Topic: Knowledge Product from the Multidimensional Evaluation of Agroecological Performance in the Battambang Initiative, Cambodia (MuLAgE Project)

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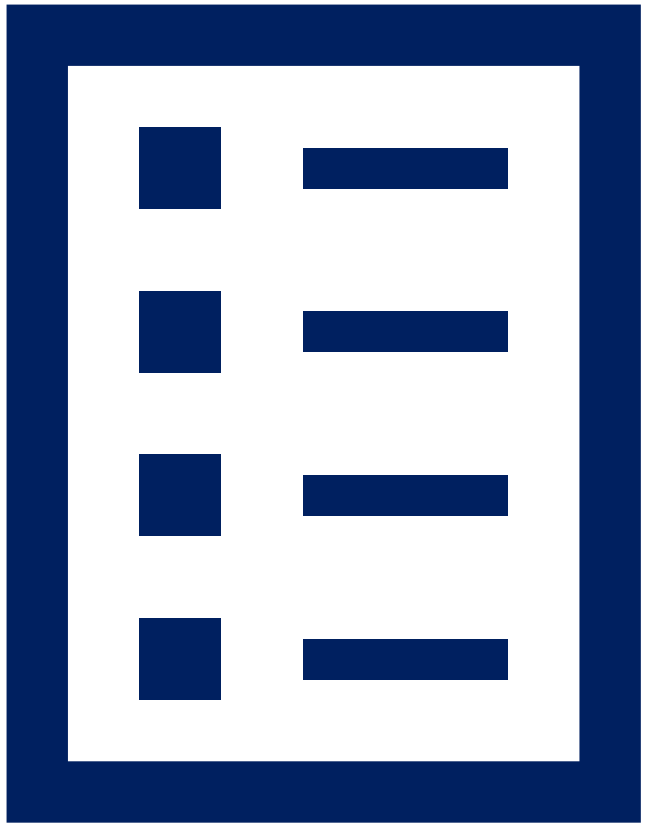
Content



i. **Introduction**
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I. Introduction

Agroecology (AE) is a comprehensive **approach** that considers **ecological, and social principles and concepts** in the development and management of food and agricultural systems. It aims to maximize interactions between plants, animals, humans, and the environment while taking into account the social issues that should be addressed for a sustainable and equitable food system (FAO, 2018).

II. ALiSEA grant in 2022

ECOLAND has been selected under ALiSEA small grant (ASSET Project 2022)

Research project: Multidimensional Evaluation of Agroecological Performance in Battambang Initiative, Cambodia (MuLAgE)

Grant Award: €20,000.00

Implementation period: 12 months (Jan–Dec 2022)

III. Project aim and objectives

Aim: To multidimensionally access and evaluate the agroecological and non-agroecological farms' performance in Battambang province of northwest Cambodia for smallholder farmers' agroecological transition and propose solutions for upgrading the transition.

Specific objectives:

1. Access baseline data on current agroecology practices and transition in the study area
2. Identify the agroecology constraints and their characteristics for the agroecology transition (CAET)
3. Generate multidimensional strategies to adapt in order to promote agroecological transition.
4. Compare agroecological and non-project farms of farmer practices in the study area

Study area

Rotanak Mondol district	Sangkae district
60 farmers in the agroecological upland area (CIRAD project)	60 farmers in low lowland area, non-project

Our approach




Step 1: conduct TAPE's step 0 as FGD with relevant stakeholders to understand current situation and challenges in agricultural practices

Step 2: survey the characterization of agroecological transition (CAET)

Step 3: Survey on the 10 core criteria of key 5 dimensions of agroecological performance

Step 4: Dissemination of results with stakeholders

IV. Deliverable agroecological acknowledges product

Case study: Input reduction in agroecological practices: A case of local practices in horticulture production in North-West of Cambodia

Main results:

- **Crop Rotation:** Change vegetable types regularly to keep soil healthy and reduce pests/diseases.
- **Cover Cropping:** Grow extra plants to improve soil, provide shade, or produce useful products.
- **Mulching:** Use rice straw or organic matter to cover soil, keep moisture, reduce weeds, and improve soil.
- **Intercropping:** Grow different vegetables or fruit trees together to increase diversity and reduce pests.
- **Agroforestry:** Plant fruit trees (coconut, mango, longan) around farms for shade, windbreak, and extra income.
- **Crop–Livestock Integration:** Raise chickens, fish, or cows on the farm to recycle nutrients and add income.
- **Organic Soil Improvement:** Use compost, bokashi, and rice straw to make soil fertile and healthy.
- **Balanced Fertilizers:** Mix organic (compost, manure) and chemical fertilizers for rice to manage nutrients.

