

The EFICAS Game

Exploring eco-friendly
intensification of
agriculture with
farmers



EFICAS Know-How Series

The EFICAS Game

**Exploring eco-friendly intensification
of agriculture with farmers**

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Eco-Friendly Intensification and Climate-resilient Agricultural Systems project
Vientiane, 2020.



Citation

Castella J.C., Collombet R., Nandee K., Lienhard P., Tran Quoc H., Phimmasone S. 2020. The EFICAS game: exploring eco-friendly intensification with farmers. EFICAS Know-How Series. Vientiane, Laos.

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The EFICAS project was implemented by



With financial supports from



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1. A role-play game for whom and for what purpose?

The EFICAS project designed the game to explore eco-friendly intensification and sustainable development scenarios with farmers in northern uplands of Lao PDR. During the game, eight players manage their farm resources (land, labor and capital) to develop their households' economy while preserving natural resources. To do so, they have to negotiate and cooperate with their neighbours... or not!

The game is part of an overall learning approach to increase adaptive capacity of village communities to environmental and economic changes. Through the EFICAS game, farmers see how their neighbours make their decisions, learn and adjust their strategies towards developing their households' economy. As a community development tool, a group of farmers engages into participatory land use planning, explores alternative development pathways, and learns how to prioritize options available to individuals and communities.

The game is also a tool to assess the impact of project interventions on decision patterns and social interactions in a village. For this, the game was played in both intervention and control villages of the project, i.e. villages exhibiting similar characteristics in terms of size, ethnic groups, accessibility, land uses, and activities as the target villages but without project interventions. We compared the decisions made during the game and interactions among players in intervention and control villages to evaluate social learning induced by the project in village communities.

Any development or research actor can use the EFICAS game to engage farming communities into sustainable intensification.



2. Materials required to play

The low-tech material used is adapted to a context of upland agriculture in Southeast Asia but it could be adjusted to other conditions or environments.

Materials described below can be easily replaced by other similar items. To play the game, the materials required are:



Board game (1m x 1m) of 100 cells (10 rows x 10 columns) representing the village territory: land cover features, i.e. agricultural land (white cell), non-agricultural land (green cell) and river, are printed on the board. During the game, color cards are pinned on the cells to represent different land uses, e.g. paddy in lowlands, agroforestry in forested landscapes.

ປະເພດການໃຊ້	ຜົນຜະລິດ (ຕາມປີ)	ປະລິມານ (ຕາມປີ)
ປະເພດການໃຊ້ 1	10	3-4
ປະເພດການໃຊ້ 2	6	3-4
ປະເພດການໃຊ້ 3	8	10
ປະເພດການໃຊ້ 4	0.5	0.5
ປະເພດການໃຊ້ 5	0	0-1.5
ປະເພດການໃຊ້ 6	0	0
ປະເພດການໃຊ້ 7	0	0

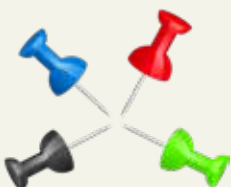
Poster displaying local land uses and activities (i.e. crops, big livestock, fallow) performances (income) and inputs (labor, capital, pesticides, others)

ປະເພດການໃຊ້	ຜົນຜະລິດ (ຕາມປີ)	ປະລິມານ (ຕາມປີ)
ປະເພດການໃຊ້ 1	10	3-4
ປະເພດການໃຊ້ 2	6	3-4
ປະເພດການໃຊ້ 3	10	10-12
ປະເພດການໃຊ້ 4	2	2-5
ປະເພດການໃຊ້ 5	2	4-6
ປະເພດການໃຊ້ 6	4	8-14
ປະເພດການໃຊ້ 7	3	2-3

Poster displaying innovative land use systems performance (outputs) and requirements (inputs)

ປະເພດການໃຊ້	ຜົນຜະລິດ (ຕາມປີ)	ປະລິມານ (ຕາມປີ)
ປະເພດການໃຊ້ 1	0	5
ປະເພດການໃຊ້ 2	0	0.5
ປະເພດການໃຊ້ 3	4	0.5
ປະເພດການໃຊ້ 4	2	4
ປະເພດການໃຊ້ 5	4	6
ປະເພດການໃຊ້ 6	0	0.5
ປະເພດການໃຊ້ 7	0	10
ປະເພດການໃຊ້ 8	0	10

Poster displaying the list of possible investments: fences, small shops, etc. with parameters decided by the participants based on local practices.



120 color pins representing players (= land users): 8 colors (as there are 8 players) and 15 pins per color. Pins are used to assert land use rights over cells and livestock ownership. 4 colors represent "Rich households" and 4 colors represent "Poor Households."



