum kilns for biochar production from a range of available agri-residues, with supporting composting infrastructure for the incorporation of bioslurry with 10 farm demo plots established
- Ingredient supply chains confirmed within 10 weeks of contracting with supporting germination tests
- Farm Demonstration plots identified within 12 weeks of contracting
- Farm demonstration plot used for (i) collecting data on the impact of the differing products and existing farm practice (control plots) – including physical input – output levels, financial data for inputs and outputs, gender disaggregated labor inputs, and soil nutrient level changes
- Monitoring and Evaluation systems established and included in the work plan

ii) Progress

See table below. Further information is available from the monthly pilot progress report and mid-term report. As can be seen most activities have been completed or are on-going.

Table 11: Cambodia PP#2 Progress

ACTIVITY	PROGRESS
Project development	Done
Staff recruitment and contract	Done
Products development	Done
Preparation of demo inputs	Done
Project staff orientation and training	Done
Selection of demo sites, and initial soil sampling	Done

Farmer groups formation and used TLUD kilns for producing biochar	Done
Conduct training for operation and maintenance of TLUD kilns to farmer group members	Done
Conduct 35 farmer field school trainings	Done
Conduct vegetable demos	Done
Organize 3 Field Days on vegetable demos at the end of the FFS training	Done
Farmer field school training on rice (early monsoon crop) to demonstration farmer and interested farmer.	On-going
Conduct rice demos	Done
Organize at least 2 Field Days on rice at the end of the FFS trainings	To be done
Monitoring demo progress	On-going
Final soil and plant sampling, and sample preparation	On-going
Soil and plant analysis	On-going
Data entry, processing, analysis, and presentation	On-going
Complete 1st draft report	To be done

1.3 PP#3: Production and Testing of Biofertilizers (Mekong Carbon Co., Ltd (MECAR))

i) Introduction

The pilot seeks to supply finance as a product development grant to create added value to compost based products through the inclusion of rice husk biochar, manures, bioslurry and possible NPK to reduce environmental pollution and increase the value of compost derived fertilizer products.

The scope of the project is limited to biochar and bioslurry related fertilizer and soil amendment products and their testing in Battambang and Kampong Chhnang provinces. Compost and bio-slurry products will be sourced from COMPED and NBP, respectively, and rice husk char from rice mill stockpiles. The fertilizer products will be demonstrated in vegetable and rice production field trials and will include an agreed set of product formulations based on crop nutrient demands and international experience in biochar, bioslurry and product pelletising.

The outputs will be:

- A detailed design of product formulations and field tests within 1 month of contracting that completes all pilot activities within 10 months.
- Compost supply chains agreed within 6 weeks of contracting
- Establish an agreement for accessing pelleting machine at Green Mountain Ltd formed with NPI (TA7833) within 4 weeks of contracting
- Formulations produced and germination tests completed within 12 weeks of contracting
- Conduct trial production runs for pelletized and non-pelletized products and evaluate product quality – adjust formulation as required to meet nutrient targets

- Establish, manage and monitor a Product Field Trial site (using 4 replicates of 4 or more treatments in a block design) identified within 12 weeks of contracting
- Monitoring and Evaluation systems established and included in the work plan

ii) Progress

See table below. Further information is available from the monthly pilot progress report or mid-term report. As can be seen most activities are completed or on-going.

Table 12: Cambodia PP#3 Progress

ACTIVITY	PROGRESS
Project development	Done
Submit Draft work plan	Done
Approved work plan	Done
Products development (Associate with MGM for biofertilizer production, Associate with COMPED for biofertilizer production)	Done
Preparation of trial inputs	Done
Selection of trial sites, and initial soil sampling	Done
Conduct vegetable trials	Done
Conduct rice trials	Done
Monitoring trial progress	On-going
Conduct field monitoring	On-going
Submit draft mid-term report	Done
Approved Mid-Term report	Done
Final soil and plant sampling, and sample preparation	On-going
Soil and plant analysis	On-going
Data entry, processing, analysis, and presentation	On-going
Overall management and coordination	On-going
Complete 1st draft report	To be done
Submit draft final report	To be done
Comments on draft report	To be done
Submit final report	To be done

2. VIETNAM

2.1 PP#1: Improved Cook Stove Use (EPRO)

i) Introduction

The pilot seeks to test a business model for increasing the use of ICS in two districts through supporting marketing and promotion of selected stoves and by developing a local sales network using existing farmer and women's unions as commissioned sales agents effectively extending the ICS supply chain

into two districts. For the business model to replicate an upscaling program the pilot would be managed and implemented through a single service provider that is to be contracted by TA7833.