Case Study

Input Reduction in Agroecological Practices: A Case of Local Practices in Horticulture Production in North-West of Cambodia

Overview

This case study has been documented in the small grant of Agroecology Learning Alliance in South East Asia (ALiSEA) in 2022 under the project titled "Multidimensional Evaluation of Agroecological Performance in Battambang Initiative, Cambodia (MuLAgE)". Locating in north-west of Cambodia, Battambang is a well-know province in agricultural productions especially rice.

The production systems are variable in according to the landscape of the area. In upland area, for instance, cash crops (cassava and maize) and perennial crops (mango and logan) are common system while in the lowland, it is observed mainly paddy rice and horticulture production. Pesticides based production was reported in both areas with production in upland area for off-season and rice rainfed production, especially 2nd cycle of rice production (Kim and Peeters, 2020; Kong and Castella, 2021). It was reported that there were approximately 5-6 applications of pesticides in the 2nd cycle of paddy rice while it was lower in the 1st cycle.

Agroecological practices have also been promoting actively in the area by different institutions and projects at national local levels. For instance, the conservation agriculture mainly focused on innovative practices including reducing tillage, diversification of crops, cover crop promotion and mechanization toward the sustainable intensification implemented by Cambodia Conservation Agriculture and Sustainable Intensification Consortium (CASIC). With these efforts, it is believed that understanding of performance and challenges of the agroecological transition would be both beneficial to the enhancing of interventions and

Objective of the Case

The main objective of this case study is to document and promote the agroecological practices of input reduction of local farmers in the community of Battambang province by highlighting the best practices and challenges in implementation.

Methodology

This case study was considered element "Input Reduction" is one of 13 elements from High-Level Panel of Expert (with level of transition (Gliessman, 2007; HLPE, 2019) (Fig. 1). This element provides valuable insights into optimizing resources usage, enhancing efficiency, and minimizing external inputs while maintaining or increasing productivity.

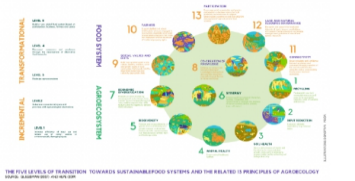
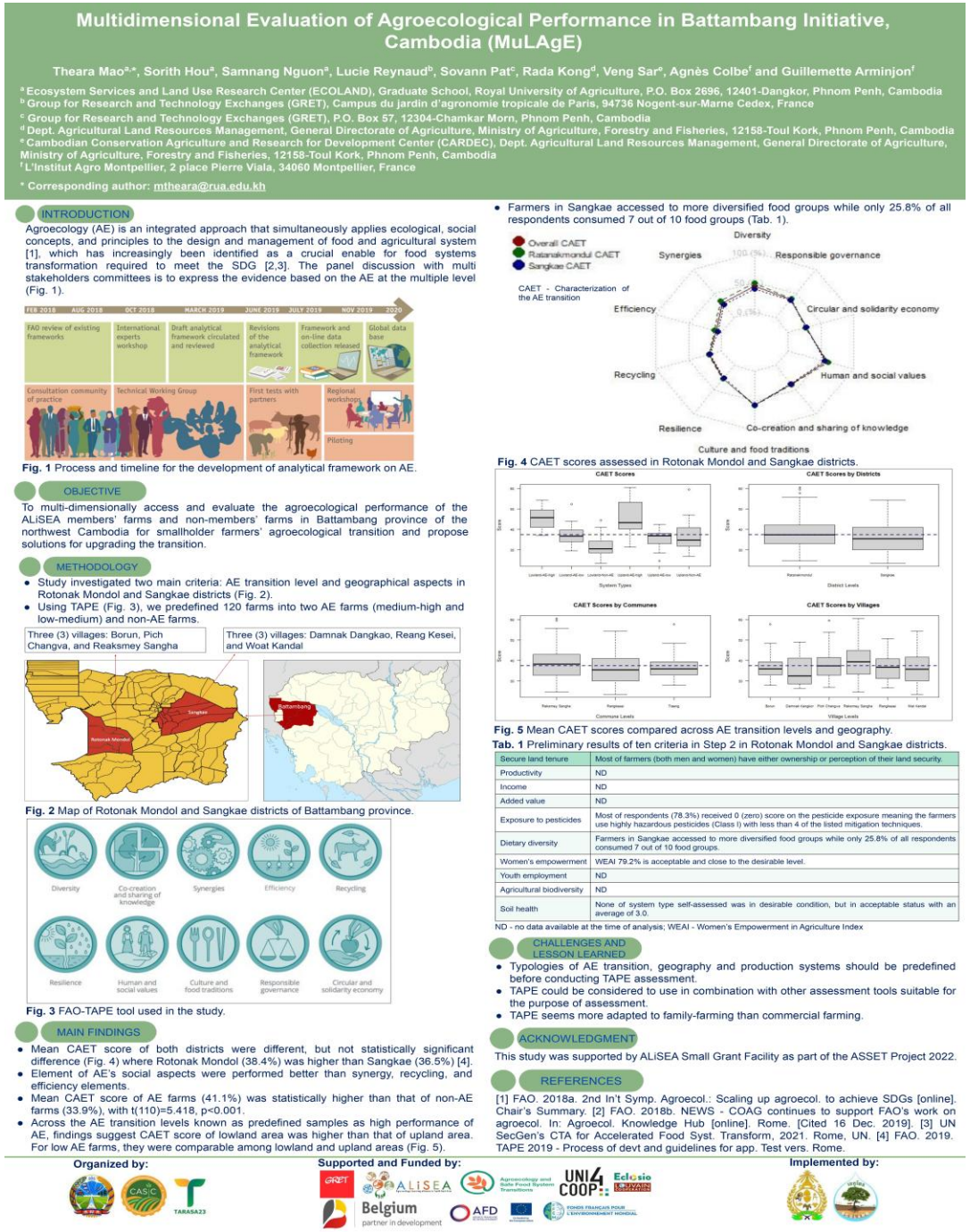


