



Asian Development Bank



Greater Mekong Subregion

Capacity Building for Efficient Utilization of Biomass for Bioenergy & Food Security in the GMS [TA7833-REG]



FINAL REPORT:

Rapid Appraisal Mission - Efficient Utilization of Biomass, Lao PDR

December 2013



KEY DATA

Name of Project:	Capacity Building for Efficient Utilization of Biomass for Bioenergy & Food Security in the GMS TA-7833 REG
Contractor:	Landell Mills Limited (LML), Bryer-Ash Business Park, Trowbridge, Wiltshire, BA14 8HE, UK Tel: +44 1225 763777 (www.landell-mills.com) in consortium with: Nexus Carbon for Development (Nexus), #33 E3 Sothearos Blvd, Corner St. #178, Phnom Penh, CAMBODIA (www.nexus-c4d.org)
Contracting Authority:	Asian Development Bank (ADB)
Start/End Date:	15 Dec 2011 - 15 March 2015
Budget:	N/A
Beneficiary:	Ministries of Agriculture of Cambodia, Lao PDR and Viet Nam
Location:	Greater Mekong Subregion, incl. Cambodia, Lao PDR and Viet Nam

QUALITY ASSURANCE STATEMENT

Version		Status	Date
Rapid Appraisal Mission - Efficient Utilization of Biomass, Lao PDR		Final	17/12/2013
	Name	Position	Date
Prepared by:	██████████		██████████
Checked by:	██████████	██████████	██████████

Report submitted by
LANDELL MILLS LTD

This report was prepared at the request and with the financial support of the ADB. The views expressed are those of the Consultants and do not necessarily reflect those of the Government of Lao PDR or the ADB.

Abbreviations and Acronyms

ADB	Asian Development Bank
B.	Ban (village)
Cluster	Koum Ban (Group of villages)
CFA	Climate-Friendly Agriculture
CLV	Cambodia, Lao PDR, Vietnam
DAEC	Department of Agriculture Extension and Cooperatives (renamed from NAFES: National Agriculture and Forest Extension Services)
DAFO	District Agriculture and Forestry Office of the province
DOA	Department of Agriculture, MAF
DOFS	Department of Livestock and Fisheries, MAF
DOPC	Department of Planning and Cooperation, MAF
DMF	Design and Monitoring Framework
FG	Farmer Groups
GMS	Greater Mekong Subregion
Ha (ha)	Hectare
ICS	Internal Control System
ICS	Improved Cook Stoves (Tao Pa Yat)
Kip	Lao Currency (Lao Kip)
Km	Kilometer
BPP	Biogas Pilot Project supported by SNV (Netherlands Development Agency)
LML	Landell Mills Limited
MAF	Ministry of Agriculture and Forestry of Lao PDR
OA	Organic Agriculture
OF	Organic Fertilizer
PAFO	Provincial Agriculture and Forestry Office (called in Lao Department of Agriculture and Forestry of Vientiane province)
PIC	Project Implementation Consultant
PPME	Project Performance Monitoring and Evaluation
NFP	National Focal Point
NGO	Non-Governmental Organization
NPI	National Project Implementation Specialist
Rai	Area of 40m x 40m
REG	Regional
SMART	TOR of each activity: S pecific (related clearly to the results the project is trying to achieve), M easurable (stated in quantifiable terms), A chievable (realistic about what is to be achieved), R elevant (useful for management), T ime-bound (they include target dates)
SME	Small and Medium Size Enterprise
SWOT	Strength, Weakness, Opportunity, Threat
TOR	Terms of reference
TA	Technical Assistance
TFP	Technical Focal Point
WGA	Working Group in Agriculture

Table of contents

	Page
I. Background	4
II. Methodology and Timeframe	4
III. Process	5
IV. Deliverables	11

Annexes:

- Map: Average size of agriculture land per household (Source: NSEDP7)
- Map: Distance of roads within Lao PDR (Source: ADB TA 7193: ODA Aid Effectiveness Project (Map of Vientiane province to be found out))
- 1. Rapid Appraisal Methodology
- 2. Rapid Appraisal Timeframe 26 September – 4 October 2013
- 3. Structured Questionnaire for Farmer Interview
- 4. Structure Questionnaire for Rice Miller Interview
- 5. Rapid Appraisal Mission Team
- 6. List of persons met by Rapid Appraisal Mission
- 7. Interviews Forms Q&A Filled out (separated into 2 folders: ANNEX 7A. 7 Rice Millers and ANNEX 7B. 20 farmers, groups, biogas & livestock, and entrepreneurs)
- 8. List of interviewed households by types: rice and vegetables, rice mills, biogas digesters and livestock, entrepreneurs
- 9. Table 1: Vegetables and other crops and areas
- 10. Table 2: Rice Mills in Vientiane Province
- 11. Table 3: Biogas Plants / Digesters in Vientiane Province
- 12. Laos_VTE province_Spreadsheet_Biomass Inventory
- 13. SWOT Analysis
- 14. Design and Monitoring Framework Road Map
- 15. Laos Pilot Projects Implementation Work Plan
- 16. Draft Structure Road Map to PAM: Laos Pilot Projects Implementation

DRAFT

Rapid Appraisal Report

By Lao National Project Implementation Specialist of the TA7833 Project

Draft version of October 14, 2013

I. Background

1. During the fourth week of September 2013, the Project Executive and ADB have approved the Rapid Appraisal Methodology (RAM) for Laos Pilot Projects to be conducted in Vientiane province as a starting point of the *TA7833-REG Output 2: Pilot-tested climate friendly biomass investment projects, for more extensive implementation*
2. The main objective of the Rapid Appraisal (RA) is a feasibility study for a pilot investment to demonstrate biomass products to support Climate Friendly Organic Vegetable Production for the Vientiane Organic vegetable Producers market with supporting due diligence
3. The specific objectives of RA are: i). to evaluate if the unused-rice husks from rice mills and bio-slurry from biogas digesters could be converted into composts and organic fertilizers; ii). to identify main target groups, farmer association/groups who are already involved in climate-friendly agriculture practices / organic vegetables and / or rice production and who will be the end-users of composts and organic fertilizers; iii). to assess the feasibility to collect, produce, package, distribute, market and sell composts / organic fertilizers to end-users such as vegetables and rice farmers, fruit orchard owners, nurseries; and iv). to identify where is a need, improved cook-stoves could also be included to provide clean cooking as awareness raising campaign

II. Methodology and timeframe

4. The Rapid Appraisal Methodology (RAM – See Appendix 1) and Timeframe (See in Appendix 2) have been elaborated by NPI in close collaboration with National Focal Point and TA7833 Team
5. Structured Questionnaire Templates (See in Appendix 3 and 4 respectively) for famers and rice millers interviews have been created (in Lao Language and then to be translated into English for analysis and consolidation of report) in order to facilitate easily the interview process by each individual RA Team member. Hands-on practices were carried-out
6. Spreadsheets and boxes and tables and other tools have been used for data collection and biomass inventory in the province and by district and by types of crops and livestock, biogas plants and rice mills

7. RA Team (See details in Appendix 5) has been set up and consisted of 8 members¹ for this purpose and division of labor has been made to conduct the survey based on experiences and education background and communication with ethnic minority community: daily evaluation has been convened after working hours or earlier morning session; the RA Team members stayed at same place Vangxang Resort (appropriate facility and meeting rooms) which is located in the middle between 2 clusters of villages and VTE administrative PAFO: distance from VTE capital: 64 km and from VTE province administrative center: 16 Km

III. Process

8. The 1st RA Team meeting has been convened at Department of Agriculture and Forestry (PAFO) of Vientiane province to introduce the approach and methodology of the rapid assessment and discussion made on how and what are better paths to follow to access information required and to communicate with local authorities and target farmers groups, especially ethnic minority community, rice millers, entrepreneurs etc
9. Starting point: a formal meeting with PAFO Management, Mr. Sithaheng Thongsavan, Acting Director General and his staff to introduce RA Mission's purposes, required better informed technical staff of District Agriculture and Forestry Offices (DAFO) and extension services clusters or centers. Fruitful consultations and guidelines have been observed: organic farming system is one of agricultural development priorities of the province. It has been informed of Phonsoung Agricultural Development Project supported by OXFARM Belgium – Good Agriculture Practices are on-going pilot projects, and ABD Smallholder Development Project is supporting / re-upgrading one organic farmer group in another district to pilot organic vegetables production (this group was dropped out from organic certification standard two year ago due to failure to follow Organic Standard Guidelines). Now after 18 months including conversion period, 18 households / farmer group (Boungphao) have been certified again as Green Organic Vegetables Production Group
10. During the formal meeting 4 districts (Viengkham, Vangvieng, Toulakhom and Phonhong) have been suggested for TA7833 pilot projects. Farmer Production Groups / Associations / Cooperatives are pioneering in these districts. However there is no organic farmer group yet, most of groups are practicing GAP. The NPI has clarified Phonhong district is more appropriate place (availability of biomass residue, unused rice husks etc.) starting with clusters of around KM 52. It was agreed that the RA should be conducted in these clusters with possible inclusion of surrounding villagers / interested farmers. Line local authorities district staff and clusters / extension staff should provide good cooperation and communication with RA Team during the assessment / survey
11. Formal meeting with Mr. Sinouan Chanthavong, Acting Director of DAFO Phonhong district, and his extension staff (Ms. Pavy, Mr. Khamvene, Ms. Khonsavanh) has been consulted on practical issues. DAFO structure links to clusters / extension

