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Low Carbon Agricultural Support Project
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Contract No. 12112015/HDTV01-LCASP

QUARTERLY REPORT 2018-Q4

Hanoi, 20 March 2019

Prepared for
Central Project Management Unit
Ministry of Agriculture and Rural Development
By
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in association with

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Smart Policies and Practices for Shared Prosperity

Agrifood Consulting International

11 June 2019

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Project Director,
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Floor 8th, Building No. 2, 16 Thuy Khue,
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Reference: LCASP/2019/06/11/01

Subject: Submission of Quarter Report Q4-2018 and Annual Report 2018

Dear Sir,

Agrifood Consulting International Inc. and our associated firm, Asia Development Consultant Joint Stock Company are pleased to submit **Quarterly Report Q4-2018 and Annual Report 2018** for your feedback.

Please let us know if you need our further clarification.

Yours Sincerely,

_____

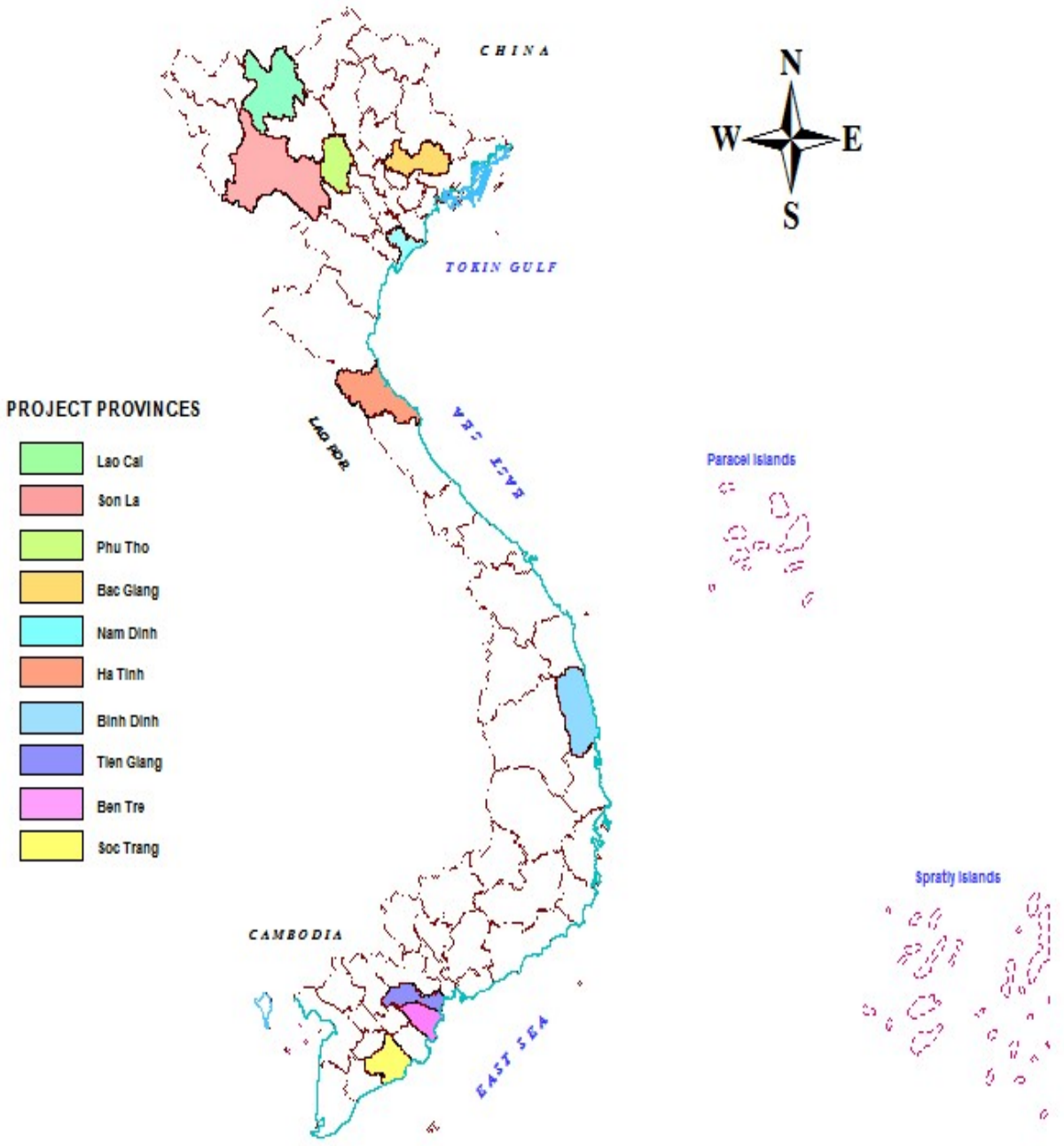
Francesco Goletti
President/CEO
Agrifood Consulting International Inc.

TABLE OF CONTENT

MAP OF PROJECT PROVINCES 1
LIST OF ACRONYMS 2
1. INTRODUCTION 3
2. BASIC INFORMATION OF THE PROJECT 3
3. SUMMARY OF TECHNICAL ASSISTANCE ACTIVITIES 4
4. TECHNICAL ASSISTANCE PROGRESS BY COMPONENT 5
4.1 COMPONENT 1: EXPANDED USE OF LIVESTOCK WASTE MANAGEMENT 9
4.2 COMPONENT 2: CREDIT LINES FOR BIOGAS VALUE CHAIN 10
4.3 COMPONENT 3: ENHANCED CSAWMP TECHNOLOGY TRANSFER 10
4.4 COMPONENT 4: EFFECTIVE PROJECT MANAGEMENT 12
6 LIC MANAGEMENT 14
7 TECHNICAL ASSISTANCE PERFORMANCE ASSESSMENT 15
9 CONCLUSIONS AND RECOMMENDATIONS 16

TABLE 1: STATUS ON THE IEE REPORT PREPARATION 12
TABLE 2: SPECIALIST INPUTS BY OFFICE AND FIELD WORK (OCTOBER – DECEMBER 2018) . 15