Fig. 1 The five levels of transition towards sustainable food systems and the related 13 principle of agroecology

This study used mixed qualitative and qualitative methods including households' interviews by using Tool for Agroecology Performance and Evaluation (TAPE) (FAO, 2019), key informant interviews, focus group discussion (FGD), field observation, participatory analysis with stakeholders in Battambang province, and interviewed a model farmer as a member of Sustainable Soil for Life Association (SSLA) related to using internal materials at the farms and communities to produce natural fertilizers and bio-pesticides (Fig. 2). It provides insights into effective strategies for optimizing

Poster presentation at ISERD 15th Conference

- Mean CAET score of both districts were different, but not statistically significant difference where Ratanak Mondol (38.4%) was higher than Sangkae (36.5%).
- Mean CAET score of AE farms (41.1%) was statistically higher than that of non-AE farms (33.9%), with $t(110)=5.418$, $p<0.001$.
- Across the AE transition levels known as predefined samples as high performance of AE, findings suggest CAET score of lowland area was higher than that of upland area.



Multidimensional Evaluation of Agroecological Performance in Battambang Initiative, Cambodia (MuLAgE)

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INTRODUCTION

Agroecology (AE) is an integrated approach that simultaneously applies ecological, social concepts, and principles to the design and management of food and agricultural system [1], which has increasingly been identified as a crucial enable for food systems transformation required to meet the SDG [2,3]. The panel discussion with multi stakeholders committees is to express the evidence based on the AE at the multiple level (Fig. 1).

Fig. 1 Process and timeline for the development of analytical framework on AE.

OBJECTIVE

To multi-dimensionally access and evaluate the agroecological performance of the ALiSEA members' farms and non-members' farms in Battambang province of the northwest Cambodia for smallholder farmers' agroecological transition and propose solutions for upgrading the transition.

METHODOLOGY

- Study investigated two main criteria: AE transition level and geographical aspects in Rotonak Mondol and Sangkae districts (Fig. 2).
- Using TAPE (Fig. 3), we predefined 120 farms into two AE farms (medium-high and low-medium) and non-AE farms.

Three (3) villages: Borun, Pich Changva, and Reaksmey Sangha

Three (3) villages: Damnak Dangkao, Reang Kesei, and Woat Kandal

Fig. 2 Map of Rotonak Mondol and Sangkae districts of Battambang province.

Fig. 3 FAO-TAPE tool used in the study.

