



Asian Development Bank



Greater Mekong Subregion

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

TA7833-REG



PROJECT PROGRESS REPORT

March 2013

Landell Mills
DEVELOPMENT CONSULTANTS



KEY DATA

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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
DAHPC	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 42 months (July 2011 to December 2014). The project concept was presented and endorsed by the GMS countries at the annual meeting of the WGA in Viet Nam in 2010. A fact-finding mission in early 2011 concluded broad agreement on the concept paper. TA7833 primarily focuses on Cambodia, Lao PDR and Viet Nam (CLV). The project intends to lay the foundations for potential investment projects to subsequently scale-up successful outcomes.

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

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

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

The following progress report provides a review of the work up to the end of March 2013. Future progress reporting will involve quarterly reports in accordance with the current format and monthly summaries according to the format in Section 2 of this report.

1.2. PROJECT OVERVIEW

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

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

The output will be achieved through a regional approach to climate-friendly agricultural development and mechanisms for harmonizing regulations and ensuring their compatibility with international trade obligations. The TA will support the adoption of common sets of sustainable indicators and criteria for land use, bioenergy standards, certification and accreditation systems, alongside a traceability and eco-labeling system. A common method of assessing greenhouse gas (GHG) emissions will also be explored. International and regional forums will facilitate progressively higher level dialogue within the region on bioenergy and food security policy issues and encourage the exchange of information and skills in the use of novel technologies. In addition, options for minimizing the cost of certification and traceability for both small-scale producers (households) and end users of products will be analyzed.
- ii) Output Two: Climate-friendly, gender-responsive biomass investment projects, pilot tested through implementation in Cambodia, Lao PDR, and Viet Nam.**

Candidate technologies include, but will not be limited to: biogas & bioslurry; improved cook stoves; biochar production and application, and; inclusive and certified sustainable value chains for smallholders. Pilot projects will use technologies already successfully tested on a smaller scale, in conjunction with pilot testing of appropriate business models and institutional arrangements. Where necessary, pilot projects will be supported with feasibility studies to deliver appropriate knowledge and experience to inform future up-scaling and investment.
- iii) Output Three: Enhanced capacity for the efficient utilization of biomass.**

Gender-sensitive capacity-building will be provided to participating central and local governments, service providers, communities and women's groups. Activities will strengthen institutional and technical capacity to expand biomass investments and ensure sustainable uptake by rural communities. Distance learning methods will be implemented to reach more rural communities and capacity building support will be offered to project stakeholders. Capacity building for ADB safeguards, feasibility assessment and project approval due diligence will be provided.
- iv) Output Four: Development and dissemination of knowledge products.**

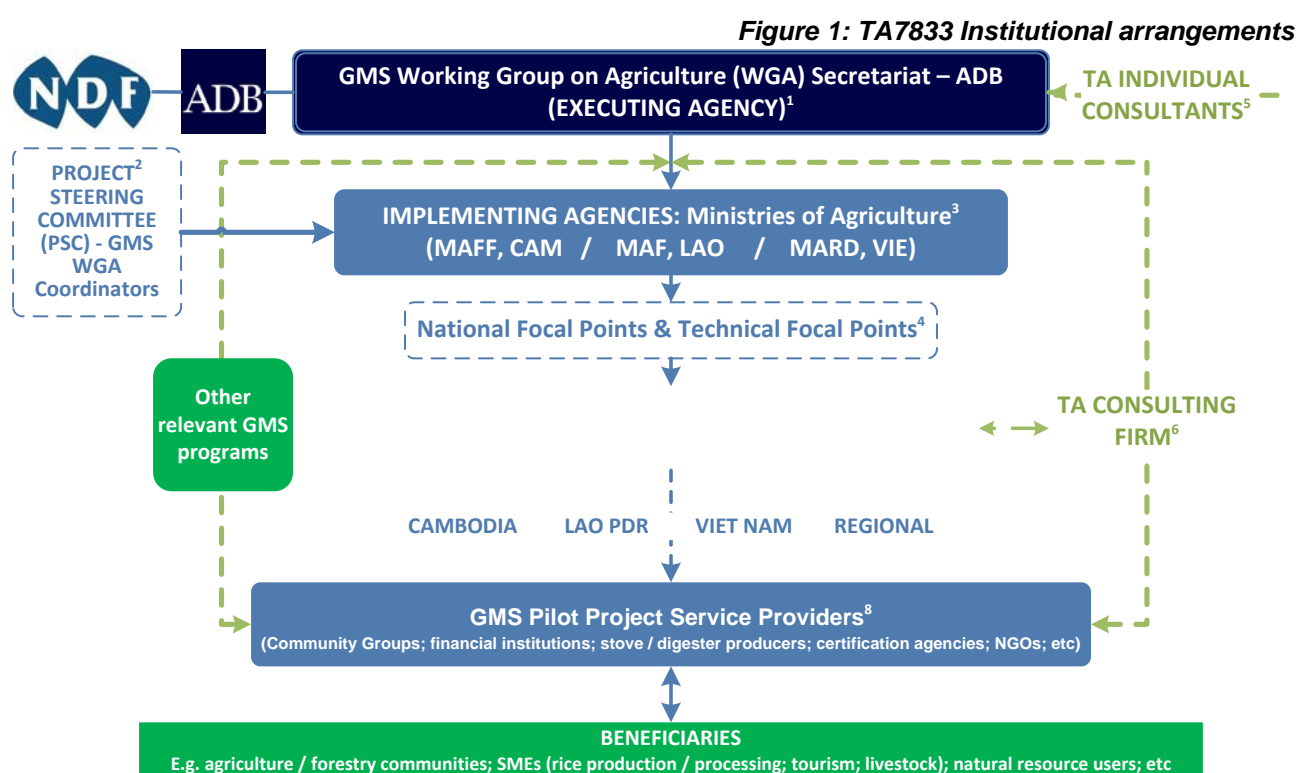
Using output from the Global Bioenergy Partnership (GBEP), the TA will develop a common methodology for assessing the supply of biomass and prioritizing its use for enhancing energy and food security. Knowledge products will be developed and links with regional

centers of excellence will be created to promote knowledge transfer and cooperation between more advanced GMS countries and CLV. An awareness campaign using mass media will be conducted. Baseline surveys will be carried out and a monitoring system established.

1.3. IMPLEMENTATION ARRANGEMENTS

As presented in Figure 1, 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 Department². 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).



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 Figure 1. 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 (Table 1).