Fake money: 200 bank notes of 1 million LAK, 100 bank notes of 500,000 LAK, 50 bank notes of 100,000 LAK



Grains representing labor force: 30 grains of red bean representing 5 men.months each; 100 grains of white bean representing 1 man.month each



Wood pieces representing big livestock (cattle or buffalo): 100 pieces



Boxes for players to store their assets (labor, livestock, bank notes, color pins, etc.)



Color cards representing different land uses and activities. The meaning and parameters of color cards are displayed in the posters "local land use" and "innovative land use systems". At least 12 different colors, 10-15 color cards each.



Color paper strips representing plot fences, 8 colors (same as players color pins), 10-15 strips per color.



Dice to play unexpected events



Booklets, pencils, and calculators for players to compute and monitor their choices and gains



3. Before starting



Training of the game facilitators

The success of the game and the quality of interactions amongst participants highly depend on the quality of the facilitation. At least three facilitators are needed to run the game smoothly:



- **A Game Master** will introduce the game, the rules and parameters, adjust them if needed, play the unexpected events, facilitate exchanges amongst players, and organize the debriefings after each play round. The Game Master constantly interacts with all of the players in order to create an interactive and friendly atmosphere all along the game session.

- **A Game Assistant** will help the players in understanding the rules, allocating their resources, and computing their choices and results in their notebooks.

- **A Game Accountant** will compute, round after round, farmers' choices and results using an Excel spreadsheet. S/he also plays the role of the bank or any trader/ foreign investor that would intervene during the game (see variations section page 18).



The role of accountant is important when using the game for a research purpose requiring a monitoring of all decisions and actions during the session. Otherwise, the Game Assistant may play the role of the bank as the Excel spreadsheet will not be used. An Excel spreadsheet is used for research purpose only to monitor the players' choices and gains.

During the facilitation training (at least two days + one gaming session in real conditions), future facilitators (e.g. project staffs, district technicians, and/or local champions) should play the game themselves - for them to master the rules, the game materials, and the course of the game - before engaging into facilitation with farmers.



A focus group discussion to parameterize the game and adjust to local contexts

Farmers will feel uncomfortable if village landscapes and agricultural activities included in the game are different from their local reality. For instance, farmers are unlikely to improve lowland rice production if they do not have paddy fields in their village. Initial land use should therefore reflect as much as possible existing land uses and activities in the village

The village land management committee¹ (VLMC) is involved in a focus group discussion prior to the gaming session to adjust the following parameters:

- Area of lowland paddy when starting the game: existence or absence of paddy in the village
- Ratio upland to lowland area to be represented on the game board at the initial stage (Fig.1)