Map of project provinces



LIST OF ACRONYMS

ACI	Agrifood Consulting International
ADB	Asian Development Bank
AD Consult	Asian Development Consultancy Company
APMB	Management Board of gricultural projects
BGT	Biogas technology
BP	Biogas plants
BVC	Biogas value chain
CDM	Clean Development Mechanism
CPMU	Central Project Management Board
CSAWMP	Practical management of smart agricultural waste to cope with climate change
DMF	Framework design and monitoring
EM	Ethnic minorities
EMDP	Ethnic Minority Development Plan
EMR	Environmental monitoring report
GAP	Gender Action Plan
GHG	Greenhouse gas
GOV	Vietnamese Government
HDPE	HDPE plastic
FI	Financial institutions
IEE	Preliminary Environmental Impact Assessment
LBP	Large scale biogas plants
LCASP	The project supports low carbon agriculture
LIC	Consultant for project implementation
MBP	Medium scale biogas plant
MARD	Ministry of Agriculture and Rural Development
NOL	No objection
PPMU	Provincial Project Management Board
REA	Rapid assessment of the environment
SBP	A small scale biogas plant
TOR	Terms of Reference
US$	U.S. dollar
VND	Vietnamese Dong

1. INTRODUCTION

This report describes the achievements and performance of Technical Assistance for LCASP conducted by ACI Consultants and ADConsult in the Quarter 4 of 2018 (from Septermber to December 2018).

During this quarter, the LIC consultant team conducted an assessment of the implementation of demonstration models effectiveness in the provinces and continued to assist these provinces in dealing with the overload of biodigesters; installation of fertilizer separators and generators has been installed in the project provinces. Besides, LIC continues to support the researcg bid packages to complete their reports on technology review and the research packages implementation plan preparation in the province.

2. BASIC INFORMATION OF THE PROJECT

Although biogas plant technology is known to Viet Nam for quite some time, the current needs for environmental mitigation measures including the reduction of GHG emission require the adoption of improved technologies and measures to minimize animal waste and effective climate smart agriculture waste management practices (CSAWMP). The new technologies and practices are important for all stakeholders in the project. Consequently, LCASP activities are supported with various capacity building and communication programs to be implemented in central, provincial, district and commune levels.
The Project is expected to increase the uptake of CSAWMP as measured by the increased use of clean biogas energy and organic bio-organic fertilizers.

The objectives of the project include:

(i) Improve management of animal waste and bio-slurry while reducing environmental pollution; creating clean energy; bio-organic fertilizer; generating incomes from Clean Development Mechanism (CDM).
(ii) Increasing the application of CSAWMPs that are effectively certified; greater use of renewable energy and bio-fertilizer from agricultural waste; replicating models in order to reduce greenhouse gas (GHG) emissions and improving the livelihoods and quality of life of rural people.
(iii) Capacity building of stakeholders and disseminating knowledge and skills of good CSAWMP to beneficiaries.

Expected Outcome:

The Design and Monitoring Framework (DMF) of the Project indicated that by 2018 (from baselines in 2013) the envisaged outcomes in the project areas include:

- At least 70% bio-slurry is converted to organic fertilizers.
- At least 80% energy produced by Biogas Value Chains (BVCs) is utilized
- Daily workload of women and children is reduced by 1.8–2 hours, on average

The four components of the project are:

i) Expanded use of animal waste management infrastructure,
ii) Credit lines for biogas value chains,
iii) Enhanced CSAWMP technology transfer and
iv) Effective project management.

The project covers 10 provinces of Vietnam, which are Son La, Lao Cai, Phu Tho, Bac Giang, Nam Dinh, Ha Tinh, Binh Dinh, Tien Giang, Ben Tre and Soc Trang. The project is implemented for a period of six years from 2013 to June 2019. Based on the Mid-term Review (MTR) in September 2016, the project net loan amount is 67.92 million USD.

3. SUMMARY OF TECHNICAL ASSISTANCE ACTIVITIES

Technical assistance in the fourth quarter of 2018 will focus on addressing technical issues that are still pending in the third quarter of 2018, particularly (i) over-loading of biogas, (ii) Review to help the contractors complete the design the settling tank of the separator models in the provinces; (iii) supporting the PPMU in surveying biogas generator installation sites, (iii) IEE for MBPs and other issues and (iv) updating Progress reports on gender and ethnic minorities. The main results are summarized below.

Biogas technology

- Supported Nam Dinh PPMU to guide and check the construction model of 20 collection tanks combined with composting.
- Supported provincial PPMUs on technical issues in the construction of medium-sized biogas tanks.
- Commented on settling tank design in the waste separation machine model in Phu Tho, Binh Dinh and Nam Dinh provinces.
- Surveyed and evaluated the effectiveness of bio-gas generator impelemenation and waste separators in Nam Dinh, Phu Tho, Binh Dinh and Soc Trang provinces
- Continued to support the operation and maintenance of small-scale biogas tanks;

Climate Smart Agriculture Waste Management Practice

- Surveyed the situation and provided technical assistance on selection of households to install the separators and biogas generators, settling tanks for livestock waste treatment, using liquid discharge of the biogas plants to irrigate the crops in Phú Thọ, Bình Định, Sóc Trăng….
- Supported and monitored the installation of the models in the provinces and followed up to evaluate the performance of the models.
- Reviewed and gave comment on the description and technology review report of 5 research packages.

Training and communication

- Wrote a script and respond to VTV 2 television for communication package No. 41;
- Commented and revised 03 Results of vocational training needs survey - to serve for the vocational training curricula development;
- Developed another agricultural and biogas low carbon value chain assessment and survey implemented in Bac Giang;
- Wrote a report on the low carbon agricultural abd biogas value chain in the project area, wrote a number of posts on the project's website on chains in the project area.;

Environment Safeguard Policy

- Revised and finalized IEE reports for MBPs in the provinces;
- Environmental monitoring of MBPs
- Reviewed, provided comments and modified provincial internal environment monitoring reports for the first 6 months of 2018 of the provinces;
- Finalized the periodical environmental monitoring report of the project for the first 6 months.