MAIN FINDINGS

- Mean CAET score of both districts were different, but not statistically significant difference (Fig. 4) where Rotonak Mondol (38.4%) was higher than Sangkae (36.5%) [4].
- Element of AE's social aspects were performed better than synergy, recycling, and efficiency elements.
- Mean CAET score of AE farms (41.1%) was statistically higher than that of non-AE farms (33.9%), with $t(110)=5.418$, $p<0.001$.
- Across the AE transition levels known as predefined samples as high performance of AE, findings suggest CAET score of lowland area was higher than that of upland area. For low AE farms, they were comparable among lowland and upland areas (Fig. 5).

- Farmers in Sangkae accessed to more diversified food groups while only 25.8% of all respondents consumed 7 out of 10 food groups (Tab. 1).

Fig. 4 CAET scores assessed in Rotonak Mondol and Sangkae districts.

Fig. 5 Mean CAET scores compared across AE transition levels and geography.

Tab. 1 Preliminary results of ten criteria in Step 2 in Rotonak Mondol and Sangkae districts.

Secure land tenure	Most of farmers (both men and women) have either ownership or perception of their land security.
Productivity	ND
Income	ND
Added value	ND
Exposure to pesticides	Most of respondents (78.3%) received 0 (zero) score on the pesticide exposure meaning the farmers use highly hazardous pesticides (Class I) with less than 4 of the listed mitigation techniques.
Dietary diversity	Farmers in Sangkae accessed to more diversified food groups while only 25.8% of all respondents consumed 7 out of 10 food groups.
Women's empowerment	WEAI 79.2% is acceptable and close to the desirable level.
Youth employment	ND
Agricultural biodiversity	ND
Soil health	None of system type self-assessed was in desirable condition, but in acceptable status with an average of 3.0.

ND - no data available at the time of analysis; WEAI - Women's Empowerment in Agriculture Index

CHALLENGES AND LESSON LEARNED

- Typologies of AE transition, geography and production systems should be predefined before conducting TAPE assessment.
- TAPE could be considered to use in combination with other assessment tools suitable for the purpose of assessment.
- TAPE seems more adapted to family-farming than commercial farming.

ACKNOWLEDGMENT

This study was supported by ALiSEA Small Grant Facility as part of the ASSET Project 2022.

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Main results:

- The element of social aspects performed better than technical aspects meaning that the farm relied on external inputs (fertilizers, pesticides, seeds, labor, and services).
- There is increasingly used agro-inputs for increased productivity, particularly in lowland area with use an average 5.4 types of pesticides.
- While the economic performance in the upland area resulted in negative total income due to climate change risks (drought and flood), pest-causing yield loss, rising agricultural input costs, loss price of agricultural products, difficulty in selling agricultural products.
- To better performance of agroecology transition, there is needed the action of farmers to save their seeds to maintain internal inputs at the farms.
- In addition, promoting AE practices at the national level with technological techniques should be widely disseminated to farmers in the community in order to use less pesticides, adapt using organic/natural fertilizers and pesticides, and apply ecological techniques.

Evaluation of Agroecological Performance Under Geographical Aspects and Agroecological Transition Levels in Battambang Province, Northwest of Cambodia

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Abstract Agroecology (AE) is the application of ecological concepts and principles to agricultural systems to increase their sustainability. This study aimed to conduct a multidimensional evidence-based evaluation of AE performance in Battambang province, using the Tool for Agroecology Performance Evaluation (TAPE). The study investigated two main criteria: geographical aspects in Sangkae (lowland) and Rotonak Mondol (upland) districts and AE transition levels. We predefined 120 farms into two AE farms (high-AE and low-AE) and non-project. Results indicated that the mean characterization of agroecological transitions (CAET) score was low (37.42%). The element of social aspects performed better than technical aspects meaning that the farm relied on external inputs (fertilizers, pesticides, seeds, labor, and services). There is increasingly used agro-inputs for increased productivity, particularly in lowland area with use an average 5.4 types of pesticides. While the economic performance in the upland area resulted in negative total income due to climate change risks (drought and flood), pest-causing yield loss, rising agricultural input costs, loss price of agricultural products, difficulty in selling agricultural products. To better performance of agroecology transition, there is needed the action of farmers to save their seeds to maintain internal inputs at the farms. In addition, promoting AE practices at the national level with technological techniques should be widely disseminated to farmers in the community in order to use less pesticides, adapt using organic/natural fertilizers and pesticides, and apply ecological techniques.