The pilot investment will achieve the following outcome: A business model tested for future upscaling of ICS using market based incentives. The outcome will be supported by the following pilot outputs:

- Output 1: Market based stove supply chain from producers to consumers established using local farmer and women unions
- Output 2: Stove producers operating a sustainable business
- Output 3: Number of households using ICS increased by 15% per commune by Pilot completion

ii) Progress

The final report has been approved so the pilot is now finished.

2.2 PP#2: Bioslurry Management (CARES)

i) Introduction

The pilot will demonstrate means of using bioslurry that are environmentally sound. The bio-slurry, when treated as an additional nutrient input to compost and properly managed, can be transformed into a valuable fertilizer – either liquid or solid - instead of a potentially hazardous pollutant. The large volume of liquid bioslurry and solid bioslurry (scum) that is currently discharged to the environment will be the feedstock of the Pilot. This practice not only saves organic resources but contributes to the environmental improvement through the improvement of soil, ground water and air.

The expense of the household for inorganic fertilizer and organic compost accounts for 60 percent of investment for crop establishment. The pilot aims to reduce this expense to 40 percent by replacing inorganic fertilizer with bioslurry integrated with composted biomass.

For the pilot it is expected that awareness improvement for environment, community is strengthened. Through capacity building and training stakeholders will be provided information and knowledge on biogas technology, its benefits and impacts as well as knowledge on composting and properly fertilizer utilization.

The implementation of pilot fits the current Vietnamese Good Agricultural Practices (VietGAP) program. According to VietGAP, soil should be managed, e.g. soil is analyzed to control and evaluate the quality and potential risks. Fertilizers and organic fertilizers that are used for crops should be documented in order to avoid contamination on agricultural products. Organic fertilizer has to be treated and managed to ensure the quality of the fertilizer.

The pilot impact will be reduced agricultural pollution and investment while increased revenue of households, knowledge on cultivation, biogas technology and composting process; improved the community relation; be a good example for duplication.

The outcome of the pilot will be an assessment of the model for the use of bioslurry for up-scaling.

The outputs will be:

- Knowledge products on biogas technology, bioslurry and composting bioslurry fertilizer
- Production and use of bioslurry-enhanced compost;
- Demonstration of compost-bioslurry on vegetable crops;
- Capacity building and training for enhanced knowledge and technology development and transfer systems

ii) Progress

The final report has been prepred and is under review.

2.3 PP#3: Demonstration of Biofertiliser and Biochar Soil Amendments (COTDEP)

i) Introduction

The pilot seeks to test if biochar biofertilizer product development is able to create viable fertilizer products to substitute (in full or at least in part) for inorganic fertilizer and to support a future supply chain that is able to reduce environmental pollution and increase the value of biofertilizer products, including NPK – biochar fertilizer pellets where c. 25% of the NPK is replaced, with the aim of yields remaining the same and even increasing.

The scope of the project is limited to Hanoi and An Giang Provinces.