Gender and Ethnic Minorities Safeguard Policy

- Continued support for GAP and EMDP updates

4. TECHNICAL ASSISTANCE PROGRESS BY COMPONENT

The implementation progress of LIC's tasks in the forth quarter of 2018 is summarized as shown in the following table:

No.	Activities				Remarks
		10	11	12	
1	**Component 1: Expanded use of animal waste management infrastructure**				

No.	Activities	10	11	12	Remarks
1.1	Continue to provide technical assistance to implement small and medium-scale models of overload protection for provinces when required				Supported Phu Tho, Soc Trang and Binh Dinh provinces to handle the overload of biodigesters
1.2	Support PPMUs in design, construction and monitoring of MBPs				Support Nam Định, Phú Thọ, Sóc Trăng
1.3	Support PPMU to use excess gas from the medium scale tank				Continue to guide the provinces to thoroughly utilize excess gas
1.4	Update the installation status and acceptance of the separators and generators				Continue to support the provinces in the project in the installation, test run and acceptance of the separators and the biogas generators
1.5	Technical support for PPMU on separation machines, generators				
1.6	Assist the contractors in the installation and acceptance of the separators, generators				
1.7	Support the design of settling tanks, gas bags, equipment storages				
1.8	Support households to operate and maintain the waste separators and generators				
1.9	Conduct an evaluation of the performance efficiency of the generator and separator model				Evaluate the efficiency of the model in 4 provinces, provinces of ND, PT, BD and ST
1.10	Support for optimum use of biogas by-products for crops (Package No. 37) and treating vermicompost (package 38)				Supported Soc Trang PPMU to implement Package 37 and 38 in ST
2	**Component 3: Enhanced CSAWMP technology transfer**				
2.2	Assist contractor package 25 to complete the technology review report and develop implementation plan				Review and comment on the technology review report and detailed
2.2	Assist contractor package 26 to finalize technology review report and develop implementation plan				

No.	Activities	10	11	12	Remarks
2.3	Assist contractor package 27 to complete the technology review report and develop implementation plan				implementation plan of 5 bid packages and send to CPMU
2.4	Assist contractor package 28 to complete the technology review report and develop implementation plan				
2.5	Assist contractor package 29 to complete the technology review report and develop implementation plan				
3	**Training and communication**				
3.1	Review training materials and support PPMUs and contractors in implementing the training activities				Continue to support PPMU and contractors to carry out training activities
3.2	Evaluate the effectiveness of training				Conduct evaluation of training effectiveness in 3 provinces
3.3	Support CPMU to implement communication activities				Continue to support provinces to carry out cad communication activities to effectively use the biogas value chain
3.4	Develop guidelines for effective use of biogas value chains				
3.5	Support CPMU to implement packages 42 and 43				Not implemented yet
3.6	Write a handbook to guide installation, operation and maintenance of generators, separators and bioslurry after biogas digester				Elaborated
4	**Environmental safeguard**				
4.1	Prepare IEE reports for MBPs				Continue to support provinces to make IEE reports and develop MT monitoring reports for the last 6 months of
4.2	Review and finalize IEE reports				
4.3	Develop environmental monitoring report for the last 6 months of 2018				
4.4	Support CPMU and PPMUs in environmental monitoring				

No.	Activities	10	11	12	Remarks
					2018
5	**Other activities**				
5.2	Review of the mission report and other reports				LIC consultants participated in meetings and seminars with PPMU, CPMU
5.3	Support and participate in workshops organized by CPMU				
5.4	Support and participate in workshops organized by PPMUs				
5.5	Write technical documents and upload to LCASP website				
5.6	Organize meetings with consultants on contract renewal				Hold a meeting to propose the extension of the project in early December 2018
6	**Gender and Minority Ethnics**				
6.1	Update GMEP				Completed the GEM updates and sent to ADB
6.2	Update GAP				
6	**Reporting**				
6.1	Q4 report and 2018 annual report				The consultants completed the fourth quarter report of 2018

4.1 Component 1: Expanded Use of Livestock Waste Management

According to the project design, component 1 consists of five main activities:

(i) Standardization and dissemination of design package for biogas value chain management;

(ii) Strengthening the monitoring capacity of relevant agencies to handover and monitor the constructed biogas plants;

(iii) Financial support for biogas plants;

(iv) Capacity building in designing, constructing, operating and monitoring biogas plants;

(v) Strengthening capacity and providing equipment for relevant agencies to manage the national biogas database.

In the above five activities, in the forth quarter of 2018, LIC focused on two main activities, namely (i) and (ii).

4.1.1 Standardization and dissemination of design package for biogas value chain management

Provincial consultants assisted the technicians in monitoring and acceptance of SBPs for households in districts in the provinces. At the same time, the provincial consultants also coordinated with the PPMUs in supervising the operation process and evaluating the effectiveness of the anti-overload model for MBPs in some districts like Ha Hoa (Phu Tho); Phu Cat (Binh Dinh); Moc Chau (Son La).

LIC continued to support the PPMUs of Soc Trang, Lao Cai, Binh Dinh and Nam Dinh guide households in operation and maintenance of the system to overcome the overload of MBPs; monitoring and evaluating the effectiveness of the MBP overload prevention in this model. The implementation of anti-overload measures of MBPs in Soc Trang and Binh Dinh provinces have also brought good results.

The Consultant monitored the settling tanks in the models of separators in the provinces of Soc Trang, Phu Tho, Son La; the comments focused on the following contents (i) proposed required capacity of the settling tank which is suitable for each farm; (ii) Tanks with screen wall to facilitate solid sedimentation.

The Consultant coordinated with the contractors to inspect and monitor the installation of separators and biogas generators in Lao Cai, Phu Tho and Tien Giang, at the same

time cooperated with the PPMUs and constractors who awarded with survey and technical design packages to provide technical assistance for the owners of the farms constructing the auxiliary works (settling tanks, machine houses, waste collection systems, etc.) to speed up the model implementation progress of the project. In addition, the Consultant has provided suggestions to contractors to improve the training materials related to the implementation of the models in the province.

The Consultant wrote a presentation on "Solutions to overcome overload of biogas plants" for the training of the LCASP. The document stated the causes of the overload of biogas plants, and proposed solutions to overcome the overload for the biogas plants at farm households. Besides, the Consultant also proposed mechanisms and policies to encourage the application of biogas technology at household scale in treating livestock waste, contributing to reducing GHG emission.

The Consultant reviewed and gave comments on the training materials about instruction for the use of manure separators and generators of contractors and assisted the contractors to carry out training activities on the operation and use of these devices.

4.1.2 Strengthening the monitoring capacity of relevant agencies to handover and monitor the constructed biogas plants

Provincial consultants regularly coordinate with provincial technicians to inspect and supervise the biogas plants constructed in the project. During the inspection process, the provincial consultants also advised the households on solutions for comprehensive treatment of animal waste as well as the optimal use of biogas.