Keywords Agroecology, Sustainability, TAPE, Multidimensional, Evaluation

គម្រោង

ការវាយតម្លៃពហុសណ្ឋាននៃការអនុវត្តកសិអេកូឡូស៊ីនៅខេត្តបាត់ដំបង ប្រទេសកម្ពុជា (MuLAgE)

គោលដៅ

ដើម្បីវាយតម្លៃ និងទទួលបានពហុសណ្ឋាននៃការអនុវត្តកសិអេកូឡូស៊ីនៃកសិដ្ឋានរបស់សមាជិក និងមិនមែនជាសមាជិក ALiSEA ខេត្តបាត់ដំបង ភាគពាយ័ព្យនៃប្រទេសកម្ពុជា ក្នុងការផ្លាស់ប្តូរកសិអេកូឡូស៊ីរបស់កសិករខ្នាតតូច និងលើកជាដំណោះស្រាយសម្រាប់ការធ្វើឱ្យប្រសើរឡើងនៃការផ្លាស់ប្តូរ។

គោលបំណងជាក់លាក់

១ ប្រៀបធៀបការអនុវត្តនៃកសិដ្ឋានកសិអេកូឡូស៊ី និងមិនមែនកសិអេកូឡូស៊ីរបស់កសិករក្នុងតំបន់សិក្សា

២ ប្រមូលទិន្នន័យមូលដ្ឋានលើការអនុវត្ត និងការផ្លាស់ប្តូរកសិអេកូឡូស៊ីនាពេលបច្ចុប្បន្ន

៣ កំណត់ឧបសគ្គកសិអេកូឡូស៊ី និងចរិកលក្ខណៈរបស់វាក្នុងការផ្លាស់ប្តូរកសិអេកូឡូស៊ី

៤ ស្វែងរកយុទ្ធសាស្ត្រពហុសណ្ឋាននានា ដើម្បីអនុម័តក្នុងការលើកកម្ពស់ការផ្លាស់ប្តូរកសិអេកូឡូស៊ី។

វិធីសាស្ត្រ

ឧបករណ៍សម្រាប់ការវាយតម្លៃការអនុវត្តកសិអេកូឡូស៊ី (FAO-TAPE)

លទ្ធផលរំពឹងទុក

១	២	៣
ឯកសារពិពណ៌នាពីទិន្នន័យមូលដ្ឋាន ឬពត៌មានពីបច្ចុប្បន្នភាពនៃការអនុវត្ត និងការផ្លាស់ប្តូរកសិអេកូឡូស៊ីក្នុងតំបន់សិក្សា។	ការបង្ហាញគ្រោងការណ៍ពីកត្តាជំរុញ និងកត្តាទាំងស្រុងក្នុងការផ្លាស់ប្តូរកសិអេកូឡូស៊ីក្នុងតំបន់សិក្សា។	ផែនការអនុវត្ត និងសកម្មភាពនានា ដើម្បីដោះស្រាយឧបសគ្គចម្បងៗមួយចំនួនដែលបានកំណត់ និងទាញយកអត្ថប្រយោជន៍ពីកត្តាជំរុញដែលមានស្រាប់ក្នុងតំបន់សិក្សា។

ខេត្តបាត់ដំបង

រយៈពេលអនុវត្ត: ១ ឆ្នាំ (មីនា ២០២៣ - មីនា ២០២៤)

ថវិកាជំនួយ: ២០.០០០,០០ អឺរ៉ូ

រូបថតដោយ: ម៉ៅ ធារ៉ា
ស្រុករតនមណ្ឌល ខេត្តបាត់ដំបង

គាំទ្រ និងឧបត្ថម្ភដោយ:

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អនុវត្តដោយ:

PROJECT

Multidimensional Evaluation of Agroecological Performance in Battambang Initiative, Cambodia (MuLAgE)

Goals

To multi-dimensionally access and evaluate the agroecological performance of the ALiSEA members' farms and non-members' farms in Battambang province of the northwest Cambodia for smallholder farmers' agroecological transition and propose solutions for upgrading the transition.

Specific Objectives

1. To compare agroecological and non-agroecological farms of farmers practices in the study area
2. To access baseline data on the current agroecology practices and transition
3. To identify the agroecology constraints and its characteristics for agroecological transition
4. To generate multi-dimensional strategies to adopt in order to promote agroecological transition.