The pilot will:

- Implement at 2 communes, one in each province – a static biochar production kiln from rice straw to assess viability
- In Hanoi implement a biochar, biofertiliser and pelleting demonstration program
- In each Province implement a farmer group TLUD biochar production capability

Outputs include:

- A final work plan agreed within 1 month of contracting that completes all pilot activities within 10 months.
- Modify existing TLUD kilns
- Fabricate a replicate rice straw kiln
- Produce sufficient biochar to demonstrate production technology and to produce sufficient biochar for the demonstrations and trial areas plus for training and capacity building purposes
- Incorporate biochar filters into 10 biogas plants in Dong An District Hanoi and conduct NPK testing to ascertain the effectiveness of the filters to extract NPK from bioslurry
- Provide agronomic input to defining biochar related products for inclusion in the demonstrations
- Ingredient supply chains confirmed within 10 weeks of contracting
- Formulations defined, produced and tested within 12 weeks of contracting
- Establish, manage and monitor a Product Field Trial site (using 2 replicates of selected treatments in a block design) identified within 10 weeks of contracting
- Farm Demonstration plots identified within 12 weeks of contracting
- Monitoring and Evaluation systems established and included in the work plan

ii) Progress

The final report has been prepared and is under review.

3. LAOS PDR

3.1 PP#1: Cluster Biomass Technology and Biofertilisers (NCG)

i) Introduction

The pilot will support 2 outputs including: (i) to increase the number of households using ICS stoves within the two clusters of 6 villages by offering an output based incentive to the Lao Women's Union, and (ii) the production of enhanced soil fertilizers and soil amendments from rice husk, bioslurry and compost formulations and their demonstration through farm demonstrations in two development clusters. The location of the villages and clusters are as follows: Nalao – Lak 52 Clusters: Ban Nalao,

Ban PhonNgarm Tai and Ban Lak 52, and Saka – Napho Clusters: Ban Saka Tai, Ban Noi and Ban Nabone, Phone Hong District, Vientiane Province.

The ICS program will be offered in both clusters within the 3 villages within each cluster and within the cluster development centers. The purpose of the pilot is to test the use of a supply chain output based incentive program to stimulate the adoption of improved ICS. In doing so, the pilot does not seek to create technology; it seeks to increase the use of best available technologies currently available.

The pilot will conduct testing of selected ICS stoves, train and resource village women's unions to conduct awareness, demonstration and education programs that lead to sale of approved ICS products, and oversee feedback and evaluation by the user. The village level Women's Unions will be linked to stove producers who will be eligible for a production support grant.

Outputs will include:

- 4 ICS stoves tested within 6 weeks of contracting
- Women union engagement confirmed within 5 weeks of contracting
- Output incentive payment agreed with each women's union within 5 weeks of contracting
- Awareness and Education Program developed within 8 weeks of contracting
- Undertake Women's Union training and evaluate effectiveness within 10 weeks of contracting
- Complete a stove producer business planning program for the producers with supply agreements to the Women's Unions within 12 weeks
- Define the Inventory stocking requirements for each Union
- Village demonstration programs starting from week 12 after contracting
- Monitoring and reporting confirming that 40% of households have adopted ICS within 10 months.
- A final work plan agreed within 1 month of contracting
- Enterprise participation agreement completed within 6 weeks of contracting:
- Biochar kilns procured within 5 weeks of contracting and rice husk produced within 8 weeks of contracting
- Compost and dung supply chains formed within 6 weeks of contracting
- New composite digester procured, installed and user training, slurry tested for nutrient content within 8 week of contracting
- Pelletisers procured and training provided within 10 weeks of contracting
- Formulations defined, produced and tested within 12 weeks of contracting
- Demonstration sites identified within 10 weeks of contracting
- Farm Demonstration plots identified within 12 weeks of contracting
- Monitoring and Evaluation systems established and included in the work plan

ii) Progress

The final report has been prepared and is under review.

Appendix 5: Agenda for Regional Forum on Standards and Roadmap for their Implementation

Dates: 05 - 06 February 2015

Venue: OC Boutique Hotel, Street 23 Tola, Sangkat 4, Ochheuteal Beach, Sihanouk Ville, Preah Sihanuk province, Cambodia

Overview: Cooperation in the Greater Mekong Subregion (GMS) agricultural sector is guided by the *Core Agriculture Support Program Phase 2 (CASP-2)* and implemented by the GMS Working Group on Agriculture (WGA). CASP-2 is the main mechanism for regional cooperation in the GMS agriculture sector with a vision for the GMS to be recognized as the leading producer of safe food, using climate–friendly agricultural practices and integrated into global markets through regional economic corridors. The broad strategy of CASP-2 is supported by three pillars: (1) Food Safety & Trade Modernization; (2) Climate-Friendly Agriculture; (3) Bioenergy & Biomass Management.