¹ Mr. Bounthavy Chaleunphonh NPI TA7833; Mr. Phouvong Chittanavanh LSC TA7833; Mr. Sengsouly Kommameung DOA CB MAF; Mr. Phonesavanh Vanmixay SIC DOPC MAF; Ms. Chantha Xayyavong DAFO ESC; Mr. Khamphong Phiewphongphanh PAFO ESC; Mr. Sangvane Chanthalangsy DAFO Livestock Specialist; and Mr. Lattana Phaxaysonbath TFP Biochar DAEC

centers: Phonsoung, Nalau, Pakcheng, Napho, Saka, Phontong etc. with a certain number of staff seconded to these clusters. The target villages / farmers groups were suggested for the TA7833 RA Mission. It was confirmed that there is no organic farmer group in the Nalau Cluster of Km 52, as well as Saka-Napho Cluster. There is no composts/organic fertilizers entrepreneur yet in the areas. (It was an humor-history telling that MALINI Firm tried to produced organic fertilizers for rice production without testing or piloting. The firm produced a certain quantity of organic fertilizers by using manure mixed with rice husks and black soil from the river. The firm sold out the fertilizers to rice farmers to use in their rice fields. Unfortunately (surprisingly) dangerous species of weeds were spread out in the fields and farmers claimed for these affects leading to factory closing: Reasons not clear). The potential is higher in terms of unused rice husks from rice mills, straw, manure if collected (now during paddy field plantation most of cattle and buffalos are free grazing in the community forests), sludge and slurry from biogas plants are partly used directly in liquid form to rice fields in the closer areas

12. Aerial photography / census of Phonhong district is not available, including lack of land use planning, except SUFFORD project under Forest Coverage Census of the Department of Forestry, MAF. PAFO and DAFO staff were requested to find out the appropriate map used by the provincial authorities such as Department of Natural Resources and Environment or Irrigation Department; NPI has to find out where and what maps to be made available for the pilot projects use
13. A joint meeting of clusters / leaders of villages / farmers groups / association / LWU / private sector / interested traders has been organized to brainstorm main activities / good practices and experiences / problems and weaknesses / needs and wants in the near future in terms of working in groups / association / interests in organic farming / entrepreneurial business model. The RA Team has introduced (by means of photo – pictures) a model family of organic vegetables grower – value chain – selling organic vegetables in organic market and organic shop in Vientiane capital. Family revenue / income has increased gradually from this value chain (started from small pilot plots in 2005 and now around 1 ha expanded)
14. The joint meeting² defined villages in the clusters / farmers groups / association / households and private sector to be involved in utilization of biomass for organic fertilizers / organic vegetables and rice / bioenergy. Three locations in different direction in two clusters have been selected:
 - Cluster 1. Named Nalau consists of three villages such as: 1). B. Nalau (Hmong ethnic minority community); 2). B. Phon Ngam Tai (Khmu ethnic minority community); and 3). B. Lak 52 (Hmong and Lao)
 - Cluster 2. Named Saka consists of three villages such as: 1). B. Saka Tai (Lao); B. Noi (Lao); and B. Nabone (Lao)
15. The RA Team has been separated into three sub-teams to conduct the survey to be covered all selected target farmers, production groups, rice mills, livestock and biogas potential areas, entrepreneurs, and provincial / Phonhong district authorities (See List of persons met in Appendix 6) for data collection. Liaison and communication with these target groups were of critical and time consuming prior to