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

Table 1: Government counterpart agencies and personnel for TA7833

ROLE	NAME	POSITION
Cambodia		
Project Steering Committee (GMS-WGA Coordinator)	H.E. SAN Vanty	Under-Secretary of State, Ministry of Agriculture, Forestry & Fisheries (MAFF)
National Focal Point (NFP)	Dr. Sar Chetra	Department of Animal Health & Production, MAFF
Technical Focal Points (TFP)	Biogas - Dr. Sar Chetra	Deputy Director of DAHP
	Biochar - Dr. Chan Saruth	Director of Department of Agricultural Engineering of General Directorate of Agriculture, MAFF
	Biofuel - Mr. Iv Phirun	Deputy Director of Department of Industry Crop of General Directorate of Agriculture, MAFF
	ICS - Mr. Khorn Saret	Deputy Director of Forestry & Community Forestry of Forestry Administration, MAFF
	Standards - Mr. Chheng Uddara	Director, Standards Development, Training & Consultancy Dep., Institute of Standards, Ministry of Industry, Mines & Energy (MIME) ³
Lao PDR		
Project Steering Committee (GMS-WGA Coordinator)	H.E. Phouang Parisak Pravongviengkham	Vice Minister, Ministry of Agriculture and Forestry (MAF)
National Focal Point (NFP)	Mr. Inthadom AKKHARATH	Deputy Director International Cooperation Division Department of Planning, MAF
Technical Focal Points (TFP)	Biogas - Mr. Nivat PHANAPHET	Deputy head of Livestock Management Center, Department of Livestock & Fisheries, MAF
	Biochar - Mr. Lattana PHASAYSOMBATH	Director of Agro-Forestry Training Centre (NAFES), MAF
	Biofuel - Mr. Khamphone MOUNLAMAI	Deputy Director of Research Management Division (NAFRI)
	ICS - Mr. Boualom XAYSANAVONG	Technical staff, Ministry of Energy & Mines (MEM)
	Standards - Ms. Nisith KHAMMOUNHEUANG	Head of Standards Division, Ministry of Science & Technology (MoST)
Viet Nam		
Project Steering Committee (GMS-WGA Coordinator)	Mdm. NGUYEN Thi Tuyet Hoa	Deputy Director General, International Cooperation Department (ICD), MARD
National Focal Point (NFP)	Mrs. Ho Thi Minh Chau	Acting Director, Multilateral Cooperation Division, ICD, MARD
NFP Coordinator	Mr. Nguyen The Hinh	Agricultural Project Management Board (APMB), MARD
Technical Focal Points (TFP)	Biogas - Ms. Nguyen Quynh Hoa	Official, Livestock Environment Division, Department of Livestock Production, MARD
	Biochar - Mr. Vu Tien Dung	Deputy Director of AST project, APMB, MARD
	Biofuel - Mr. Nguyen	Official, Department of Crop Production, MARD

³ www.isc.gov.kh

ROLE	NAME	POSITION
	Tu Hai	
	ICS - Mr. Tran Ngoc Tue	Deputy Head, Biomass Energy Division, Forestry Science Technique Application Centre, MARD
	Standards - TBD	To be determined / nominated by MARD

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

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

1.4. PROJECT SCOPE AND DEFINITION

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

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

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

The efficient utilization of biomass requires technologies that transform agricultural and forestry residues, which create environmental problems and pollute waterways when left to decay, to produce bioenergy, biochar and organic fertilizers⁴. 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 national and international NGOs with mixed results and on a limited scale.

Bioenergy can be generated from biomass either directly or indirectly converted in either: solid, liquid or gaseous forms. Modern bioenergy relies on efficient conversion technologies which are increasingly available. The project defines bioenergy as: *"...renewable energy from plants and animals. Organic matter containing bioenergy is known as biomass that can produce heat ... or be*

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

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 problems⁵.

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.

⁵ WGA meeting, 12 July 2012, Nanning, China

2. SUMMARY OF PROGRESS AGAINST OUTPUTS

DMF	ACTIVITIES COMPLETED AND OUTPUT CONTRIBUTION PLAN		
OUTPUTS & ACTIVITIES	2012 (ACTUAL)	2013 (PLAN)	2014 (PLAN)
OUTPUT 1: ENHANCED REGIONAL COOPERATION IN BIOENERGY DEVELOPMENT TO FOSTER AND SAFEGUARD FOOD SECURITY			
1. Regional forums for high level dialogue	1st GMS Forum for was successfully accomplished in Nanning in July 2012 and reported in the IR and the Report on Proceedings	2 nd GMS Regional Forum on Harmonization of Standards in Bioenergy (November 2013) possibly in Hanoi – to be confirmed. Combined with International Conference.	3 rd GMS Regional Forum on Harmonization of Standards in Bioenergy - to be determined, scheduled for mid-Q2 2014
1.1 Testing of mechanisms to facilitate adoption of common set of sustainable indicators, bioenergy and trade standards, certification systems an eco-labeling	Harmonization Roadmap devised and agreed at 1st GMS Forum as initial mechanism for facilitating dialogue and ultimate adoption of common standards. See p12 of Report on Proceedings	<p>3 National policy forums (May 2013) - one in each country prior to next planned Regional Forum, offering more intensive mechanism for national-level dialogue for wider harmonization. The forums will provide a venue for policymakers and public officials to discuss policies and opportunities relevant to their country, and engage with other stakeholders and experts. The forums will provide a process for developing policy strategies that will be presented at the regional forum.</p> <p>The Forums will be used to:</p> <ul style="list-style-type: none"> - (i) confirm the willingness and feasibility of using a regional pool of compliance inspectors - (ii) the purpose and target of eco-mark labels - To Date: Cambodia has identified its first forum subject as biogas, and will be held on May 23rd - Viet Nam has a first draft of their proposed agenda for May 16th that is awaiting confirmation 	3 National policy forums (before April) one in each country prior to next planned regional forum, offering more intensive mechanism for national-level dialogue for wider harmonization

DMF	ACTIVITIES COMPLETED AND OUTPUT CONTRIBUTION PLAN		
OUTPUTS & ACTIVITIES	2012 (ACTUAL)	2013 (PLAN)	2014 (PLAN)
		<ul style="list-style-type: none"> - Lao PDR: Agenda options are still being finalized. <p>By 31 March:</p> <ul style="list-style-type: none"> - (i) Regional biomass resources – proposed assessment methodologies are being reviewed by each country. Options for integrating this within a multi-criteria decision support tool linked to life cycle analysis have been developed and are being reviewed. It is proposed to use these as an integral part of the compendium on biomass under Output 4 - (ii) Application of BEFS – ongoing dialogue with FAO regarding access to materials and experts. - (iii) Traceability - (iv) Participatory Guarantee Systems – Proposed ToR and report outline has been distributed for final comments - (v) International certification systems reviewed – Report scope and outline agreed and initial data collation complete 	
1.2 Annual international workshops on household energy and food security	Not accomplished. Planned to coordinate with FAO-BEFS but postponed to 2013 by order of ADB to focus on PP implementation.	The conference will be linked to the Regional Standards Forum in Q3 2013 to enable PP progress and findings to be reported including: a) present FS findings; b) present pre-final PP plans for comments and suggestions; c) training & capacity	

DMF	ACTIVITIES COMPLETED AND OUTPUT CONTRIBUTION PLAN		
OUTPUTS & ACTIVITIES	2012 (ACTUAL)	2013 (PLAN)	2014 (PLAN)
		building side sessions on core TA topics. By March 30: no progress	
OUTPUT 2: PILOT TESTED CLIMATE FRIENDLY BIOMASS INVESTMENT PROJECTS FOR WIDER IMPLEMENTATION			
2.0 Conduct biomass assessment and development of criteria for selection of pilot project areas by 2012	*Biomass assessment not accomplished. Secondary data collected and assessment framework initiated but not complete. Review of ICS supply chain and technology	Biomass assessment: Biomass expert will complete assessment with local team members before end of 2013. By 31 March: <ul style="list-style-type: none"> - Proposed methodology distributed for comment, secondary data and existing assessment studies are being collated - Pilot Feasibility studies include biomass assessment at field / household level for ICS, Biogas, and Bioslurry. 	
2.1 Implementation of pilot projects in lower cost biogas technologies as investment options involving use bioslurry for high vale crop production	Draft ToR for pilot prepared but not approved.	Pilot FS contracted and completed before June 2013. By 31 March: <ul style="list-style-type: none"> - Priority topics by country agreed (see APPENDIX 4:). - 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 – awaiting confirmation by Government. - Lao PDR EOIs currently advertised - EOIs due April 5th Pilot projects to be contracted and implemented from April through to	Pilot projects reviewed and written up Proposed subprojects designed and written up for inclusion in follow on loan