Supporting Pillars 2 and 3 of CASP-2, ADB confirmed the 'Capacity Building for the Efficient Utilization of Biomass for Bioenergy and Food Security in the Greater Mekong Subregion (TA7833)' project. The TA is collectively implemented by 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, in cooperation with ministries of agriculture in Myanmar, Thailand, and People's Republic of China.

TA7833-REG aims to promote the scale-up of efficient and eco-friendly approaches to utilization of biomass for bioenergy and food security in Cambodia, Lao PDR and Viet Nam (CLV) through: (i) harmonization of policy, standards and mechanisms to enhance regional cooperation on bioenergy and food security enhancement; (ii) implementation of feasibility studies and pilot projects to test and demonstrate mechanisms for scaling-up biomass investments for bioenergy and food security; (iii) awareness-raising and capacity building for project stakeholders, and; (iv) knowledge product development and dissemination. The mechanisms for scaling-up demonstrated under TA7833 are designed to foster future public and/or private bioenergy and food security investment projects.

So far, the TA 7833 supported Cambodia and Laos to draft different national standards.

Cambodia drafted Organic Rice Standard and Biodigester Standard. The organic rice standard has been revied and commented by the General Directorate of Agriculture (GDA), MAFF. The TA 7833 will forward the draft Biodigester Standard to MAFF for reviewing. MAFF will process both Standards for approval.

Laos drafted Biofertiliser Standards based on Lao Pilot Activities Performance. The draft Standards have been reviewed and revised by the Laos inter-ministerial committee and will process for approval, based on Laos regulations and procedures etc.conversion period, tests results

Purpose: the purpose of this *Regional Forum on Standards and Roadmap for their Implementation* is to prepare, discuss and provide comments on the draft roadmap for the implementation of these draft standard of each country.

Expected Outcome:

- Final draft Cambodian Organic Rice Standard
- Draft Cambodian Domestic Biodigester Standard
- Drat Roadmap for the implementation of the Cambodian Organic Rice Standard
- Drat Roadmap for the implementation of the Cambodian Domestic Biodigester Standard
- Final draft Laos Organic Rice Standard
- Draft Roadmap for LORS application/piloting (being finalized during the forum)
- Draft Roadmap for the implementation and replication of the Laos Biochar-Based Biofertiliser Standards (being finalized during the forum)

Table 13: Forum Agenda

TIMING	LOCATION / LEAD PERSON	ACTIVITY
Thu 5 Feb	**OC Boutique Hotel**	**Organic Rice Standard**
AM	All	Travel to venue in Preah Sihanouk province
1200-1310	All	Lunch (at own discretionary) and Check-in
1310-1325	All	Registration
1325-1330	**MC**	National Anthem and inviting speaker
1330-1340	**Lindsay Saunders, Team Leader, TA 7833**	Brief on the overall TA 7833 related to the Regional Forum on Standards and Roadmap for their Implementation
1340-1400	***H.E. San Vanty, WGA Coordinator and Under Secretary of State,*** MAFF	Welcome by Cambodia government representative – government policy related to ASEAN standards and the Cambodia standards under the support of the TA 7833
1400-1420	***Mr. Claudius Bredehoeft,*** Resource person	Steps undertaken to prepare and finalize the Cambodia Organic Rice Standard (ORS)
1420-1435	***Mr. Chou Cheythyrith*****,** Chief, Office of Rice Research and Extension, GDA	Highlights of the Cambodia ORS
1435-1500	***Mr. Claudius Bredehoef & Dr. Hean Vanhan***	Q&A on Cambodia ORS and process
1500-1525	***Ms. Phonthip Sommany and Mr. Bounthavy***	Steps undertaken to prepare and finalize the Laos ORS
1525-1540	***All***	***Group Photo*** ***Coffee break***
1540-1610	***Mr. Thavisith Bounyavong,*** LORS Consultant	Highlights of the Laos ORS
1610-1630	***Mr. Thavisith Bounyavong & Mr. Bounthavy***	Q&A on Laos ORS and process
1630-1645	***Mr. Nguyen Van Chung,*** *TFP-Standard*	Status of the VIETGAP
1645-1700	***Mr. Claudius Bredehoeft****, Resource person*	Views on the AROS linking to the ASEAN member countries Standards
1800-	***All***	***Welcome dinner at the OC beach club***
Fri 6 Feb.	**OC Boutique Hotel**	**Organic Rice & Biodisgestor Standard**