² The joint meeting was organized on 28 September 2013 at Nalau Extension Center Meeting Room

- appropriate arrangements made and interviews or field visits conducted, in some cases interviews have been done in evening or night time
16. Interview³ with Head of B. Phon Ngam Tai: total households – 76; population – 404 (200 women), consists of 68 (Laoloum) and 336 (160 women) (Laotheung); arable land (Rain Fed) 36 ha mainly for paddy rice production; cattle – 100 (free grazing); Village Revolving Fund exists for LWU weaving groups; no vegetable production group, only 4 family used to grow vegetables in home garden; cooking habits – mainly 3 legs stoves with 100% firewood; willingness to have two production groups in the village such as improved weaving group and organic vegetables production group (to be formed to implement pilot – Khmu minority community); LWU would like to join the project in ICS selling on outputs-based performance; no biogas plant in the village; access to electricity since 1998; Main problem is lack of water during dry season (for organic vegetables production) and lack of technology in these activities and lack of support from other project / extension services
 17. Interview⁴ with Head of B. Nalau: total hh – 496 with 502 families; population – 2960 (1509 women), consists of Hmong 1610 (855 women) and Laoloum 1350 (654 women); productive land – 257 ha; cattle – 150; pigs – 563; poultry – 3150; a group of 19 Hmong farmers used to grow vegetables (GAP); no biogas plant; aware of chemical fertilizers are expensive; main problem is lack of water during dry season (for vegetables cropping); cooking habits – 3 bricks legs (or 3 stones) in the houses; willingness to have at least one organic vegetables production group (to be formed – Hmong ethnic minority community) and a Hmong teacher of secondary school is much interested in organic farming introduced by RA Team and also a Lao woman teacher of the same school will join the pilot project
 18. Interview⁵ with Head and Village Development Committee of B. Lak 52: no production group in the village; individual household production in home garden for self consumption and very few to sell in the market; business persons do exist with inclusive value chain (3 persons) – livestock raising business, rice production and rice mill and trade in rice, chicken raising; B. Lak 52 is developing for trading center (small town) in these clusters; no irrigation, lack of water during dry season; relying on rainy season cropping; total hh – 417; 482 families; population – 2693 (1321 woman) mainly Hmong minority community; land areas – 25 ha (rain fed for paddy production); cattle – 2519; buffalo – 185; pigs in two hh farms; poultry – 6115 – in individual household pigs raising is prohibited due to smelling in town; no biogas plant; no use of manure; plenty of rice husks; possibility of organic farming group is very limited due to land limited, only home garden is widespread; access to electricity since 1989; cooking habits (Hmong) – traditional tree legs stove in the house, some hhs of Laoloum use LPG and Tao Dam ICS (local produce); willingness to join the pilot projects (some business persons) – new biogas technology - composts / organic fertilizers – market for organic vegetables/products

³ The interview made by NPI Bounthavy Chaleunphonh on 30 September 2013 at the Village Meeting Hall with 6 mixed farmer representatives (Laosoung, Laotheung and Laoloum), including 2 women

⁴ The interview made by Ms. Chantha Xayyavong on 1 October 2013 in the evening with 8 Hmong farmers (3 women) – Hmong dialect language is difficult for Lao staff and some meanings need to be translated

⁵ The interview made by NPI Bounthavy Chaleunphonh on 1 October 2013 at village meeting room with 4 committee members (1 woman)

19. Interview⁶ with Cluster 2. B. Saka Head of Farmer Group, Deputy Head of village and 8 vegetable growers (6 women): Saka Tai cluster total households – 231 with 258 families, divide into 16 groups; population – 1133 (579 women); land areas – 122 ha (paddy fields) of which 43 ha can be used for dry season cropping; experienced working in groups; vegetable grower group exists (12 hh of which 6 hh are producing around the year); training on GAP provided by Phonsoung project; express of intention to join organic farming (without chemical fertilizers); technical assistance in these activities required – such as training, study tour, inputs – seeds, shadow equipment, marketing and awareness raising, hands-on practices leading to organic standard and certification; It was agreed to select model farmers and to form organic vegetables group (B. Noy and B. Nabone and B. Vangmon to be included); available potential for biogas technology development and use of biomass residue for composts making; biogas digesters exists (SNV standards: 6, 8, and 12 c.m), unfortunately during field visit the RA mission found that there is leaks in 3 biogas plants that need to be repaired (reasons: poor workmanship of contractors – not follow standards guidelines); express of intention to use new biogas technology (composite) for cooking, light and heating and use slurry for organic fertilizers due to this date sludge and slurry are used directly in liquid form to vegetable garden and rice fields - close to the plants