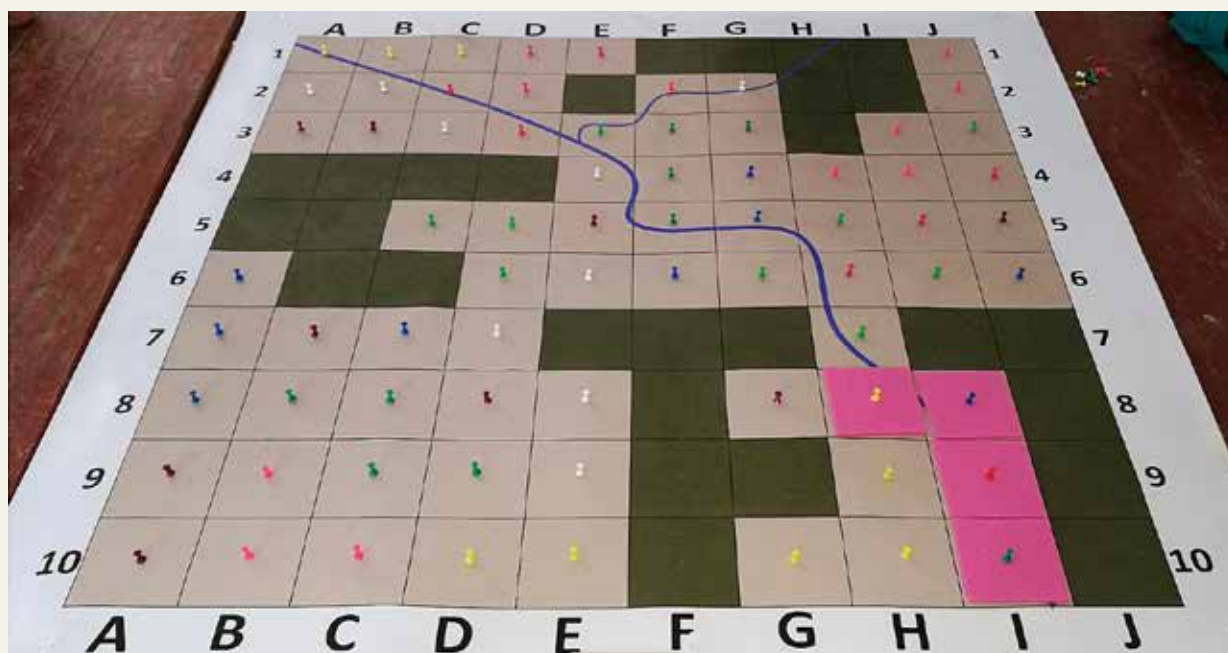


Figure 1: Game board at the initial stage. Players place their colored pins on the board, the pink cards represent initial lowland paddy fields.

- **Local land uses and activities:** Seven land uses and activities are proposed by default (Table 1) with their parameters: labor requirements, average income, etc. The enabling conditions for each activity have to be discussed during the preparatory focus group discussion and adjusted in the poster "local land use" according to village context.

Activity	Labor/ha (men.months)	Income/ha (MLAK)	Comment
1 Upland rice	10	3-4	NC
2 Maize	6	3-4	NC
3 Paddy rice	8	10	NC
4 NTFP	0.5	0.5	NC
5 Roaming cattle	0	0-1.5	Can feed 1 cattle or 10 goats on cropland or fallow.
6 Regenerating fallow 1	0	0	You cannot plant annual crops on this plot. Wait for 2 rounds
7 Regenerating fallow 2	0	0	You cannot plant annual crops on this plot. Wait for next round.

Table 1. Local land uses with related labor requirements and expected income (MLAK: million Lao Kips)

¹ The VLMC is described in *Community-based Agricultural Development Planning (CADP): Engaging farming communities into participatory land use planning*. EFICAS Know-How Series, 2020. VLMC plays an important role during and after the participatory land use planning process (PLUP).

• **Innovative land use systems:** Nine activities are proposed by default as improvements of local land uses (Table 2) with their parameters and conditions for implementation. They are discussed and adjusted with participants in the poster "Innovative land use"; other eco-friendly options are displayed in Fig. 2

	Activity	LABOR/ha (men.months)	INCOME/ha (MLAK)	Comment
1	Upland rice + Pigeon pea	10	3-4	This leads to an improved fallow of pigeon pea the next round.
2	Maize + Pigeon pea	6	3-4	This leads to an improved fallow of pigeon pea the next round.
3	Paddy rice + winter vegetables	10	10-12	Protect your plot against animals.
4	NTFP + cardamom	2	2-5	Protect your plot against animals.
5	Improved pasture + Grazing	2	4-6	Can feed up to 2 cattle or 20 goats. Cattle are vaccinated.
6	Improved pasture + Cut & Carry	4	8-14	Can feed up to 4 cattle or 40 goats. Cattle are vaccinated.
7	Improved pasture + Collect seeds	3	2-3	If you protect against animals, you can collect seeds directly in year 1.
8	Stick lack production	3	1-2	Can produce stick lack on improved fallow. Wait for next round to plant annual crops.
9	Fruit trees	4	8-14	Protect your plot against animals.

Table 2. Innovative land uses with related labor requirements and expected income