0830-0845	Mr. Lindsay Saunders	Recap of Day 1 – discussion and outline for Day 2
Group 1 – Organic Rice Standard		
0845-0900	***Mr. Claudius Bredehoeft****, Resource person*	How to get ORS implemented (Certification, labeling, inspection, traceability) – Lessons from elsewhere (a draft roadmap)
0900-1000	Laos Team finalizes Action Plan to include inputs and comments from participants	Cambodia and Laos team split to one side of the room to prepare bullet points on a flipchart of ideas for implementation (i.e. a draft roadmap).
1000-1015	***Mr. Thavisith Bounyasouk,*** LORS Consultant	Laos group presents their ideas
1015-1045	***Mr. Thavisith Bounyasouk,*** LORS Consultant, Laos Team	Q&A
1045-1105	***All***	***Coffee break***
1105-1120	One representative from	Cambodian group presents their ideas
1120-1150	One representative from	Q&A
Group 2 – Biodigesters		
0845-0900	***Mr. Eric Buysman***, Resource person	Steps undertaken to prepare and finalize the Cambodia Biodigester Standard
0900-0915	***Mr. Eric Buysman***, Resource person	Highlight of the Cambodia Biodigester Standard
0915-0945	***Mr. Eric Buysman and Mr. Chea Sokhom***	Q&A on Cambodia Biodigester Standard and process
0945-1015	***Dr. Tong Xuan Chinh***	The Vietnam Biodigester Standards-contents and implementation (certification….)
1015-1045	***Dr. Tong Xuan Chinh***	Q&A on Vietnam Biodigester Standard
1045-1105	***All***	***Coffee break***
1105-1120	***Mr. Eric Buysman,*** Resource person	Ideas for Roadmap for implementation of the Cambodia Biodigester Standard
1120-1150	***Mr. Eric Buysman and Mr. Chea Sokhom***	Q&A on the roadmap for the Cambodia Biodigester Standard
1150-1315	**All**	**Lunch provided**
1315-1330	***Mr. Sok Leng, Deputy Director,*** *Dept of Standard, Institute of Standard of Cambodia*	Cambodian Standard Development Process (linking with the ASEAN Standard format)
1330-1400	***Dr. Nivong Sipaseuth & Ms. Yatheo P.***	Highlights of the biochar-based organic fertiliser standards in Laos and applicability to biofertilisers and constraints (e.g. when using new formulations)
1400-1415	***Dr. Seng Vang****,* CARDI	Cambodia Experience on biofertiliser formula and how it align to the Prakas of MAFF on Procedures &

		Standards requirement for Fertilizer Registration in Cambodia and the field experiments (Cambodia do not have standard on biofertiliser)
1415-1430	***Dr. Khiev Borin***, CelAgrid	Experience that farmers are using the biofertiliser formula for the farm demo on vegetable and rice crops
1430-1450	***All***	***Coffee***
1450-1530	***Dr. Truong Hop Tac***	Major quality criteria for Vietnam organic fertilizer
1530-1600	***Dr. Sar Chetra, NFP and Deputy Secretary General,*** MAFF	Wrap-up. Recommendations for follow-up work on roadmaps and presentations of them at the final conference
Sat 7 Feb		**Departures**
0730-	*All*	Hotel check-out and Leaving Preah Sihanuk Province for the Phnom Penh or the airport