20. Meeting with the Project Management Team of Phonsoung Agricultural Development Project supported by OXFARM Belgium. Since 2008: Coverage – 29 villages in 3 districts of the province; purpose – to introduce and pilot food safety GAP standard; Bio-control agent – KM 8 Salakham Center (Vientiane Capital) in association with Department of Agriculture of MAF; Working in GAP groups and an Association established leading to Cooperative (share holding) Market – Trade Fair 2 times a week (Monday and Thursday); seeds production group exists and one organic composts making group (quality not tested yet – not clear standard); the project has introduce trend / change to organic farming as well due to chemical fertilizers and pesticides from Thailand are very expensive; model households – 4; target certification (in process for GAP standard) – 2 groups (46 hh, with average vegetable plot of 1 Rai pr hh); inspection – ICS (Internal Control System has been introduced by the project); cooperation with TA7833 is welcome

21. 2nd Meeting⁷ interview with the interested entrepreneur to re-identify his potential and intention to participate in the pilot project activities – to produce composts / organic fertilizers to be demonstrated and used in organic vegetables plots of the anticipated target groups. His paddy land – over 5 ha; cattle – 25 (of which 13 are being born after this harvest season: December); now cattle are free grazing in community forest (discussion on how to keep in place to collect manure – feedstock for composts making – it seemed to be possible to follow advice by TA Team after harvest); capital for investment – available; provision of his paddy filed for rent – 3 parts of produce being divided and 1 part belongs to landowner and 2 parts belong to labor provider; yield maximum 3.5 t/ha, if use manure for fertilizer yield should be

⁶ The interview made by Bounthavy Chaleunphonh on 2 October 2013 at the house of Head of farmer groups

⁷ The 2nd meeting interview with Mr. Meksavanh, his wife, daughter and son-in-law was conducted by Bounthavy Chaleunphonh on 2 October 2013 from 20:00 – 21:30 at his house B. Vangmon, KM 58 from VTE Capital and 12 KM from Vientiane Province Governor's Office (new on-going short-cut road)

- increased to maximum 4 t/ha; very little quantity of straw collected, the rest burn out in the field; cost of labor person/day: 2010: 30000 kip, 2011: 40000 kip and 2013: 50000 kip and 2013: more than 50000 kip; every year for rice production in wet season, he used to purchase 2-3 t of dry manure from B. Lingxane and Hatsiew (around 12 Km from his rice field) to use in his paddy field, (bags provided by him to livestock owners for periodical collection of manure: one bag of 30-35 kg costs 40000 kip)
22. Business model has been discussed and supply chain raised for practical steps to be processing: a). feedstock availability: for biochar production - rice husks, straw, cob and stalks (residue not collected and not used yet); manure (cattle and buffalo), slurry, dung (not properly collected and used); and top soil or suitable soil (Hatsane and Hatsiew) is available; b). where should be location of enterprise: available land area beside paddy field – with access road and electricity nearby can be connected; c). what technology required: bio-fertilizer composition techniques / formulas / processing technology (how to produce good quality of biochar / standards / certification process / manure dyers / crushers / packaging and labeling; and d). where to realize these products: initially there is a need to demonstrate and test in organic vegetable pilot plots, rice fields (own and relatives), fruit orchard and nurseries (own and relatives) to make sure good and reliable quality and fertility (N-P-K) tested and proved by users / farmers and certified by authorized agencies (again funny history of avoiding mistakes liked MALINI Organic Fertilizer Firm)
23. Meeting⁸ with Pakcheng Extension Service Center (former JICA field office) to identify staff service capacity, capacity building activities, tools and equipment in this center, cooperation projects in the province, policy and action plans to promote organic farming: total staff – 26 (of which 5 staff reallocated to newly established Agriculture Land Management and Development Section); 4 units in this Center: Administration, Information, Agriculture, and Promotion; lack of staff and capacity, including lack of funds to provide extension services throughout 13 districts of the province; tools and equipment are also lacking; lack of inspectors for organic farming activities – so relying on project support; Phonsoung ADP (GAP), ADB SHDP (re-upgrading Boungphao (former HELVETAS target group)) Organic Vegetable Group, SUFFORD forest coverage project, ADB Namngum Watershed Management Project ; poor internet connectivity; staff training and capacity building needed; market place support for organic products needed, including awareness raising; problem in dry season cropping – watering system (lack of water) - shallow wells / ground water support needed
24. Interviews and field survey (See Q&A forms filled out by interviewers in Appendix 7): the RA Team members have conducted interviews (See in Appendix 8) with 31 interviewees of which 17 rice and vegetable growers, 5 biogas digester owners and livestock farmers, 7 rice millers, and 2 private entrepreneurs (excluding Lao Women’s Union); structured questionnaire for farmers and rice millers created and used for assessment in the two clusters