DMF	ACTIVITIES COMPLETED AND OUTPUT CONTRIBUTION PLAN		
OUTPUTS & ACTIVITIES	2012 (ACTUAL)	2013 (PLAN)	2014 (PLAN)
<p>2.2 Conduct of reviews to identify appropriate biochar, ICS and biofuel investment modalities by 2012 and implementation of pilot project by 2014</p>	<p>By 30 October - Summary reviews of ICS, Biochar and carbon emissions, the private sector, financing modalities, and the institutional frameworks in CLV completed.</p> <p>By 30 December - 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.</p> <p>Biofuel technology has been dropped based on TA team findings and CLV Government skepticism.</p>	<p>July and completed in Q1 2014</p> <p>Individual technical reviews and reports.</p> <p>By 31 March</p> <ul style="list-style-type: none"> - ICS review drafted and distributed for review - Biochar Technologies review drafted – awaiting final editing - Financing modalities for biomass technology – drafted awaiting final editing <p>To be Finalized by June 30th</p> <p>FS study findings will be linked with expert reviews for a final set of recommendations for scaling-up</p>	
OUTPUT 3: ENHANCED CAPACITY FOR EFFICIENT USE OF BIOMASS			
<p>3.0 Development of gender-sensitive training programs including distant learning activities, use of these for training local and central government officials, farmers organization and women's groups (30% women by 2013)</p>	<p>By 31 December:</p> <ul style="list-style-type: none"> - Initial awareness-raising completed for government and non-government stakeholders in CLV via inception workshop / stakeholder meetings, PNH, VTE & HAN – Feb 2012 (120pp; 33% women); - Support for attendance of TFP-Biochar at International Biochar Initiative (IBI) Congress, Beijing - Sept 2012 (3pp; 0% women). See BTORs; <p>*No further formal training</p>	<p>By 31 March:</p> <ul style="list-style-type: none"> - Biochar/ICS Regional Workshop and Study tour with sharing of technology and field trial results (<i>Report on Proceedings under drafting</i>), Siem Reap – Mar 2013 (35pp; 28% women); - Global Alliance for Clean Cookstoves (GACC) Forum, Phnom Penh - Mar 2013 (7pp; 14% women) <p>Awareness-raising program developed and tested by Q2 2013.</p> <p>FS will develop a capacity building proposal for each pilot that will be</p>	<p>Ongoing and expansion of activities</p>

DMF	ACTIVITIES COMPLETED AND OUTPUT CONTRIBUTION PLAN		
OUTPUTS & ACTIVITIES	2012 (ACTUAL)	2013 (PLAN)	2014 (PLAN)
	accomplished. Target should be 2014 to acknowledge & include learning from TA PPs and KPs, etc.	developed and delivered during pilot implementation Distance-learning activities developed by Q3 2013 Study tour and workshops in each country will be used for awareness and training of government officials, and local stakeholders.	
3.1 Conduct training in the implementation of the investment project by 2014		Opportunities for in-country training participation in ADB RM training linked to procurement and disbursement will be offered in the last quarter 2013 and 2014.	To be implemented as part of the finalization of subprojects for the loan project. <ul style="list-style-type: none"> - Innovative financing - ADB project preparation and implementation training Social baselines finalized from pilot and Pilot FS, triangulated with secondary data and SPRSS prepared
3.2 Conduct of training in the use of biomass to enhance food security and soil carbon sequestration by 2014	*No further formal training accomplished. Target should be 2014 to acknowledge & include learning from TA PPs and KPs, etc.	Training will be continue during Q2 2013 and through to end Q1 2014. Regional study tours relating to: <ul style="list-style-type: none"> - Biochar. Completed in Q1 2013 (Seam Reap) – see above - Biogas Q3 2013 - ICS Q4 2013 	Final training programs delivered and evaluations written up Training resources reviewed updated and finalized
OUTPUT 4: DEVELOPMENT AND DISSEMINATION OF KNOWLEDGE PRODUCTS			
4.0 Development of methodology for assessing and prioritizing the use of biomass for energy and food security by 2012 and dissemination of the methodology through regional forums, training, and capacity building by 2014	Not accomplished. This refers to evaluating if GBEP methodologies are appropriate for adaption and adoption in GMS countries.	Methodologies will be assembled and reviewed by the TA experts in Q2 2013 with findings presented during 2 nd GMS Regional Forum on harmonization between countries and also between the range of donor supported input to biomass assessments By 31 March:	Methodological framework will be written up and defined in terms of a time bound action plan

DMF	ACTIVITIES COMPLETED AND OUTPUT CONTRIBUTION PLAN		
OUTPUTS & ACTIVITIES	2012 (ACTUAL)	2013 (PLAN)	2014 (PLAN)
		<ul style="list-style-type: none"> - Existing resource assessments for CLV have been compiled, international assessment methods identified and a proposed assessment framework is being reviewed 	
4.1 Establishment of baseline information and monitoring and evaluation system for pilot projects by 2012	Not accomplished.	<p>Baselines will be established during the FS for each pilot, and also as part of the pilot implementation reporting and completion</p> <p>By 31 March:</p> <ul style="list-style-type: none"> - Baseline requirements specified in the pilot feasibility study ToR - Social baselines in the FS will be triangulated with secondary data <p>Harmonization roadmap will be evaluated through participant surveys and reporting</p>	<p>Multi-stakeholder, user-focused evaluation forums used to complete and review each of the pilot studies.</p> <p>Training evaluations will be written up and assessed in terms of future needs and capacity building programs</p>
4.2 Conduct key studies such as life cycle assessments, least cost options, and eco-labeling by 2013	Not accomplished.	<p>Studies will be undertaken during the second half of 2013</p> <ul style="list-style-type: none"> - Life cycle assessment - Least cost options <p>By 31 March:</p> <ul style="list-style-type: none"> - Options have been outlined for using the pilot projects as case studies for lifecycle and least cost assessments and how these could be combined with the biomass assessment framework within a multi-criterion decision framework. - Initial decision parameters are being defined and will be distributed to each Technical Focal Points for their review and 	

DMF	ACTIVITIES COMPLETED AND OUTPUT CONTRIBUTION PLAN		
OUTPUTS & ACTIVITIES	2012 (ACTUAL)	2013 (PLAN)	2014 (PLAN)
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	Not accomplished.	<p>comment in April.</p> <p>Initial draft will be completed during Q2 2013</p> <p>Booklets will be prepared off the knowledge products contracted for delivery in Q4 2013</p> <p>By 31 March:</p> <ul style="list-style-type: none"> - Draft outlines for knowledge products in Biochar have been prepared and are being reviewed by potential service providers 	<p>Peer review and publications</p> <p>Booklets finalized and distributed via distance learning platform</p>
4.4 Analysis of potential climate change scenarios and their likely impact on the availability of different type of biomass and assessment of need for the development of alternative biomass sources by 2013	Not accomplished.	<p>Frameworks for climate emission and carbon assessment and reporting will be developed during 2013 for peer review in Q4 and integrated with standards, labeling harmonization</p> <p>By 31 March:</p> <ul style="list-style-type: none"> - Climate change framework and emissions assessment is proposed using the TA consortia member Nexus experts through contract variation detailed in the submitted inception report 	Finalization of climate emission framework

3. DETAILS OF PROJECT PROGRESS & PERFORMANCE

3.1. PROJECT IMPLEMENTATION PROGRESS

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

The 1st GMS Regional Forum on Harmonization of Bioenergy Standards was held in Nanning, China in July 2012. The Forum provided the opportunity to prepare and agree a harmonization roadmap mechanism to engage all the three implementing countries in agreed priorities and procedures for strengthening national and regional institutional co-alignment in the twin areas of bioenergy and food security. The roadmap is being enacted and elaborated through ongoing efforts and a series of national forums scheduled for May 2013. These national forums will address identification, awareness-raising, priority-setting and, where necessary, preparation of national standards, policies and institutional framework options that will input to the GMS Regional Forum and future national forums. Cambodia and Viet Nam are in the final stages of defining their agendas and timetables. Lao PDR is expected to do likewise by 31 March 2013.