The Ethnic Minority Development Plan (EMDP) and the Gender Action Plan (GAP) are regularly updated to support the CPMU.

4.2 Component 2: Credit Lines for Biogas Value Chain

Financial Institutions (FIs) to provide credit lines to Eligible Beneficiaries to finance Biogas Value Chain Infrastructure and other climate-smart agriculture waste management investments which satisfy the Subproject Eligibility Criteria by June 2019.
No activity was reported this quarter.

4.3 Component 3: Enhanced CSAWMP technology transfer

4.3.1 Utilizing farmer-based research including using biochar and other agricultural wastes as organic fertilizers; applying other efficient low greenhouse gas emission

agricultural practices which generate bio-energy, managing waste treatments in aquaculture and other CSAWMP.

In the fourth quarter of 2018, 5 research packages have been implemented, however, these 5 packages are still in the process of finalizing the technology review report and developing a detailed implementation plan in the field. Under the direction of CPMU, LIC will review and support these 5 packages to complete the technology review report to meet the requirements. Comments of the 5 research packages were collected and sent to CPMU by LIC.

4.3.2 Developing livestock waste management models for agricultural production and greenhouse gas emission reduction

Monthly, the provincial consultants regularly organize field trips to inspect and supervise the quality of the demonstrations. The initial results showed that in some provinces, the installation of the models was effective as in Nam Dinh, Binh Dinh, and Phu Tho. However, some models have not been effective (as in Binh Dinh, Tien Giang) because there is no market demand for the separated manure. For example:

- In Soc Trang, the Consultant checked 4/5 demonstration models (models of packages 33, 34, 36, 37). The results showed that (i) the households selected to participate in the model were enthusiastic and willing to fulfill the requirements to meet the progress; (ii) all 4 bidding packages are behind schedule. Based on this result, the Consultant also made recommendations to the CPMU, PPMU and contractors to have better coordination to accelerate the implementation of the models.

- In Son La, the Consultant checked 5 models of separators in the province. The results showed that (i) All 5 models of the separators performed well and compressed manure could be sold to market; (ii) The farms were satisfied with the quality as well as the consultancy provided by the contractors and provincial consultants. However, in order for these models to operate more effectively, the Consultant also proposed some following recommendations: (i) Some biogas plants are overloading with gas, the PPMU can advise these farms to install medium or large-scale generators to optimize the use of the generated biogas, avoiding direct discharge to the environment; (ii) The contractor shall accelerate the organization of the final workshop so that the models can be replicated to livestock farms in the area and (iii) After the models come into operation, LIC coordinates together with the PPMU to evaluate the effectiveness of the model implementation.

LIC consultant also sent a mission to evaluate the effectiveness of the implementation model in 4 provinces: Nam Dinh, Phu Tho, Binh Dinh and Soc Trang. The preliminary

assessment results show that most households are satisfied with the quality of the model and this model has initially been effective for users.

4.3.3 Capacity building for researchers, extension staff and farmers including vocational training program, training packages and study tours on CSAWMP

The provincial consultants have supported the PPMUs to organize some training courses during this period. Together with the technical consulting team, the provincial consultants have actively supported the PPMUs in document compilation and support for training activities.

LIC continued to coordinate with the CPMU to monitor and promote the selection of the agencies to prepare the curriculum and speeding up the progress of drafting the Vocational Training Program with the North Vietnam College of Agriculture and Rural Development.

LIC together with the CPMU agreed on the types of evaluation forms and the number of samples to be evaluated for LCASP capacity training activities in the provinces. The Consultant carried out 3 field trips in 3 provinces of Son La, Bac Giang and Phu Tho.

4.3.4 Establishing an information system (e-library, map sets on agro-ecological zones and distance learning system) to disseminate awareness and knowledge CSAWMP

No activity was reported this quarter.

4.4 Component 4: Effective Project Management

4.1 Establish CPMU and PPMUs to be operational by 2013
4.2 Conduct a gender awareness raising workshop for PMUs by 2016.
4.3 Engage consultants for start-up and auditing, and to develop the PPMS, with gender-and-ethnicity-disaggregated data and including gender action plan monitoring by 2015.

This section also includes environmental and gender safeguards

Environment
In the forth quarter of 2018, the MBPs did not have much fluctuation, mainly those which had been constructed in the third quarter of 2018. The IEE for the last 6 months of 2018 was prepared and sent to ABD for review.

Table 1: Status on the IEE report preparation

No.	Province	Number of MBPs	Status of IEE in the third quarter of 2018	
			Preparation stage	Finalized and provided to CPMU
1	Son La	0	0	0
2	Lao Cai	0	0	0
3	Phu Tho	0	0	0
3	Bac Giang	14	3	3
4	Nam Dinh	6	6	1
5	Ha Tinh	2	10	4
6	Binh Dinh	6	6	6
7	Tien Giang	2	2	2
8	Ben Tre	3	3	3
9	Soc Trang	0	0	0
	Total	**30**	**30**	**19**

There were remaining problems which occurred in the previous quarters like: most of the construction works have not been designed with proper and standard settling tanks to treat the slurry after the biogas plants, liquid discharge from the settling tanks did not meet the QCVN 62-MT: 2016/BTNMT. Although LIC experts and slurry treatment specialists proposed several designs to reduce the amount of suspended solids in liquid discharge generated by the biogas plants, these designs still have not fulfill the requirement and many husbandry households did not want to apply them due to: lack of construction sites, lack of funding and efficiency of these tanks have not been tested.

Gender and Ethnic Minorities

LIC collaborated with CPMUs, PPMUs and contractors to integrate gender indicators into the specific activities of the studies and activities and at the same time guided the provinces where EM communes are available develop EM indicators.

The Consultant updated the GAP report of the forth quarter of 2018 and sent to CPMU for review and approval.

4.4 Undertake baseline surveys in all project provinces with collection and analysis of gender-and-ethnicity-disaggregated data by 2016.

Completed in early 2016.

4.5 Prepare progress reports and submit to ADB on a regular basis by 2018.

Various reports including technical and quarterly progress reports have been provided to CPMU. In addition, LIC have also sent weekly reports to CPMU on technical progress.

5 SPECIALIST MOBILIZATION

In this quarter, LIC has mobilized a specialist on the biogas value chain (from 20/8/2018) to replace the former biogas value chain specialist that quit from March 2018.