⁸ The meeting (with Mr. Bounkhouang Chanthakongseng, Acting Director of Agriculture Section and his staff) was organized at the PAFO Pakcheng Center on 3 October 2013

25. Data collection: vegetables and other crops production and areas (See in Appendix 9, Table 1) have been collected in the province and collated with Statistics Year Book 2012 of MAF; trend to increase in vegetables production in the areas, however organic farming system is in pioneering stage, mainly GAP standards have been introduced widespread; during the interview with one farmer who used to grow (2011-2012) sweet maize and corn in 4 Rai (Rai = 40 m x 40 m) followed GAP Guidelines: inputs – hired tractor to plough the area (26000 kip/Rai), seeds (21000 kip x 2 types), chemical fertilizers (2 main ingredients: Urea 46-0-0 and 15-0-0) costs: 266000 to 280000 kip /1 bag other chemical fertilizers: 18-8-8; 16-0-0: total costs of inputs (including labor) were around 4.6 million kip / season (rainy); when selling 2 types of crops after harvest, there was no profit margin at all, so the in 2013 season he went to rice production due to unaffordable chemical fertilizers and other inputs; he expresses his interest to join the organic vegetables group to be piloted in his cluster (vegetables prices have been increased largely: average 50% or higher and prices of some varieties increased over 100% such as chilly, onion and garlic, salad, carrot, mints, etc; most of vegetables in the market of KM 52 come from Vangvieng and Hineheud district – not organic or GAP vegetables – not sure about food safety); food/meals prices in the areas are also expensive, prices of some meals are much higher of that in Vientiane capital
26. Rice production status: land clearance: using tractor, price 1000 Thai Baht / Rai; plough/cultivation: mainly by hand tractor (Tok-Tok) and some parts using buffalos – costs of labor: average 50000 kip/day plus diesel fuels: 9500 kip/liter; sowing – mainly by hands; weeding – mainly by small hand-weed cutting machines (Gasoline price: 11600 kip/liter) and by hands; harvesting – mainly by hands and partly by small-weed cutting machines with specific blades; threshing – mainly by mobile machines and partly by hands
27. Rice mills identification: rice mill data collection (See in Appendix 10, Table 2) has been carried out at Department of Industry and Commerce of the province and consultation made with concerned staff; the RA Team has been focused on mills around (parameters of 8 Km) the clusters with potential to supply rice husks for biochar produce; 7 millers have been interviewed including site visits / picture taking; rice paddy prices in average: common-traditional varieties: 2800-3200 kip/kg and good-improved varieties: 3500 – 3800 kip/kg; white rice prices at mill gates: common varieties: 6600 – 7500 kip/kg and good quality rice: 8000 – 8500 kip/kg; white rice prices at market KM 52: common rice: 8000 – 8500 kip/kg and god quality rice: 10500 – 11000 kip/kg (Thai rice with good packaging: 1300 kip/kg); fine broken: 3500-4000 kip/kg and bran: 2000 kip/kg; observation: prices increase by 30% compared to last 2 year prices)
28. Biogas digesters and livestock farmers: biogas data (See in Appendix 11, Table 3) has been collected in Livestock and Fisheries Section of PAFO and asked for opinions on Biogas User Survey 2012; the RA Team has focus on samples of 5 biogas digesters with different sizes (6, 8, 10 and 12 m³) in surrounding villages of the two clusters and interviews made with potential livestock farmers; there is an interest in use of new biogas technology / composite reactors