The national forums will be informed from the national review of laws, regulations, policy and plans that is currently in process. Further the forums will be used to identify priority application of proposed eco-labels and the viability of developing a regional eco-label as opposed to specific national value chain labels such as a Viet Nam Climate Friendly Rice label. The forums will be reported to regional stakeholders in the 2nd GMS Regional Forum in November 2013.

The proposed study into participatory guarantee schemes (PGS) has been defined in terms of scope, approach and structure of final study outputs. The field information required for the research and the proposed case studies will be defined prior to the national forums during which the TA will discuss with the TFPs and national policy experts the scope and potential case studies.

The review of international standards and certification has been defined in terms of scope and proposed output. Currently materials are being sourced from libraries, the internet and TA expert networks. The initial synthesis of these will be collated and presented to the TA stakeholders and participants at the national forums.

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

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

A review of the private sector and financing modalities has been completed, with the options paper in a final edit stage for an ADB knowledge product. The current assessment draft has identified numerous innovative options but is light on the basis for integration of options within the relevant value chains in each country. As such, the report requires more input to provide the necessary public-private sector context within which these could operate. The shortfall will be addressed through the feasibility studies to be completed for each pilot project, where after the report will be circulated for peer review and comments before dissemination.

Country-wise stakeholder consultation in December identified each country priorities for pilot investments to be implemented by the TA. According to these priorities, concept papers were

prepared for the follow-on pilots and used to confirm government commitment. In January 2013 the procurement procedures were negotiated with ADB to enable Consultant Qualification Selection (CQS) procurement procedures to be used, recognizing the highly specific nature of the work required, short time-intervals involved and few potential qualified service providers available.

EOIs were sought in both Cambodia and Viet Nam in February 2013 via ADB's website and local newspapers. Cambodia EOIs are being reviewed in the last week of March while Viet Nam evaluations are complete and the ranking outcomes presented to Government for confirmation. Lao PDR has taken longer to obtain official approvals and the EOIs deadline is 05 April 2013. It is expected that the Feasibility Studies will be contracted by the end of April and completed by mid-June. Pilot investments will operate from July 2013.

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

The TA7833 capacity building program applies a blended approach to activities such as public awareness campaigns, distance-learning methodologies, in-situ and field demonstrations during project implementation. The focus of capacity development generally falls on the pilot project topics as agreed with the IAs and listed in APPENDIX 4:

The institutional mapping exercise carried out during the inception phase resulted in a list of organizations that already provide services relating to capacity building on biomass-to-energy technologies and improved food production in the GMS (see Inception Report).

i) Awareness-Raising

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

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

- Interrelation of bioenergy and food security sectors;
- Overview of bioenergy technologies (biochar, biogas/bioslurry, ICS and liquid biofuels);
- National status & perspectives on efficient utilization of biomass for bioenergy & food security;
- Working group sessions: a) Sustainability indicators for bioenergy & food security; b) Private sector participation and financing modalities for bioenergy & food security; c) Policy & regulatory coherence for bioenergy & food security.

By 31 March, the TA team has collated and screened a large selection of relevant awareness-raising materials covering these interrelated topics. A sub-contract will be signed to tailor this material into a single, coherent, info-video to be both burned to DVD *and* hosted on the Internet.

Significant awareness-raising activities targeted at rural communities have been incorporated into the feasibility study and pilot project design terms of reference – e.g. ICS demos via women unions, etc. Progress on these and the above will be reported in the Q2 2013 progress report.

ii) Training

In September 2012, TA7833 provided support for attendance of the TFP-Biochar from CLV (total 3 participants; 0% women) at the International Biochar Initiative (IBI) Congress in Beijing, China. The participants benefitted from presentations and intensive discussions surrounding: a) the application

potential of biochar in an agricultural-dominant country; b) biochar and soil processes; c) biochar and climate change mitigation, and; d) biochar production in bigger scale. See APPENDIX 3:1;

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

TA7833 aims to further develop analytical capacity in government stakeholders in CLV countries through training in the application of the FAO's **Bioenergy and Food Security (BEFS)** Analytical Framework and Tool Box⁶. At the request of the NFPs, the Consultant initiated dialogue with FAO to provide regional, and if required, national trainings to government officials and technical staff on the BEFS tools. An introduction of the NFPs to BEFS Criteria and Indicators is a critical step to regional standard harmonization and will enable NFPs and TFPs to monitor and support the approved pilot projects and to assure that the ensuing loan projects will apply these internationally and regionally agreed criteria and indicators.

BEFS training will be initiated through a participatory training session in each country, linked to the national forums in May 2013, wherein the TA team will facilitate the presentation (via webconference led by FAO resource person) and then practical application of the BEFS Analytical Framework to the various proposed pilot project topics. This session will include the NFPs, TFPs, provincial government officials and feasibility study service providers, with the outcomes being used to enhance final pilot project design. These sessions are in the planning process and the activity proposal will be circulated for comments by 31 March 2013. Resource materials will be adapted from prior FAO events and tailored to the GMS context and target groups.

Building upon this experience, the BEFS Analytical Framework will be the focus of a detailed session at the 1st GMS Conference on Household Bioenergy and Food Security in November 2013 wherein the learning from May's session and subsequent experience from pilot project implementation will be applied to the Framework for the attention of a wider target group. This session will be incorporated into the activity proposal for the GMS Conference. Resource materials will be adapted from prior FAO events and tailored to the GMS context and target groups.

iii) Distance Learning

Distance learning activities will be focused on the last quarter 2013 and 2014 to enable the materials developed during the implementation of TA7833 to be incorporated.

The distance-learning program will utilize the ADB Institute to host a series of learning modules covering the key bioenergy and food security topics covered by TA7833 ToR. Participants will be selected via the feedback questionnaires from awareness-raising video campaign and by nomination by the IAs (est. total of 20 per country). ADB Institute will award a certificate on completion.

⁶ www.fao.org/bioenergy/foodsecurity/befs

Module 1 will be used to pilot the concept by adapting the awareness-raising video campaign material into distance learning resource pack for a moderated online webinar, preparatory work and online test.

3.1.4. Output 4: Knowledge products developed and disseminated

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

The biomass feedstock assessment priorities have been agreed and the experts have started to collate a very significant number of existing assessments of biomass in the countries as well as from the wider region. These will be reviewed and used to provide options for each country on how biomass and feedstock assessments can be undertaken. Based on the proposed framework an initial feedstock assessment will be developed using mostly secondary data sources and data collected during the feasibility studies.

Proposed knowledge products for biochar and GHG emissions assessment are in preparation with an initial scope of work under discussion with potential service providers.

Additional knowledge products linked to ICS and biogas will be defined in the 3rd quarter of 2013, however it is increasingly likely that this will be a collation and linkage to existing materials of which there is a significant volume.