KEY

CARDI	Cambodia Agriculture Research and Develoment Institute
CelAgrid	Center for Livestock and Agriculture Development, Cambodia
MAFF	Ministry of Agriculture, Forestry and Fisheries
NPI	National Project Implementation Specialist
NFP	National Focal Point
ORS	Organic Rice Standards
GDA	General Department of Agriculture

Appendix 6: Agenda for Final Conference (2nd Conference on Efficient Utilization of Biomass for Bioenergy & Food Security in the GMS)

Dates: 05 – 06 March 2015

Location: Luang Prabang, Lao PDR

Overview: Cooperation in the Greater Mekong Subregion (GMS) agricultural sector is guided by the *Core Agriculture Support Program Phase 2 (CASP-2)* and implemented by the GMS Working Group on Agriculture (WGA). CASP-2 is the main mechanism for regional cooperation in the GMS agriculture sector with a vision for the GMS to be recognized as the leading producer of safe food, using climate–friendly agricultural practices and integrated into global markets through regional economic corridors. The broad strategy of CASP-2 is supported by three pillars: (1) Food Safety & Trade Modernization; (2) Climate-Friendly Agriculture; (3) Bioenergy & Biomass Management.

Supporting Pillars 2 and 3 of CASP-2, ADB confirmed the 'Capacity Building for the Efficient Utilization of Biomass for Bioenergy and Food Security in the Greater Mekong Subregion (TA7833)' project. The TA is collectively implemented by 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, in cooperation with ministries of agriculture in Myanmar, Thailand, and People's Republic of China.

TA7833-REG aims to promote the scale-up of efficient and eco-friendly approaches to utilization of biomass for bioenergy and food security in Cambodia, Lao PDR and Viet Nam (CLV) through: (i) harmonization of policy, standards and mechanisms to enhance regional cooperation on bioenergy and food security enhancement; (ii) implementation of feasibility studies and pilot projects to test and demonstrate mechanisms for scaling-up biomass investments for bioenergy and food security; (iii) awareness-raising and capacity building for project stakeholders, and; (iv) knowledge product development and dissemination. The mechanisms for scaling-up demonstrated under TA7833 are designed to foster future public and/or private bioenergy and food security investment projects.

This *2nd Conference on Efficient Utilization of Biomass for Bioenergy & Food Security in the GMS* is organized with the following purpose, format, and expected outcomes.

Purpose:

(a) To prioritize strategy and options for delivering donor support to promote climate friendly agriculture and biomass utilization based on:

- the findings of the TA7833-REG pilot studies
- business models for upscaling efficient utilization of biomass;
- an exchange of information, knowledge and best practice in approaches to bioenergy and food security development within GMS;

(b) To provide a forum for regional dialogue on how to overcome barriers to scaling-up of bioenergy and food security technology;

Participants: The conference will attended by approximately 80 invited government officials, non-government organizations, small & medium enterprises, civil society leaders, financial institutions, donors and other key stakeholders from Cambodia, Lao PDR, Viet Nam, Myanmar, P.R. China and Thailand – initial estimates are:

- 15 from each of Cambodia, Lao PDR and Viet Nam.
- 4 from each of Myanmar and PRC and Thailand.
- Deputy Director of Nordic Development Fund
- 5 from ADB/WGA, including the Director of Environment, Natural Resources and Agriculture Division, and Dr. Sununtar Setboonsarng as speaker and resource person.
- Pilot contractors: 1 per contractor (7)
- 4 to 6 from the private sector or service organizations working in climate friendly agriculture and bioenergy activities such as SNV.
- TA7833 Team: 8

Format: The two days will present detailed findings on TA 7833 pilot investments, lessons learned and the linkages to organic standards. The conference will provide a platform to discuss the status, challenges, possible modalities, and opportunities for scaling-up efficient utilization of biomass for bioenergy and food security in the GMS.

The content of proposed sessions will cover:

- Pilot project monitoring and evaluation results;
- National strategies for enhancing sustainable agriculture focusing on utilization of biochar, biogas and bioslurry within agricultural value chains;
- Possible business models and market opportunities for scaling-up appropriate technologies, and;
- The role of standards and certification in supporting development and application of bioenergy and food security technologies.