Methodology

Tool for Agroecology Performance Evaluation (FAO-TAPE)

Expected Outcomes

1	2	3
Descriptive document of the baseline data or information on current agroecology practices and transition in the study area.	Schematic representation of the levers and lock-ins for agroecological transition in the study area.	Proposed activities and action plan to address some of the key barriers identified and to take advantage of the existing levers in the study area.

Battambang province

Implementation period: 1 year (Mar 2023 - Mar 2024)

Grant: 20,000.00 EUR

Photo: Mao Theara Rotonak Mondol district, Battambang province

Supported and Funded by:

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Implemented by:

PROJECT

Multidimensional Evaluation of Agroecological Performance in Battambang Initiative, Cambodia (MuLAgE)

About MuLAgE

The MuLAgE project is supported by Agroecology Learning Alliance in South-East Asia (ALiSEA) as part of the Agroecology and Safe food System Transitions (ASSET) project and Uni4Coop (Eclosio and Louvain Coopération). This project funded by the French Development Agency (AFD), the European Union (EU), the French Facility for Global Environment (FFEM) and the Directorate General for Belgium Development Cooperation (DGD).

Grant: 20,000.00 EUR, 1 Year (Mar 2023 - Mar 2024)

Agroecology

Agroecology (AE) is "an integrated approach that simultaneously applies ecological and social concepts and principles to the design and management of food and agricultural systems" (FAO, 2018a), which has increasingly been identified as a crucial enabler for food systems transformation required to meet the Sustainable Development Goals (SDGs) (FAO, 2018b; UNSG, 2021).

Goals

To multi-dimensionally access and evaluate the agroecological performance of the ALiSEA members' farms and non-members' farms in Battambang province of the northwest Cambodia for smallholder farmers' agroecological transition and propose solutions for upgrading the transition.

Research objectives

1. To compare agroecological (AE) and non-agroecological (non-AE) farms of farmers practices in the study area
2. To access baseline data on the current agroecology practices and transition
3. To identify the agroecology constraints and its characteristics for agroecological transition
4. To generate multi-dimensional strategies to adopt in order to promote agroecological transition.

Methodology

- The study investigated two main criteria including agroecological transition level and geographical aspects in Rotonak Mondol and Sangkae districts northwest of Battambang province.
- We predefined 120 farms into AE-farms (medium-high and low-medium) and non-AE farms.

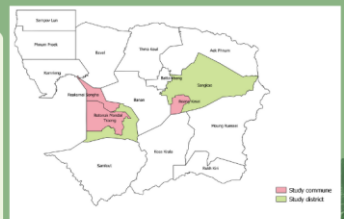

Fig. 1 Map of communes and districts selection in Battambang province.

Tool for Agroecology Evaluation and Performance (FAO-TAPE) was used as a main evaluation in this study as follows:

Fig. 2 FAO-TAPE tool used in the study.

Image.1 Focus group discussion with relevant stakeholders, project partners, and local authorities in Battambang province.

- **Step 0**: We conducted focus group discussions with relevant stakeholders, project partners and local authorities, as well as conducted secondary data on socio-economic, environmental and demographic characteristics and contexts of the system in the study area.
- **Step 1**: We interviewed farmers on characterization of agroecological transition (CAET) with the 10 elements of agroecology.
- **Step 2**: We interviewed farmers on the 10 criteria from five key dimensions strategics to generate the evidence on multidimensional performance of agroecology.
- **Step 3**: We analyzed data and organized a dissemination workshop with relevant stakeholders and local project partners in order to share the research findings, receive feedback and improve the research implementation.

Expected Outcomes

1. Descriptive document of the baseline data or information on current agroecology practices and transition in the study area.
2. Schematic representation of the levers and lock-ins for agroecological transition in the study.
3. Proposed activities and action plan to address some of the barriers identified and to take advantage of the existing levers in the study area.

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Implemented by:

I-stand English and Khmer

leaflet

Other agroecology acknowledges product leaflets and videos

All agroecology acknowledges product in MuLAgE project

https://drive.google.com/drive/folders/1JQrc8vPmkqBUCk6YASO9OAgYEMxtEVXq?usp=drive_link

- https://d.docs.live.net/8faadbfe813c4a85/Desktop/MuLAgE%20project/video_2025-08-01_14-49-56.mp4

សូមអរគុណ!

THANK YOU!

សំណួរ និងចម្លើយ

Q & A