3.2. PROJECT MANAGEMENT

3.2.1. Summary of Consultant TA team

The first of the international consultants were mobilized in December 2011 and the others thereafter as shown in Table 2.

Table 2: International staff engaged on TA7833 (31 March 2013; contract variation#2)

NAME	SPECIALIST POSITION	INPUTS UTILIZED (MONTHS)	INPUTS REMAINING (MONTHS)
SAUNDERS *	Team Leader	7.25	5.75
BARACOL-PINHÃO	Legal Standards & Certification Specialist	3.37	2.5
MUNFORD**	Capacity Building & Distance Learning Specialist	0.0	3.0
BLOOMFIELD	Improved Cookstove Specialist	0.75	0.25
YAPP	Private Sector Development Specialist	4.67	2.0
SHACKLEY	Biomass / Biochar Technology Specialist	0.88	4.0

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

**Mr. MUNFORD replaced by Mrs. Elizabeth HUBA in January 2013

i) Cambodia

Cambodian national TA consultants were mobilized from December 2011. The TA7833 project office was set up at MAFF in Phnom Penh in a meeting room on the 3rd floor of the Inspection Department. The procurement of office equipment received ADB approval in March 2012 and was mostly delivered and installed by May 2012. Asset registers have been shared with ADB and the

IAs. To allow the undisturbed parallel use of the meeting room for other office work, a room separator was also installed at the cost of the TA, along with minor renovations. This procurement procedure has been completed. Names and positions of the Consultant's Cambodian national staff are shown in Table 3. To support coordination TA7833 consultants plan to meet with the Implementation Agency every month.

Table 3: Cambodian national staff engaged on TA7833 (31 March 2013; contract variation#2)

NAME	SEX	SPECIALIST POSITION	INPUTS UTILIZED (MONTHS)	INPUTS REMAINING (MONTHS)
Sovannarith HEM	M	National Project Implementation Specialist (NPI)	10.5	13.0
Visal SOUN *	M	Legal, Standards and Certification Specialist	0.4	0.0
Bona SAM	M	Private Sector Development Specialist	2.12	2.88
Davuth DY**	M	Capacity Building & Distance Learning Specialist	1.5	0.0
Navy HAP***	F	Social Development Consultant	1.07	0.0
Sokheng KEO	M	Project Assistant	Full-Time	

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

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

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

ii) Lao PDR

The Lao PDR national TA team was mobilized from December 2011. The TA7833 project office was setup at MAF headquarters in Vientiane and has been in use since February 2012. The procurement of office equipment was completed as planned.. Names and positions of the Consultant's Lao national staff are shown in Table 4. To support coordination TA7833 consultants plan to meet with the Implementation Agency every month.

Table 4: Lao PDR national staff engaged on TA7833 (31 March 2013; contract variation#2)

NAME	SEX	SPECIALIST POSITION	INPUTS UTILIZED (MONTHS)	INPUTS REMAINING (MONTHS)
Phonexay KHAMMAVONG	M	National Project Implementation	9.5	13.0
Singthilath THONGDENG*	M	Legal, Standards and Certification	0.77	2.0
Bounthavy CHALEUNPHONH	M	Private Sector Development	1.4	3.6
Savengkith PHOMMAHACK**	M	Capacity Building & Distance Learning	0.33	0.0
Duangchith VIRAVONGSA***	F	Social Development Consultant	0.33	0.0
Daraphone RATTANAVONG	F	Project Assistant	Part-Time	

*Mr. THONGDENG resigned in Feb 2012 and is to be replaced by Mr. Phouvong CHITTANAVANH in Apr 2013

**Mr. PHOMMAHACK resigned in June 2012 and Mr. CHALEUNPHONH and Mr. KHAMMAVONG took over these tasks

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

iii) Viet Nam

The Vietnamese national TA team was mobilized from December 2011 onwards. A TA7833 project office was set up on the 9th floor of the newly relocated APMB of MARD in Tay Ho, Hanoi and is in use since February 2012. The procurement of office equipment has now been completed. Names and positions of the Consultant's Cambodian national staff are shown in Table 5. To support coordination TA7833 consultants plan to meet with the Implementation Agency every month.

Table 5: Vietnamese national staff engaged on TA7833 (31 March 2013; contract variation#2)

NAME	SEX	SPECIALIST POSITION	INPUTS UTILIZED (MONTHS)	INPUTS REMAINING (MONTHS)
Li Thi THOA*	M	National Project Implementation Specialist	8.0	13.0
NGUYEN Minh Bao	M	Legal, Standards and Certification Specialist	1.15	2.33
LINH Le Thi My	F	Private Sector Development Specialist	1.23	2.77
HO Lan Huong**	F	Capacity Building & Distance Learning	0.78	0.0
HA Huu Nga***	F	Social Development Consultant	0.3	0.0
VU Trang	F	Project Assistant	Part-Time	

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

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

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

3.3. PROJECT DISBURSEMENT

Table 6: Summary of TA7833-REG Project Disbursement Summary (31 March 2013) / US\$

Category	Budget	VO#1	Disbursed	Balance
1200 Equipment	90,000	90,000	20,928	69,072
1300 Seminars, Workshops & Training	560,000	560,000	84,120	475,880
1400 Studies, Surveys & Reports	925,000	925,000	0	925,000
TOTAL	1,575,000	1,575,000	105,048	1,469,952

4. LESSONS LEARNT, STRATEGIC ISSUES & RECOMMENDATIONS

Provide a critical review of key issues identified and provide advice and proposals for relevant strategies and broad initiatives for addressing said issues.

ISSUES ENCOUNTERED	RECOMMENDATIONS & REMEDIAL ACTIONS
<p>Regional cooperation Lack of operational procedures for ADB implementation and procurement in Regional Technical Assistance Projects</p>	<p>WGA standard operating procedures (SOPs) covering the role of the public sector in Regional TA projects and the basis for their engagement for services supported by an ADB OSFMD agreement for the procurement systems and documentation required.</p> <p>Other issues need to address: incentives for Government staff participation (facing various requests for fees to officials for providing services such as bid evaluations); translation and agreement of common language for RETAs (English); provision of project office facilities; etc.</p> <p>SOPs are under preparation by TA7833 Regional Cooperation Specialist for discussion at WGA10 in April 2013.</p>
<p>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. The ADB and Consultant have raised concerns about these initial delays in TA inception and implementation and their knock-on effect on the project performance – e.g. the DMF references milestones in 2011, even though the contract was not signed until December 2011.</p>	<p>Such constraints are to be expected due to the complex regional nature and innovative, pioneering approach of TA7833. All parties continue to work hard to recover the lost time.</p> <p>Enhancing opportunities for communication and collaboration are considered prime approaches for enhancing engagement and the Consultant has proposed monthly meetings at priority pilot project sites to achieve this goal (under review by ADB).</p>
<p>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 TA Team Leader and a lack of project progress.</p>	<p>Team leader replaced and TA team and approach streamlined. Revised work plan elaborated and distributed to project partners.</p>
<p>Immature technologies The ToR specify up-scaling of a wide range of technologies, however many of these are not sufficiently mature for up-scaling.</p>	<p>Liquid biofuels such as jatropha-derived biodiesel will not be included in TA activities due to key concerns about the feasibility of jatropha, lack of farmer / government commitment and interest and the broad-based questions regarding the potentially negative correlation between jatropha production and food security.</p> <p>Biochar and bioslurry technologies are also assessed to be too immature and as such the targets for their adoption in the DMF are considered too optimistic.</p> <p>Pilot projects will focus on demonstrating production and management of the more immature technologies and how these products can be integrated into greener value chains.</p>
<p>Scale of technology</p>	