Each session will be chaired by a senior WGA official from the participating countries.

Expected Outcomes: The following outcomes are expected from the conference:

- Gaps in public sector support to scaling-up bioenergy and food security technology identified and discussed including:
  - the potential role of biomass technologies and related products
  - prioritizing farming systems for biomass utilization and its role on climate friendly agriculture
  - exploring public private partnerships as a means of transforming agriculture to support public sector goals relating to GHG emissions
  - identifying ongoing knowledge gaps and access to technology constraints
- Future directions and actions to build on the current understanding with an emphasis on continued building of upscaling mechanisms
- Enhanced awareness and knowledge of the issues and opportunities surrounding the nexus of agricultural waste biomass, bioenergy and food security;
- A more integrated, informed and effective network of public and private sector stakeholders in the bioenergy technology and sustainable agriculture sectors;

Table 14: Forum Agenda (as of 12th Feb 2015) -

DAY 1 ***Facilitator:*** *MAF representative*	
0745	**Registration**
0830 *4 x 5 mins*	**Official Welcome & Introduction** • Official Welcome: Vice Minister, *H.E. Phouang Parisak Pravongviengkham (MAF), Working Group on Agriculture (WGA) Coordinator – Lao PDR* • *Welcome: Mr Javed H. Mir, Director, Environment, Natural Resources and Agriculture Division, Southeast Asia Department, ADB* • *Welcome:* Ms *Leena Klossner, Deputy Director of Nordic Development Fund* • *Welcome and agenda (plus protocols) for the conference: Mr Lindsay Saunders / Mr Simon Foxwell, an overview of TA7833* • Group photograph
0900 *4 x 15 mins*	**ICS in GMS: successes and constraints** *Purpose is to discuss pilot findings with regards to ICS uptake, including successes and challenges. Identified gaps and constraints will be highlighted and an NGO with extensive ICS experience will share lessons learnt.* • Viet Nam ICS pilot results: Ms Tang Thi Hong Loan, EPRO consultant • Lao PDR ICS pilot results: Mr Videth Visounnarath, NCG consultant • Cambodia ICS pilot results: Mr Sorany Em, METT consultant • SNV's ICS support programme in Lao PDR: Mr Sophabmixay Inthone, ICS business planner
1015	**Coffee/Tea Break**
1030 *2 x 15 mins*	**ICS options for scale-up** *Possible business models to address the constraints and capitalize on the opportunities identified in the previous session will be outlined.* • ICS programme in Lao PDR: Mr Souvannalath Amphone, ARMI • ICS business models: Ms Alexandra Warrington, TA7833
1100	***ICS Q&A Panel*** • Open Q&A from audience to panel of speakers from ICS sessions
1145	**The Future of ICS in the GMS** *Summary of the morning discussion and messages to be tabled on day 2.* • Dr. Sununtar SETBOONSARNG, Southeast Asia Department, ADB

1200	**Lunch**
1330 *4 x 15 mins*	**Biogas pilots and Biodigester program results** *Purpose is to discuss pilot findings with regards to biogas and biodigester use, including successes and challenges.* • Viet Nam Biogas pilot results: Ms Le Thi Thoa, TA7833 • Lao PDR Biogas pilot results: Houangkham Siharath, NCG Consultant • Viet Nam Biodigester program: Dr Tong Xuan Chinh, MARD • Cambodia Biodigester program: Mrs. Lam Saoleng, National Biodigester Program
1445	**Coffee/Tea Break**
1500	**Cambodia Biodigester standard and roadmap** *Current situation of the biodigester standard and the way forward for Cambodia will be outlined.* • Mr Eric Buysman, Nexus and Mr. Chea Sokhom, TFP Biogas
1515	**Biogas and Bioslurry: options for scale-up** *Possible business models to address the constraints and capitalize on the opportunities identified in the previous sessions will be outlined.* • Lindsay Saunders, TA7833
1530	**Biogas, Bioslurry and Biodigester Q&A Panel** • Open Q&A from audience to panel of speakers from Biogas, Bioslurry and Biodigester sessions
1600 *1 x 30 mins* *3 x 5 mins*	**Country group free time for discussion** • Participants - country specific groups to discuss the findings from day 1. • Group feedback to audience
18:00	**Dinner**
DAY 2 ***Facilitator:*** *MAF Representative*	
0830 *5 x 15 mins*	**Biochar – Biofertiliser Formulation and Pilot Results** *Purpose is to discuss pilot findings with regards to biochar use, including successes and challenges.* • Lao PDR Biochar Formulation and standards: Dr Sipaseuth Nivong, MAF and Ms Phomidalyvanh Yatkeo, MAF • Lao PDR Biochar and Biofertiliser field experiment on rice and vegetable:

	Mr Houangkham Siharath, NCG consultant • Cambodia Biochar Formulation, production and field experiment on rice and vegetable: Dr Seng Vang, CARDI • Cambodia Biofertiliser Farmer Demonstration on rice and vegetable: Dr Khiev Borin, CelAgrid • Viet Nam demonstration of Biofertiliser and Biochar soil amendments: Mr Nguyen Cong Vinh, COTDEP consultant
0945	***Biochar Q&A Panel*** • Open Q&A from audience to panel of speakers from previous Biochar session
1015	**Coffee / Tea Break**
1030	**Compost, Slurry and Biochar – Understanding soils, nutrients and carbon sequestration** • >>>>> TBD>>>>
1050	**LCA (Life Cycle Analysis) and Least Cost Assessment** • Ms Abbie Clare, TA7833
1110 *2 x 15 mins*	**Biofertiliser: options for scale-up** *Possible business models to address the constraints and capitalize on the opportunities identified in the previous sessions will be outlined.* • Biofertiliser business perspective: Mr Syvong, Deputy MD of Dongxiengdy Biofertiliser enterprise • Biofertiliser business models: Mr Lindsay Saunders, TA7833
1140	**Biofertiliser Q&A Panel** • Open Q&A from audience to panel of speakers as above
1215	**Lunch**
1330 *5 x 15 mins*	**Organic Standards and options for scale-up** • Cambodia ORS and roadmap: Mr Claudius Bredehoeft and Mr. Chou Cheythyrith, GDA-MAFF • Lao PDR ORS and roadmap: Mr Bounyasouk Thavisith, MAF and Ms Sommany Phonethip • >>>> tbd >>> • Organic Rice regional buyer perspective: Mr Keam Makarady, CEDAC • PGS and Scale-up of Organics options: Mr Chris May (to be confirmed)
1445	**Coffee / Tea Break**

1500	**Organics Q&A Panel** • Open Q&A from audience to panel of speakers from previous organics session
1530 *6 x 10 mins*	**Future of Biomass Utilization and Food Security in GMS** *Country representatives to summarize their key focus areas and strategies for biomass utilization and food security.* • Viet Nam: MARD rep • Cambodia: H.E San Vanty, WGA Coordinator and Under Secretary of State, MAFF (TBC) • Lao PDR: MAF rep • Thailand rep • Myanmar rep • P.R. China rep
1630	**Plenary & Conference Wrap-up -** *Chaired by MAF Leader* • ADB • TA7833
1645	**Conference Close – Laos PDR NFP/WGA Focal Point**

KEY

BEFS	Bioenergy and Food Security
NFP	TA7833 National Focal Point
NPI	TA7833 National Project Implementation Specialist
TFP	TA7833 Technical Focal Point
MAFF	Ministry of Agriculture, Forestry & Fisheries (Cambodia)
MAF	Ministry of Agriculture & Forestry (Lao PDR)
MARD	Ministry of Agriculture & Rural Development (Viet Nam)
MoA	Ministry of Agriculture (PR China)
MoAC	Ministry of Agriculture & Cooperatives (Thailand)
WGA	Working Group on Agriculture
GMS	Greater Mekong Subregion
ADB	Asian Development Bank