6 LIC MANAGEMENT

LIC team members provided technical support as required by the CPMU and the PPMUs. The provincial consultants have supported PPMUs in a wide range of activities, with the involvement of relevant experts.

Coordination

LIC has coordinated effectively with relevant parties to conduct the project. In addition to the CPMU and PPMUs, LIC has worked with the suppliers of seperators and biogas generators assist them in completing work related to the installation of these devices as well as reviewing and giving comments to these contractors to finalize the training materials.

Report preparation and submission

In addition to the technical reports (Appendix 5), the Q3 2018 report were also submitted to the CPMU.

Organization of missions/field visits

In the forth quarter of 2018, LIC conducted 09 field visits to the provinces of Soc Trang, Phu Tho, Nam Dinh, Binh Dinh, Son La, Bac Giang, with a total of 22 turns of participants. Details of the LIC's field visits are presented in the Appendix 3.

Inputs of the Specialists and Provincial consultants

Inputs of the Specialists and Provincial Consultants by office work and field work are shown in Table 3 for the period of October to December 2018.

Similar to Q3/2018, in this quarter, mobilization time of the specialists reduced significantly as requested by the CPMU. ADB agreed to extend the project to June 2019, however, the contract LIC signed with the CPMU will expire on 30th December 2018.

Hence, LIC completed the evaluation report on the project implementation and proposed to extend the LIC contract to continue the project's activities.

The total man-month is 16,27, of which, time of office work is 8,41 man-months and time of field work is 7,86 man-months.

Table 2: Specialist Inputs by Office and Field work (October – December 2018)

Full name	Man-months by office work	Man-months by field work
Manohar Shrestha		
Bùi Bá Bổng		
Henrik B. Moller		
Nguyễn Văn Bộ	0,23	
Lê Thị Thoa	3	0,91
Bùi Văn Chính	2,36	0,64
Phạm Thị Vượng	2,23	0,59
Phạm Văn Bình		
Tạ Hòa Bình		
Lê Thị Mộng Phượng	0,59	
Nguyễn Ngọc Long		
Bùi Thế Hùng		0,64
Bùi Thị Phương Loan		
Lê Ngọc Hùng		1,5
Đặng Thị Phương Lan		
Tống Khiêm		1,41
Nguyễn Đình Vinh		1,32
Đào Văn Thông		
Bùi Thị Lan Hương		0,36
Trần Việt Cường		
Dư Văn Châu		0,86
Total	**8,41**	**7,86**

7 TECHNICAL ASSISTANCE PERFORMANCE ASSESSMENT

The common current situation of households with biogas plants is the size of biogas tanks is unsuitable with the amount of animal waste to be treated, hence LIC continues to support the design of solutions to prevent overload of SBPs and MBPs in some project provinces by (i) adding a two-compartment settling tank in front of the biogas tank and by natural sedimentation separating solid waste from livestock liquid waste for making

organic fertilizers and (ii) separating solid matters in the tanks after biogas tanks, using collected solid matters to make organic fertilizer.

The manure separators and generators continue to be installed in the provinces and many technical issues have been addressed by the LIC team, such as comments for finalizing of designs for settling tanks and slurry collectors for the manure separators, using waste collection system and settling tanks for high efficiency separators. These comments were accepted by the CPMU and the contractors, and based on these comments, the contractors modified the design of the settling tanks.

The provincial consultants regularly conducted the inspection of some models using separators in the provinces, the initial results showed that these models have been useful for local people, especially in the provinces of Nam Dinh, Son La, Phu Tho, Binh Dinh, Soc Trang. In some provinces, the separator model has not been effective because there is no market for fertilizer, leading to the situation that the pressed manure can not be sold.

LIC supported the CPMU, PPMUs organized many workshops and trainings by providing presentations, sharing outputs and experience. In particular, LIC assisted the CPMU in reviewing training materials on the use of manure separators and generators prepared by the contractors.

8 WORK PLAN FOR THE NEXT QUARTER

According to the contract signed between the CPMU and LIC, the constract will expire by 31th December 2018. Therefore, in the mean time when the contract has not been extended yet, LIC does not have any plan to implement the next activities.

9 CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The construction progress of SBPs and MBPs in the forth quarter was slow. The number of newly constructed MBPs has exceeded the target, which indicates that increasing the subsidy for the construction of MBPs (from 10 million VND to 50 million VND) helped reducing the financial burden for the farmers. In order to support the farmers to use the biogas value chain effectively, the provincial consultants regularly coordinate with the PPMUs to check, supervise and provide advices to the local people.

The manure separators and biogas generators continue to be installed in the project provinces. Models of manure separators have been installed in most of the provinces

with needs. The models os generators have been installed, however the situation of small-scale biogas generators installed in Lao Cai have not been fixed.

All 5 research packages are still in the process of finalizing the technology review reports. Therefore, till now, all 5 packages are behind schedule.

The consultants continued to assist the PPMUs and the contractors in compiling training materials and conducting training. However, the PPMUs as well as contractors need to complete the training evaluation in accordance with the Overall Training Plan.

Recommendations:

- The effective implementation of manure separators and biogas generators requires close coordination among CPMU, PPMUs, LIC and the Contractors.
- The installation and testing of manure separators and generators requires close monitoring from CPMU, PPMU and LIC for advice and support on technical issues.
- Although this recommendation was stated in the previous quarterly reports, until the third quarter, the issue has not been solved. Therefore, manuals for using biogas generators in English should be translated into Vietnamese and pasted on the machines for instruction and warning signs should be installed at the generator locations to warn people when using electricity.
- The research packages should be combined with relevant model packages at some locations for easy comparation with new technology and equipment.
- The acceptance of technology review reports of 5 packages should be speeded up to meet the planned progress.
- There should be a plan utilizing the equipment purchased under package 14 on environmental protection; the research packages shall use these equipment for sample collection and analysis.
- It is recommended to review, facilitate and approve the extension of LIC contract until 30th June 2019.

APPENDIX

Appendix 1: Comments on the 05 research contracts

1. Report on technology review of Package 25: Research on production of organic fertilizer from animal waste and biogas by-product following the value chain

1.1 General comments

(i) The report has been generally modified in accordance with the comments of LIC at the meeting on 10/9/2018

(ii) However, it is suggested to replace the term "Technology 1,2…" by "Content 1,2…"

(iii) Two of the contents according to the TOR are missing, including "Technology integrated model" and "Policy", hence, it is inadequate when compiling the cost of the package by the end of the report.