	<p>The preference for household-level technology, while appropriate for ICS, may be inappropriate for biochar and to a lesser extent bioslurry. The financial viability of such technologies will determine the extent of their adoption. However TA findings and expert opinion currently suggests that the viability of small-scale technology that has adequate safeguards may be insufficient to generate viability and attract investment and adoption.</p> <p>Experience in Thailand and China suggest that the biochar and bioslurry sectors emerge from a demand for biofertilizer from specialist agents that collect from product catchment areas. Further discussion is ongoing on the correct scale for these two technologies as a part of the feasibility studies.</p>
<p><i>Donor crowding within the ICS sector</i></p>	<p>The ICS sector has a range of players many of whom offer subsidies and grants for the adoption of ICS technologies. The continued investment from the WB, EU and other ADB TA's that offer more concessional investment makes a purely commercial value chain less likely. The TA is focusing its ICS pilots on stove producer risk reduction through skill development, and demand aggregation through women's unions.</p>
<p><i>Innovative financing mechanisms</i></p> <p>The purpose of the TA is to pilot implementation mechanisms. The assumption being that innovative implementation mechanisms will support up-scaling initiatives more effectively. Numerous innovative financing mechanisms were identified by the TA in 2012 and provisionally endorsed by the ADB and team leadership in relation to proposed potential pilot implementation modalities. However, rigorous internal review has revealed that: (i) the nature of the modalities is not fully understood by all project parties; (ii) the complex institutional requirements for options including revolving funds and social merchant banking are not in place; (iii) the constraint of timelines for outcome-based funding would ensure that the TA would be closed prior to outcomes being achieved, making financing impossible; (iv) the TA resources are too limited to adequately finance the required investment funds including development bonds and social merchant banks at sufficient scale; (v) the risk averse nature and novelty factor of national and regional private sector stakeholders for engaging in such innovative modalities, and; (vi) the questionable performance of some of the proposed mechanisms, across a range of scenarios (e.g. Nepal), and the degree to which critical success factors are represented within the GMS – e.g. social merchant banking is a mix of financing modalities that individually are used in other ADB loan projects, many of which require 1-2 years to establish.</p>	<p>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.</p> <p>The financing modality for biogas and biochar will continue to emerge throughout the pilot Feasibility Studies and their implementation.</p> <p>Private-sector stakeholders and financing institutions will continue to be targeted for relevant awareness-raising and capacity building activities so as to raise the profile and confidence levels of potential future investors re. TA7833-relevant themes.</p>

APPENDIX 1: DESIGN & MONITORING FRAMEWORK

Design Summary	Performance Targets & Indicators with Baselines	Data Sources & Reporting Mechanisms	Assumptions and Risks
<p>Impact</p> <p>Improved use of biomass in Cambodia, the Lao PDR, and Viet Nam</p>	<p>By 2020:</p> <p>5% increase in production of clean bioenergy from biomass (2011 baseline: 0.1%)</p> <p>5% increase in use of by-products of bioenergy systems (bio-slurry and biochar) (2011 baseline:0%)</p>	<p>Project baseline and benchmark surveys</p> <p>Periodic surveys and annual reports of agriculture and energy ministries of Cambodia, the Lao PDR, and Viet Nam⁷</p>	<p>Assumptions</p> <p>The governments of Cambodia, the Lao PDR, and Viet Nam remain committed to regional cooperation in clean bioenergy and food security.</p> <p>Risk</p> <p>Private sector investment is constrained by over-regulation.</p>
<p>Outcome</p> <p>Efficiently operating pilot projects in biomass use</p>	<p>By 2014:</p> <p>At least two investment modalities for biogas and bioslurry (Cambodia and the Lao PDR); three for biochar (Cambodia, the Lao PDR, and Viet Nam); two for improved cookstoves (the Lao PDR and Viet Nam); and three for inclusive supply chain of certified biofuel and organic crops in (Cambodia, the Lao PDR, and Viet Nam)</p>	<p>Project completion report</p> <p>Annual reports from agriculture ministries of Cambodia, the Lao PDR, and Viet Nam</p>	<p>Assumptions</p> <p>The central and provincial governments remain committed to working with the poor in remote areas.</p> <p>Risk</p> <p>Pilot projects are not successfully implemented.</p>

⁷ a Ministry of Agriculture, Forestry and Fisheries (Cambodia); Ministry of Agriculture and Forestry (Lao PDR); and Ministry of Agriculture and Rural Development (Viet Nam)

<p>Outputs</p> <p><i>1. Enhanced regional cooperation in bioenergy development to foster and safeguard food security</i></p> <p><i>2. Pilot-tested climate-friendly biomass investment projects for wider implementation</i></p> <p><i>3. Enhanced capacity for efficient use of biomass</i></p> <p><i>4. Development and dissemination of knowledge products</i></p>	<p>By 2014:</p> <p>Mechanism tested for harmonizing at least three bioenergy standards⁸ and certification systems, and a common method of assessing greenhouse gases</p> <p>Construction of at least 500 bio-digesters, 600 biochar kilns, 75,000 improved cookstoves; and introduction of at least 300 farmers to sustainable certification standards</p> <p>Increased capacity for gender-sensitive investment among at least 500 government officials, 400 service providers, and 3,000 lead farmers (i.e., at least 55% of those to be trained will be women and at least 70% of those trained will have increased capacity)</p> <p>Methodology for assessing and prioritizing the use of biomass for bioenergy and food security</p> <p>Compendium of good practices in biomass use</p> <p>Booklets on different models of improved cookstove, biochar kiln, and biodigesters</p>	<p>Consultants' reports and document records of agriculture ministries of Cambodia, the Lao PDR, and Viet Nam</p> <p>Agricultural household survey reports of Cambodia, the Lao PDR, and Viet Nam</p> <p>Benefit and impact monitoring reports</p> <p>Project review missions</p>	<p>Assumptions</p> <p>The consulting team is given timely access to records, information, personnel, and relevant geographic sites.</p> <p>Local officials, technicians, and lead farmers are available to participate in training</p> <p>Development partners and the private sector are keen to participate in the TA activities.</p> <p>Risks</p> <p>Cambodia, the Lao PDR, and Viet Nam cannot agree on harmonized standards and certification systems</p>
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⁸ b Including standards set by such organizations as the Global Alliance on Clean Cookstoves and the Roundtable on Sustainable Biofuels, along with quality assurance from regional quality assurance centers to be established for biogas, improved cookstoves, bio-char, etc.

