

Promotion the potential benefits of biogas and bio-fuel as a source of renewable energy for smallholder farmers in Xiengkhouang province, Lao PDR

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1. Introduction

- **Project name:** Promotion the potential benefits of biogas and bio-fuel as a source of renewable energy for smallholder farmers in Xiengkhouang province, Lao PDR
- **Budgeting:** USD 79,800
- **Donor:** Approved by “Promotion of Biomass Energy for Agricultural Communities and Rural Development in ASEAN Region” and funded by Japan – ASEAN Integration Fund (JAIF) through the ASEAN Technical Working Group on Agricultural Research and Development (ATWGARD)
- **Implementation schedules:** 1 year (from approval date July 2019)
- **Project locations:** Xiengkhouang province, Lao PDR

2. Project Objectives

- Demonstrate the models of biogas and bio-fuel as a renewable energy source for household cooking and electricity.
- Treatment of agricultural residue and reducing environmental pollution.
- Assessment the impact of biogas and bio-fuel models on economic, social and environmental impact.

3. Project activities

Activity 1: Baseline survey for site selection.

- Pek, Kham, Nong Had district, Xiengkhouang province
- Using two methods: i) farmers' focus group meetings and ii) individual interviews of farmers using a semi-structured questionnaire.

Activity 2: Experimental design.

- **Model 1:** Utilization of fattening cattle and/or fattening pig waste for **biogas**.
- **Model 2:** Utilization of maize cobs pellet for **bio-fuel** production.

2 villages per each (Pek, Nong Had and Kham district) will select for study

3. Project Activities

Activity 3: Experimental plan and model installation.

Model 1:

- Three model of biogas (Plastic tubular, Plastic tank and Concrete tank) with the volume of 5-7 m² will install on smallholder farms.
- 2 villages of Pek district, Xiengkhouang province. Five farmers per biogas model per village will use in the study.

Model 2:

- 2 villages of Kham district, 2 villages of Nong Had district, Xiengkhouang province, and five farmers per village will select for study.
- Maize cobs will achieve from local area, sundry, milling and compress into the pellets.

3. Project Activities

Activity 4: Data collection and analysis.

Model 1-Biogas: will measure dry matter, nitrogen, pH, the volume of the gas and methane.

Model 2-Bio-fuel:

- The **physical and chemical** composition of maize cobs will analyze for Carbon, Hydrogen, Nitrogen, Oxygen, Sulfur, Moisture and Ash content.
- The **gross Calorific and net Calorific** value will determine by bomb calorimeter.
- 50g and 100g of the maize cobs pellet sample will determine for **combustion rate** by burning in a form of open fire under indoor condition.

3. Project Activities

Activity 5: Evaluate the benefit of the model and reporting the result

- **Economic sector:** Reduce the cost of electricity and firewood use for household cooking on sustainable energy production for smallholder farms.
- **Social sector:** Smallholder farms gain cost saving in fattening cattle waste management mainly time and labor, reduce environmental pollution, better hygiene in the village.
- **Environmental sector:** Treatment of agricultural residue and reduce environmental pollution which contribute to environmental friendly.
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4. Expect outputs

- To promote and practice the models of biogas and bio-fuel as renewable energy source for household.
- To build capacity of using residue from livestock and maize production.
- Reducing environmental pollution from agricultural residue.
- Obtain detail information of biogas and bio-fuel and recommendation on sustainable agriculture production.
- Establish the system for sharing the information on renewable energy production among the AMCs.

5. Detail schedule

Planned Activities	Time-frame			
	May-Jun 2019	Jul-Aug 2019	Sep 2019- Mar 2020	Apr-Jun 2020
Preparing pilot project proposal based on agreement of the meeting				
AMCs provide the training course for Laos especially from Vietnamese expert on biogas and bio-fuel technology				
Implementation the pilot project: - Installation the models - Data collection, monitoring - Data analyze and evaluation - Meeting/workshop for reporting the results				
Report and recommendation to institute, policy marker. - Establishment the system for sharing and exchange the information for AMCs				

Khob Chai/Thank you