1.2 Specific comments

- On the research of movable manure separators, it is necessary to clarify the content related to the scale of husbandry (number of pig heads); the maximum spacing between the households to ensure the efficiency. About the 4-wheel tractors, it may recommend specific brand like "Kubota".

- On the design of "control panel" in item 1.2.2: it is recommended to review this function, since the 3-phase transformer is only needed where there is no 3-phase electricity.

- Item 1.3.1: It is recommended to refer to the correct content as in the TOR and explain why the submersed stirrer is used.

- The content of "Improvement of fixed manure separators" (Table 9): it is recommended to clarify which details are improved, why it is necessary to do so and the improvement shall be conducted on the machines of which countries; what improvement for the content of "research on transforming fixed compressor to movable compressor" are?

- It is recommended to explain why it is necessary to "transform 2-phase power source to 3-phase power source"

- It is recommended to add data on analysis of nutrient components and relevant indicators of liquid discharge after biogas tanks.

- In all items, the report refered to the production of "organic micro-organism" fertilizers, however, according to the proposed content, most of the fertilizers are "bio – organic". It is recommended to confirm the types of fertilizer to be produced

and required quality indicators to be obtained in accordance with the regulations stipulated in Decree 108 in 2017 on Management of fertilizers

- On the content related to treatment of liquid discharge after biogas tanks, it is recommended to clarify on the technology and quality indicators of the output.

- On the basis to calculate the economic efficiency, it is recommended to pay attention to the following issues: For fixed manure separator, the suitable scale of husbandry is 2000 pig heads; while the suitable sacle for movable separators is 500-1000 heads (depending on the household's selection). It is inappropriate to use fixed separator for the scale of 1000 pig heads as stated in the report.
- It is recommended to review the calculation of economic efficiency, payback period; the efficiency might be calculated too high so that the payback period of 0.3-0.5 year is unrealistic.

- On the selection of Indian worms, it is recommended to briefly introduce the significant advantages of this variety in treatment of pig waste to serve as foundation to select for research.

- The formula for worm raising: King grasses, stems of banana/maize plants
- On the terminologies: In the Table 2, 3, 4.1, 4.2 and 5: Replacing the term "Intake power" by "Energy consumption"; " Intake power of submersed pump" by "Energy consumption of submersed pump" and "Cost/machines" by "machine cost"; or in Table 7, replacing "Compression period" by "Compression frequency"

- The units shall be uniform in the whole report since the units are varied (i.e. mg/kg for total organic N, P, K; VND or million VND). It is suggested to be in million VND for easy comprehension.

- On the production of bio-organic fertilizers (point 2, item 2.4): it is recommended to specify the composting technology: Agricultural by-products of saw dust may be used to create appropriate C/N ratio, or using only micro-organism products. It is recommended to explain the basis for confirmation of only using micro-organism products that makes the organic matters decomposed well while the C/N ratio and moisture is inappropriate for the composting process.

- Name of content 3 shall be corrected as stated in the TOR.

- On content 1 (point a, item 3.4): It is suggested to specify the experiment formulas so that the implementors may follow easily. It should be experiment on pre-processing of pig waste to reduce the NH_4 content which may poison the earth worms.

1.3 Conclusion

(i) The contractor shall modify the report in accordance with the above comments (if

reasonable) as soon as possible and submit it to the CPMU

(ii) The CPMU is requested to allow the contractor to implement as soon as possible to meet the schedule.

2. Technology review report of bidding package 26: Research on improving biogas technology and efficient use of biogas in the value chain

2.1 General comments

(i) The report has been updated and basically completed according to the advice of LIC consultant at the meeting 11/9/2018

(ii) Added a part of the policy content in the review report.

2.2 Specific comments

- Domestic overviewL: Medium scale is necessary to add 50-300 m3 brick-shaped tank, which is quite popular, easy to build and effective in our country.

It is necessary to rewrite the strengths and limitations of the proposed technology stated in the bidding package to highlight the content to be studied.

- Explain more why choose composite biogas plants of size 5.6m3, HDPE of 450m3
- Which scientific basis says the average gas consumption is 1,111 m3 / day
- Gas sharing (1.3.8): "The pipe will be placed on the ground about 10cm deep", should review this depth because Many foreign documents recommend placing pipes with a depth of 50-60 cm to Safe for vehicles running through pipes.
- Need to recalculate the capacity of the tank for medium-sized.
- Review the cost of KSH composite 5.6m3 tank because the composite tank with a diameter of 2.25m (volume of 7m3) is sold in the project is 11.5 million dong. Whether the price is higher than the current tank, the improvement tank is more outstanding and superior?
- Given the scientific basis for the depreciation of brick tanks (small and medium) is 7 years.
- Section 3 (part 1.6.1): Proposing the design of a medium-sized construction project of 70 m3: this household builds new or only designs and installs a stirrer?
- Unified size of medium-sized construction tank (56 or 70m3)?

- Gas sharing system: Before implementing the model, does the contractor conduct gas measurement? and how is the measurement of gas consumption at each household conducted?
- Part 2.3 (Generator), describe the system automatically and optimize the process of daily running to avoid condensation.
- Filter section: Need to specify what filters currently in use have advantages and disadvantages? What is the current selling price? Since then, there is a basis for making content that needs improvement.

2.3 Conclusion

(i) The contractor quickly corrects the above comments (if reasonable) and submits the CPMU

(ii) Request CPMU to approve the review report after receiving the amendment of package 26 and agree to allow the contractor to implement in the workshop and field to ensure the time.

3. 2. Technology review report of bidding package 27: Research on water saving pig breeding technology

3.1 General comments

(i) The report is updated and basically completed according to the advice of the LIC consultant at the meeting on September 11, 2018 and the first comment on September 13, 2018

(ii) Added a part of the policy content in the review report.

3.2 Specific comments

The report has written in a compact way and added many necessary issues; However, there are some issues to discuss further as below.

- On page 6, the CO2 content analysis criteria should be added, as shown on page 13. But it also needs to compare with the CO2 content in normal air.