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

Tasks and Activities	2012				2013												2014																																									
	Q1	Q2	Q3	Q4	Jan			Feb			March			April			May			Jun			Jul			Aug			Sept			Oct			Nov			Dec			Jan			Feb			Mar			Apr			May			Jun		
					1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2
1.3 Inform & enhance biomass, bioenergy & food security policy dialogues relating to standards operationalization & quality control																																																										
i	Study on feasibility & development of GBEP labelling system																																																									
	ToR preparation																																																									
	Approval																																																									
	Study contracted																																																									
	Completion																																																									
	External peer review																																																									
	Delivery of knowledge product																																																									
ii	Study on the feasibility of a CLV traceability system																																																									
	ToR preparation																																																									
	Approval																																																									
	Study contracted																																																									
	Completion																																																									
	External peer review																																																									
	Delivery of knowledge product																																																									
iii	Review of international standards and certification systems on bioenergy and climate-friendly agriculture																																																									
	Prepare outline of review for team comments																																																									
	Initial draft for team inputs/comments																																																									
	External peer review																																																									
	Knowledge products																																																									
iv	Case Studies on Participatory Guarantee Systems																																																									
	Preparation of study outline/methodology for team review																																																									
	Desk study of international experience																																																									
	Desk study of country level secondary sources																																																									
	Field study																																																									
	Consolidation of findings																																																									
	Draft paper for review																																																									
	Completion/Submission of case studies																																																									
	Delivery of knowledge product																																																									
	Recommendations for a program on climate friendly certification development under ADB investment program																																																									
v	Review of relevant CLV laws, regulations, policies and plans																																																									
	ToR preparation																																																									
	Approval																																																									
	Study contracted																																																									
	Initial comments																																																									
	Recommendations and completion																																																									
	External peer review																																																									
	Delivery of knowledge product																																																									

2. OUTPUT 2

Tasks and Activities	2012				2013												2014																																									
	Q1	Q2	Q3	Q4	Jan			Feb			March			April			May			Jun			Jul			Aug			Sept			Oct			Nov			Dec			Jan			Feb			Mar			Apr			May			Jun		
					1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	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																																																										
<i>i</i>	<i>Review current situation/status</i>																																																									
<i>ii</i>	<i>Identify and assess existing technology</i>																																																									
<i>iii</i>	<i>Counterpart ranking of technologies</i>																																																									
<i>iv</i>	<i>Technology readiness Assessments</i>																																																									
<i>v</i>	<i>Country Agreement on priority technology pilots</i>																																																									
<i>vi</i>	<i>Country level consultations</i>																																																									
2.2 Pilot Feasibility studies and due diligence																																																										
<i>i</i>	<i>Identify scope and output for pilot concepts</i>																																																									
<i>ii</i>	<i>Identify potential stakeholders and partners</i>																																																									
<i>iii</i>	<i>Prepare feasibility study terms of reference</i>																																																									
<i>iv</i>	<i>Procure service provider</i>																																																									
<i>v</i>	<i>Feasibility study implementation</i>																																																									
<i>vi</i>	<i>Government consultation</i>																																																									
<i>vii</i>	<i>Specify due diligence and social baselines</i>																																																									
2.3 Pilot implementation and monitoring																																																										
<i>i</i>	<i>Definition of terms of reference</i>																																																									
<i>ii</i>	<i>Procure implementation service providers (QCBS)</i>																																																									
<i>iii</i>	<i>Implementation Agency Agreements</i>																																																									
<i>iv</i>	<i>Pilot implementation</i>																																																									
	- stakeholder awareness																																																									
	- supply side programs																																																									
	- demand creation and aggregation																																																									
	- sales and capacity building																																																									
	- monitoring and evaluation																																																									
<i>v</i>	<i>Final Report Review and Consultation</i>																																																									
2.4 Regional investment subproject model formulation																																																										
<i>i</i>	<i>Stakeholder Meeting to review each subproject</i>																																																									
	- lessons learned proposed outputs																																																									
	- draft DMF																																																									
	- subproject model specification, implementation arrangements																																																									
<i>ii</i>	<i>Regional meeting to share lessons and approaches</i>																																																									
<i>iii</i>	<i>Final preparation of core subprojects for follow-on investment programs</i>																																																									

3. OUTPUT 3

Tasks and Activities	2012				2013												2014																																									
	Q1	Q2	Q3	Q4	Jan			Feb			March			April			May			Jun			Jul			Aug			Sept			Oct			Nov			Dec			Jan			Feb			Mar			Apr			May			Jun		
					1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2
Output 3: Enhanced Capacity for Efficient Use of Biomass																																																										
3.1 Development and delivery of awareness-raising programs																																																										
<i>i Develop and deliver awareness-raising material on efficient use of biomass for bioenergy and food security</i>																																																										
Collation and consolidation of existing resources																																																										
Prepare policy briefs relating to bioenergy and CFA																																																										
<i>ii Finalise list of target agencies and individuals</i>																																																										
<i>iii Plan awareness-raising campaign inc. schedule, M&E and multimedia delivery mechanisms</i>																																																										
<i>iv Manage advertising and delivery of multimedia awareness-raising program</i>																																																										
<i>v Collate feedback, evaluation findings and experiences</i>																																																										
<i>vi Re-launch awareness-raising program</i>																																																										
<i>vii Develop and deliver specific awareness-raising materials for farmers</i>																																																										
3.2 Develop and deliver training and capacity building programs																																																										
<i>i Capacity development needs assessment</i>																																																										
<i>ii In-situ training and facilitation</i>																																																										
BEFS Approach																																																										
Sustainability indicators, primarily based on GBEP																																																										
AROS standards																																																										
Biomass assessment methods and approaches																																																										
Innovative financing mechanisms for scaling-up bioenergy and food security investments and activities																																																										
ADB investment project readiness and implementation																																																										
<i>iii Facilitate regional study tours and biomass technology exposure visits</i>																																																										
Biochar, including production via kilns, gasification ICS, etc.																																																										
Biogas / bioslurry																																																										
ICS, including technology assessment and testing																																																										
<i>iv Develop and deliver distance learning program</i>																																																										
<i>v Evaluation and adaptation of training & capacity development resources</i>																																																										
3.3 Development of a social baseline for the proposed investment project																																																										
<i>i Incorporation in Feasibility Terms of Reference</i>																																																										
<i>ii Social survey completed by FS service providers</i>																																																										
<i>iii Consolidation of social survey findings across pilots</i>																																																										
<i>iv Assemblage of secondary data and data triangulation</i>																																																										
<i>v Draft SPRSS report for each investment loan (n=3)</i>																																																										
3.4 Organize annual international conference on household bioenergy and food security																																																										

4. OUTPUT 4

Tasks and Activities	2012				2013												2014																																										
	Q1	Q2	Q3	Q4	Jan			Feb			March			April			May			Jun			Jul			Aug			Sept			Oct			Nov			Dec			Jan			Feb			Mar			Apr			May			Jun			
					1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3
OUTPUT 4: DEVELOPMENT & DISSEMINATION OF KNOWLEDGE PRODUCTS																																																											
4.1 Baseline Assessments																																																											
<i>i</i> Conduct baseline survey of biomass resources and technologies																																																											
Review of current biomass assessments and data availability within the GMS																																																											
Present biomass resource assessment findings and technology readiness assessments																																																											
<i>ii</i> Complete a least costs assessment of available biomass technologies																																																											
<i>iii</i> Identify international biomass assessment and priority assessment frameworks																																																											
<i>iv</i> Conduct a lifecycle assessment for alternative biomass resources and technologies																																																											
<i>v</i> Prioritize options and recommend a common approach across each participating country																																																											
4.2 Compile compendium of best practice in efficient utilization of biomass																																																											
Develop a proposed scope and outline of compendium																																																											
Update scope based on comment																																																											
Identify international, regional and national best practice for inclusion																																																											
Review examples and select for inclusion write up																																																											
Distribute for reviews and include comments																																																											
Incorporate findings from Output 4 .A above																																																											
Peer review draft																																																											
External peer review																																																											
Finalise and distribute																																																											
4.3 Develop & disseminate knowledge products to support efficient biomass utilization technology																																																											
Devise knowledge product development and dissemination plan																																																											
Agree standard templates / logos with ADB and IAs																																																											
Contract Biochar Kmngte product - IBI																																																											
Contract ICS knowledge management product -GERES																																																											
Contract Carbon Assessment Knowledge Product - Nexus																																																											
Collate Biogas Kmngte product																																																											
Collate household rural energy knowledge product																																																											