29. Biomass for bioenergy: at initial stage of development rice husks have been utilized by some Lao liquor / wine makers and Lao traditional noodle makers – fermentation is used for pig raising; biochar from rice husks have been used directly to paddy fields or home gardens, not in form of composts or organic fertilizers yet; pigs manure has been used to feed – inlet of biogas plants (mainly 10 cubic meter size standard) and sludge / slurry has been also used directly to rice fields (close to biogas digesters) in liquid form

30. Biomass improved cookstoves: 4 technologies of ICS (Tao Pa Yat) have been found and created by biochar TFP Mr. Lattana and some testing and comparing of efficient use of biomass for bioenergy for cooking: biomass ICS using rice husks for energy (two technologies: one locally produce and another one like gasifier from Vietnam); Biomass ICS using wood residue (very small pieces) for coffee and tea boiling; Work Bank ICS using firewood; biomass ICS using small piece of wood residue from saw mills or from small firewood (short pieces: 15 cm length) for home cooking: 300g of short firewood heats in frame in 40 minutes; and Superman ICS; the 4 ICS technologies should be demonstrated in the two clusters where residue or relevant biomass are available

31. Biomass resources inventory (See in Annex 12: Laos VTE province spreadsheet biomass inventory): biomass data has been collected and collated between Statistics Years Book 2012 of MAF and Semi-Annual Report 2012-2013 of PAFO of the province; it could be observed the yields are varied, especially paddy rice yield; straw, stalks, cobs, etc. residue is not collected for use; manure / residue from cattle, buffalo or even dung is not properly collected possibly due to free grazing; pigs farms are best of use for biogas projects

32. The Biomass spreadsheet⁹ inventory can be used for analysis, so Dr. Simon Shackley should be involved in this spreadsheet and practical recommendation required including biochar production technology and techniques leading to reliable standard and quality in Laos context

IV. Deliverables

33. Wrap-up meeting at PAFO Vientiane province was organized on 4 October 2013 was final session of the RA Mission: PAFO Management appreciated the mission and he acknowledged the factual SWOT analysis presented and practical steps to be undertaken jointly with MAF, PAFO, DAFO and TA7833 in close cooperation with other on-going projects in the province; the wrap-up meeting concentrated on key findings: SWOT analysis; Laos Pilot Project Implementation Activities; DMF Road Map; PAFO Management has agreed in principle on the three debriefed findings working papers presented and he will inform the provincial leadership of the RA Mission's outcomes

⁹ The specific spreadsheet covers biomass data: (plants) rice, maize, cassava and sugarcane; and (animals) pigs, cattle, poultry and buffalos – special calculation formula needed

34. Total number of 31 structured questionnaire Interviews / forms have been filled out during fields/households survey are fundamental working papers for SWOT analysis process
35. SWOT analysis (See in Appendix 13): the RA Team come up with 11 Strengths; 20 weaknesses; 22 opportunities; and 23 Threats – basic working papers for further pilot projects preparation process
36. DMF Road Map (See in Appendix 14): the NPI has draft the DMF Road Map: Impact Statement and Outcome Statement are the same statements of TA7833; General Output Statement is the same statement of TA7833 Output 2: Three Outputs have been identified: key activities with SMART analysis, including target and performance indicators (Organic Standard Baselines almost ZERO in the Phonhong district clusters), Monitoring and reporting mechanism; Assumptions and Risks and Activities / Inputs as per ADB project management and M&E process
37. Laos Pilot Projects Implementation Work Plan (See in Appendix 15): Two clusters have been identified and expected at least 2 organic farmers groups to be established with participation of Ethnic Minority Community: Hmong (Laosoung), Khmu (Laotheung, and Lao (Loaloum); Timelines are missing there due to procedural aspect of ADB procurement guidelines to be followed; the target farmers groups mention that after this harvest season is the best time to start this process and accelerate pilot projects activities on the ground otherwise we need to wait for another next season
38. Draft structure of Road Map to simple Project Administration Manual for Laos Pilot Project Implementation (See in Appendix 16) – possibly for TA7833 International Team Leader reference to create TOR for PIC or procure and /or select Project Implementation Consultant or Firm
39. Recommendation: a debriefing meeting with NFP and TFP at central level is needed to inform the Government's Authorities involved and comments and feedbacks required from them leading to approval process
- 40.