- In Table 3, (pages 10, 11): It is necessary to review the prices of materials such as clean water prices (where they write 20 000 đg / m3, the place is 7000 VND) or the selling price of the litter is not uniform Best: On page 10 (line 16 from the top) write the price at 1500g / kg, but in table 3, part III - Return revenue calculated 1000g ...). It is necessary to review these figures as well as the data in the columns so that readers can easily understand and try to retry, thus convincing readers.
- In the spreadsheet with calculation of environmental benefits, this data should be removed because this is an indicator of abstraction for the people, even if we take into account it is not convincing people. Besides, the CPMU agreed to not calculate into economic efficiency but only considered environmental efficiency.

- Should review the effect of padding: The payback period is too short of 0.38 years. If based on this result, people will put the problem as high benefits so why in our country this technology is very difficult to produce..

- Table 4: If the experiment uses only short-cut straw, it is likely that it will be difficult to reduce odors (which is very easy to recognize), as well as slow down the fermentation of organic matter. muscle in livestock waste. Because if there is small crushed straw, it will quickly absorb urine, which contains very high uric content, and C source in crushed straw will contribute to uric enzymes as well as endol, scatol are unpleasant odors. . Maybe the crushed straw will increase the cost a bit, but it will bring more efficiency and the success of the experiment is also higher.

- On page 18, if the TOR does not require research to produce micro-organic fertilizer, it should only be said that the topic will create normal organic fertilizer. Because if it is microbial organic fertilizer, they will require to buy microbial inoculants and analyze the number of microorganisms that have been cultivated when composting, it will create unnecessary troubles.

- At all tables, there should be a table number for easy lookup, there should be no table, numbered tables have no table number, making it difficult to track.

- Also consider a number of modified and added phrases in the report to make a more complete report.

3.3 Conclusion

(i) The contractor quickly corrects the above comments (if reasonable) and submits the CPMU

(ii) Request CPMU to approve the review report after receiving the amendment of package 27 and agree to allow contractors to deploy in the workshop and field to ensure time.

4. Package No. 28: Research on the efficient use of crop residues in the value chain

4.1 General comments

(i) Technology review report of the package to study the use of value-added agricultural waste products (the first draft) has made more investment and more focused analysis on the contents stated in ToR.

(ii) There is no policy content in the review report.

4.2 Specific comments

1.1 Content 1

- Methods and technologies for collecting and processing crop by-products for different purposes, so it is necessary to clarify which bidding packages will be used and what purpose to use and what the market will look like. : May have to split up as follows:

- Rice straw: used for different purposes such as (i) For mushroom cultivation: How does collection work, limit and propose methods and technologies; (ii) Making pellets and bars of biofuels: similarly; (iii) Cultivating mushrooms ... .: (iv) making organic fertilizer ...; (v) biological padding ...
- With corn cobs: What the purpose will do

- Equipment for collection:

- In RRD: It is necessary to state what methods are being used to collect and what are the advantages and disadvantages? From the disadvantages of the current method, there is a basis for proposing solutions.
- Mekong Delta has large field area, currently using collectors with capacity of 80-120 rolls / hour, small-scale RRD can be collected with productivity of 60-80 rolls / hour?

- It is necessary to review the feasibility of adding on-site microbial preparations spraying to make fertilizer.

Table 2 calculates the economic efficiency when adding inoculant spraying parts on straw collectors which are not accurate and specific in the table of initial costs, the cost of oil a day is 15 liters of oil (VND 255,000), meanwhile, the total cost of buying processing oil for 1 ha is 300,000 VND, so if you want to collect, it only takes more than 1 day? Whether such calculations are accurate or not?

- - In the "Investment" section, the research team stated two items: renting machines and milling rigs, but the table did not show money in these two items..

- The calculation for rice straw for animal feed has not fully reflected the cost, so the economic efficiency is not accurate. Economic efficiency must separate the effect of additional investment, ie the composition, the price of straw after being sprayed will increase how much, how much the price of this feed increases., …

- - Above when proposing solutions, it is not said to invest in bone sprayers but in the replication section, this solution is mentioned. If there is no part in section 1.4, what are the bases to propose the possibility of replication?.

1.2 Content 2

- - Strengths and weaknesses need to be mentioned: Demand for coal / fuel pellets; What is the current technology, the type of material used primarily, the type of main product (tablet or bar); The current cost / existence needs to be addressed if it is to be expanded.

- - The proposal should be very specific because it is a technology review report, should not be written in this way.

- - The expected part of the study site, when it comes to completing the grinding equipment, should it be clear what the contents are to be completed? Completing the pelletizing equipment, the choice of pellets or fuel rods has not been clarified, why choose the member? How current equipment and technology, what defects, improvements and how much improvements will be made, expected to be effective; What is the capacity that the target customer wants? No description of the finishing part of rotary drum drying equipment.

1.3 Content 3

- - Overview, selection of technology and materials did not specify any scientific basis to choose what technology / improvement part. So need to add more.

1.4 Content 4

- It should be clearly stated that the objective of this component is to use edible mushrooms and medicinal mushrooms as a means to handle crop residues which add value, but the goal is not to research / develop mushrooms (internal content of national products). Therefore, the component needs to immediately identify suitable strains of mushrooms, fat mushrooms to ensure good conversion of by-products such as rice straw and corn cobs.
- State the current technology being applied and expected technology to improve the productivity, quality and increase the value of the mushroom production chain.
- Technology has groups to clarify: (i) Effect of using fungi to treat by-products (straw and corn cobs); (ii) Technology for processing the most effective materials and processes for growing mushrooms on raw materials; (iii) Technology for treating post-fungal media for bio-organic fertilizer production to meet standards according to Decree 108
- Supplementing the process of producing organic fertilizer from post-mushroom growing medium, expected organic fertilizer standard.
- Note the market potential of mushrooms, organic fertilizers. Stability of materials; Simplicity and stability of technology, suitable for farmers.
- Lack of processing organic fertilizer from growing mushrooms
- Market analysis: Need to clarify: Is the material available, purchase price; Mushroom market and organic fertilizer market
- Area of implementation: In Son La province producing oyster mushroom, Linh Chi mushroom, Nam Dinh produce mushrooms and button mushrooms.

1.5 Content 5

- The overview should be short. What technologies are available, the nature of

the technology, the problems and the contents of the bidding package will impact. How technologies are effectively transforming organic chemicals, how many days; Material quality annealed?

4.3 Conclusion

(i) The contractor quickly corrects the above comments (if reasonable) and submits the CPMU
(ii) Request CPMU to approve the review report after receiving the amendment of package 28 and agree to allow the contractor to implement it in the workshop and field to ensure the time.