APPENDIX 3: REPORTS & DELIVERABLES

1. BACK TO OFFICE REPORTS: IBI CONGRESS, BEIJING (SEPT 2012)

TA7833-VIE: Back to Office Report

EVENT:	The 4th International Biochar Congress
LOCATION:	Beijing, China
DATE(S):	16 - 20 September, 2012.
NAME:	Nguyen Nam Khanh - TA7833-VIE Project Preparation Officer

The event topic	The congress topic is: Biochar, the Road to Richer Food and Safer Environment. <i>The application potential of biochar in an agricultural-dominant country, biochar and soil processes, biochar and climate change mitigation, and biochar production.</i>
Discussion summary	<p>The 4 key reports were:</p> <ol style="list-style-type: none"> 1. <i>A biochar solution for the low yield arable land in China?</i> This was given by the Congress Chair Prof. Lin Qimei 2. <i>Connecting biochar properties with biochar processes in soil</i>, by Prof. Johannes Lehmann, Chair of IBI. 3. <i>Mitigation of climate change with biochar: what is possible?</i> By Prof. James Amonette, Pacific Northwest National Laboratory, USA. 4. <i>Pathways to large scale production of high quality biochar</i>, by Dr. Christian Roy, Pyrovac Inc. Canada. <p>These reports gave participants a whole picture of the application potential of biochar in an agricultural-dominant country, biochar and soil processes, biochar and climate change mitigation, and biochar production in bigger scale.</p> <p>There were 68 oral presentations and 50 poster presentations on the following 5 themes:</p> <ol style="list-style-type: none"> 1. Biochar Making & Properties 2. Biochar & Plant Growth 3. Biochar & Soil Processes 4. Biochar & Climate Change 5. Biochar & Environment. <p>Many of the reports highlighted new results of research activities. These reports posed a challenge to the scientific community to identify the short- and long-term risks of biochar incorporation to soil, if any, and how those risks may be overcome, before biochar can be widely used commercially.</p> <p>Some of the key results coming out of the conference included discussions on the most practical way for climate warming mitigation by biochar relying on the large amount use of low-tech biochar producing equipment fed with thinly distributed bio-waste; the community needs to explore methods to apply biochar in agriculture; results from a recent 3 year field experiment showing that biochar incorporation did not improve wheat and maize yield; biochar impacts herbicide efficacy and its effect in conservation tillage</p>

	<p>needs more attention the functional bioassay of biochar's effects on soil processes is more related to plant response; and thermal carbonization is a potential way to minimize moist bio-waste and produce biochar with less stability in soil.</p> <p>In conclusion, The conference themes and sub-themes were well chosen and there were many interesting presentations and discussions in plenary and in the numerous parallel sessions. The participant acquired a list of new contacts and links that will be 'put into use' in future network activities and follow-up. For instance, after the Congress, we worked with Mr. Dylan Maxwell from Novotera Biochar in Vietnam on how to make and apply ICS in the project and in Vietnam.</p>
Recommendations / Conclusions	The Congress provided good chance for biochar researchers of the world to meet each others. It was also a good opportunity to make new friends, hold face to face discussions, and build new cooperative relationships. It was also an excellent opportunity for acquiring new knowledge and information about biochar.
Annex 1	<p>Four congress reports were given to all participants after the opening ceremony which included:</p> <ol style="list-style-type: none"> 1. <i>A biochar solution for the low yield arable land in China?</i> This was given by the Congress Chair Prof. Lin Qimei 2. <i>Connecting biochar properties with biochar processes in soil</i>, by Prof. Johannes Lehmann, Chair of IBI. 3. <i>Mitigation of climate change with biochar: what is possible?</i> By Prof. James Amonette, Pacific Northwest National Laboratory, USA. 4. <i>Pathways to large scale production of high quality biochar</i>, by Dr. Christian Roy, Pyrovac Inc. Canada.
Annex 2	
Annex 3	<p>If other meetings (name, position, date and principal outcomes of the meeting)</p> <ol style="list-style-type: none"> 1. Mr. Christian Roy - CEO of Pyrovac. Subject: Pathways to large scale production of high quality biochar. 2. Prof. Stephen Joseph - University of New Southwales, Australia 2. Prof. Yoshiyuki Shinogi - Kyushu University 3. Ondrej Masek - University of Edinburgh, UK

TA7833-CAM: Back to Office Report

EVENT:	4 th International Biochar Congress
LOCATION:	Beijing, PRC
DATE(S):	16-20 September 2012
NAME:	Mr. Chan Saruth, Director of Agricultural Engineering. MAFF, Cambodia / TA7833-CAM TFP-Biochar

Objectives of event and of participation	<ol style="list-style-type: none"> 1. To learn and share information on new research findings on Biochar application for dissemination; 2. To share experiences on Biochar application among participants; 3. To discuss on future Biochar research to promote Biochar application more widely, reduce GHG emission and soil amendment.
Resource materials	Only a Biochar compiled book from all presenters provided by the

obtained or made accessible	organizer
Discussion summary	<p>There were 5 themes presented in this congress namely 1) Biochar production and property right 2) Biochar and agricultural crops 3) Biochar and soil amendment 4) Biochar and climate change and 5) Biochar and Environment. Due to time constrains, I was able to join only theme 1, 2 and 3.</p> <p>During the congress session, I had discussed with Dr. Sunantar, ADB office in charge of TA7833 on future action to be taken under TA7833 and long distant biochar learning that supposed to be provided by International Biochar Initiative.</p> <p>Several presentations were interested, especially on biochar making devices and biochar application on agricultural crops that related to the TA7833's activity on biochar.</p> <p>Some Biochar making devices were introduced during this congress that can be considered and made in Cambodia.</p>
Recommendations/ Conclusions	<p>It was a good opportunity for acquiring new knowledge and sharing information for CLV participants on biochar making devices and biochar application on agricultural crops that can be applied in TA7833 in Cambodia, Laos and Vietnam.</p> <p>National Biochar Programme should be consider and established in order improve networking and cooperation with other local and international organizations on biochar application for agricultural crops and biochar making device..</p>
Action items for TA7833	<p>Presentation and report had been made with relevant staffs for information and knowledge from the congress and submitted to Ministry of Agriculture, Forestry and Fisheries for information and advice as well as to TFP/NPI and local coordinator TA7833 for sharing information and discuss for future action in Cambodia.</p> <p>3 different types of biochar device had been produced by Department of Agricultural Engineering, Cambodia.</p>
Annex 1	<p>Biochar networking:</p> <ul style="list-style-type: none"> - It proposed to establish biochar networking among participants in order to share information, experiences and cooperation. - Budget constraints and language barrier
Annex 2	<p>Long distant learning</p> <ul style="list-style-type: none"> - Capacity building on biochar through internet,
Annex 3	Not available
	<p>Dr. Sunantar, ADB office in charge of TA7833 18 September 2012, Beijing, PRC</p> <ul style="list-style-type: none"> - Future action to be taken under TA7833 and long distant biochar learning that supposed to be provided by International biochar Initiative; - Regional Biochar Conference supposed to be organized in Cambodia in 2013. <p>Dr. Stephen Joseph, Professor, Cornell University and the Vice Chairperson of International Biochar Initiative 18 September 2012, Beijing, PRC</p> <ul style="list-style-type: none"> - Biochar device introduced by him on Biochar pilot project in Vietnam; - Teaching materials on biochar application on various agricultural crops.

APPENDIX 4: LIST OF PROPOSED PILOT PROJECTS & FEASIBILITY STUDIES

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