5. Package 29: Research on the treatment of sludge waste in shrimp ponds

5.1 General comments:

The contractor mastered the TOR to write a review of logic and science technology. In general, the contractor has revised the report according to the advice of the consultant, however, the second revision report has not mentioned the mechanism and policy.

5.2 Specific comments

- Analysis of quality criteria need specific

➢ With mud from the pond: Total pH, OM, NPK, Na, Cl- and SO4-, conductivity (EC); P and K are easy to digest, Ca and Mg are exchanged

➢ With pond water (environmental index): COD, BOD, pH, Toc, salinity (EC), TSS, NH3, P2O5

➢ With soil for 3 plants: Similar to pond mud

➢ With organic fertilizer: It is necessary to ensure the quality requirements of Decree 108 for each type of registered fertilizer (Organic and Organic Mineral Organic)

- Research on developing algae group for shrimp, need further explanation: Name of species / algae variety. These algae affect oxygen competition with shrimps, because algae problems in animals are controversial

- As suggested at the previous meeting, it is recommended to describe the technology and mechanism of N-protein conversion in pond water through the creation of a group of microorganisms for inorganic and organic treatment as shrimp feed. Specifying species / strains of bacteria? Technology created or brought from outside into VietnamCác thí nghiệm về hiệu lực phân bón hữu cơ chế biến từ bùn thái

cần cụ thể: Diễn giải lý do tại sao sử dụng phân bón được sản xuất ra từ bùn thải ao nuôi để bón cho các loại cây lấy lá, cây ăn quả và cây chắn sóng và nêu rõ loại cây gì? nêu công thức thì nghiệm, liều lượng và thời kỳ bón phân, các chỉ tiêu theo dõi cây trồng. Tất nhiên đất cần được phân tích các chỉ tiêu cơ bản liên quan: pH, OM, NPKNa tổng số, Ca, Mg trao đổi, EC, PK dễ tiêu.

- All tables need to be named for easy tracking and quoting

- Need to add the column "Provincial units" for some tables and bring the unit to VND 1,000, instead of copper, to make the table compact, easy to see
- Regarding terminology: Review the term "organic nitrogen". In fact, only organic N
- The calculation of economic efficiency: The reason why using 78 million / ha.
- Regarding the request for additional funding for all contents: Difficult to feasible, if necessary, propose adjustment from less important content (eg fertilizer validity test with crops)

5.3 Conclusion

- The content to be edited is not large, but necessary, so the contractor is requested to correct and supplement
- Particularly, it is difficult to request additional funding, so if necessary, it is suggested that CPMU can transfer from other contents (eg fertilizer testing with 3 crops).
- After editing, immediately send to CPMU and copy to LIC to know.

Annex 2: List of LIC's field trips carried out in the fourth quarter of 2018

No	Date	Province	Purpose	No of specialist
1	15-16/10/2018	Sóc Trăng	Work with PMU of Soc Trang province and contractors	2
2	05-08/11/2018	Sơn La	Check the operation status of models, Biogas Works in Son La	2
3	22-25/11/2018	Bắc Giang	Check biogas works and investigate training impact assessment	1
4	04-06/12/2018	Phú Thọ	Evaluate the performance of the model of separation machine, generator and use of bioslurry	3
5	10-12/12/2018	Nam Đinh	Evaluate the performance of the model of separation machine, generator and use of bioslurry	4
6	19-22/12/2018	Bình Định	Evaluate the performance of the model of separation machine, generator and use of bioslurry	4
7	26-29/12/2018	Sóc Trăng	Evaluate the performance of the model of separation machine, generator and use of bioslurry	4
8	18-21/12/2018	Phú Thọ	Check biogas works and investigate training assessments	1
9	24-28/12/2018	Sơn La	Check biogas works and investigate training assessments	1

Annex 3: List of LIC's main technical documents in the fourth quarter of 2018

No	Documents	Compiler
1	Draft Guidance for operation, technology transfer on the system of separation machines and organic fertilizer production from the following products	Bùi Văn Chính
2	Draft Evaluation of the effectiveness of the demonstration model: Using the separation machine to treat livestock waste to collect solid waste into organic fertilizer for crops	Bùi Văn Chính
3	Detailed report on survey results and occupational investigation: Production of animal feed from crop residues	Bùi Văn Chính
4	Evaluate the actual effectiveness of the demonstration model: Using the separation machine to treat livestock waste to collect solid waste into organic fertilizer for plants	Bùi Văn Chính
5	Proposing institutional policies to advise MARD and other organizations such as VBA, institutional development and mechanisms for Biogas technology and Biogas value chain management	Bùi Văn Chính
6	Draft Handbook to guide the operation, maintenance and maintenance of systems using biogas tank as fertilizer for plants	Bùi Văn Chính
7	Proposing method of dissemination and replication of biogas technology in Vietnam	Bùi Văn Chính
8	Các giải pháp khắc phục hiện tượng quá tải bể KSH	Bùi Văn Chính
9	Hướng dẫn lắp đặt, vận hành, bảo dưỡng hệ thống máy phát điện khí sinh học	Bùi Văn Chính
10	Hướng dẫn xây dựng, bảo dưỡng công trình KSH qui mô vừa	Bùi Văn Chính
11	Báo cáo chuỗi giá trị KSH và nông nghiệp các bon thấp khác vùng dự án	Nguyễn Thị Vượng
12	Báo cáo đánh giá kết quả đào tạo nâng cao năng lực dự án lcasp tại 3 tỉnh: Bắc Giang, Phú Thọ và Lào Cai	Nguyễn Thị Vượng
13	Dự thảo Sổ tay hướng dẫn xây dựng vận hành, bảo dưỡng máy phát điện KSH	Lê Thị Thoa
14	Hướng dẫn sử dụng triệt để khí ga thừa	Lê Thị Thoa
15	Tờ rơi giới thiệu về các mô hình trình diễn của dự án LCASP	Lê Thị Thoa
16	Báo cáo tổng hợp thực hiện dự án LCASP	Lê Thị Thoa
17	Báo cáo đánh giá mô hình trình diễn tại 4 tỉnh: Nam Định, Phú Thọ, Bình Định và Sóc Trăng	Lê Thị Thoa, Bùi Văn Chính và Nguyễn Đình Vinh