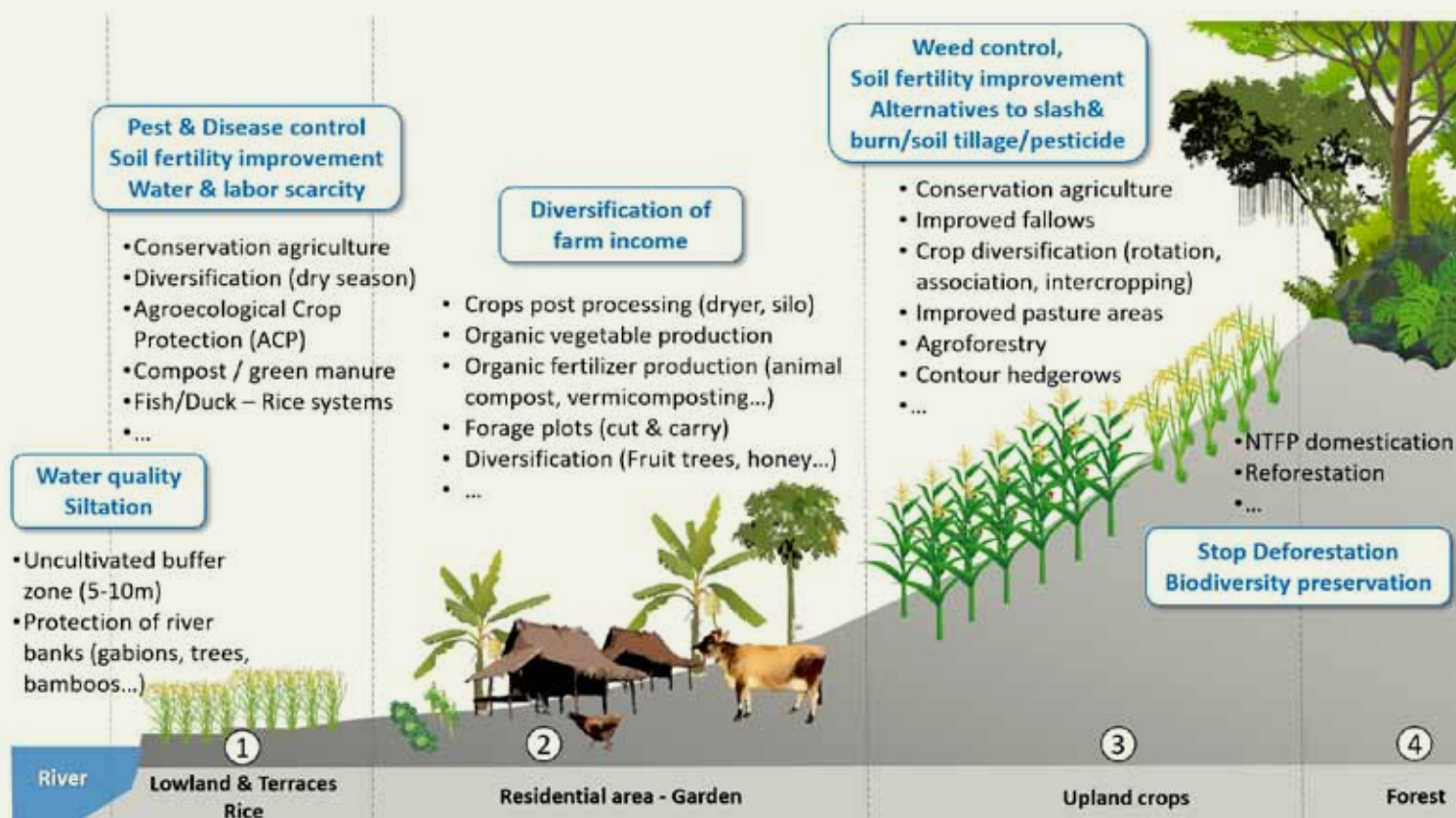


Figure 2: Example of eco-friendly practices adapted to different landscape units



Figure 3: Gameboard with innovative land use systems after a few rounds

- **Investments that players can do:** Eight investments are proposed in Table 3, with their parameters: labor requirements, income, and conditions for implementation represented in the poster "list of potential investments"
- **Hazards village community are exposed to:** e.g. price fluctuations for cash crops, droughts, floods, damages on crops due to roaming animals, insects, and diseases, livestock diseases (example in Table 4, p15).

	Activity	Labor/ha (men.months)	COST (MLAK)	Comment
1	Cattle	0	5	You can also sell your cattle if needed.
2	Improved pasture	4	0.5	Forage available from the second round after plantation. Only seed production possible on first round if fenced.
3	Cardamom plantation	2	4	No production but maintenance cost (labor) for <u>1</u> round after plantation.
4	Fruit tree plantation	4	6	No production but maintenance cost (labor) for <u>2</u> round after plantation.
5	Fence (100 m)	0	0.5	Barbed wire fence with living trees.
6	Paddy terracing	0	30	
7	Off-farm business	0	10	
8	Goats	0	0.5	

Table 3. Example of investments players can do with related labor requirements and cost



Selecting players within the village community

The eight participants are selected based on the following criteria:

- Balanced gender representation (e.g. four men and four women)
- Balanced representation of poor and rich households (using local criteria of wealth) within the village community
- In multi-ethnic villages, balanced representation of different ethnic groups

The village-head can help with the selection of the players: present him/her the concept and objective of the game and ask him/her to provide a list of potential players according to criteria required.

The players volunteer to take part in the game and they receive a lump sum to cover the costs of a work day as a game session usually lasts one full day including breaks and debriefing session.

4. Setting up the game

The initial conditions of the game are set before the game starts based on focus group discussions with the village land management committee.

The game facilitators define 4 colors referring the "Rich households" and 4 colors for the "Poor households". Each player then choose a color pin randomly without knowing that the color represents the initial conditions of two household types:



- Rich households: 24 men.months labors (equivalent 2 adult workers), 1 million LAK (equivalent \$120) in cash for investment, 1 paddy card (in villages with paddy land), and 3 cattle (pieces of wood) per household



- Poor households: 24 men.months labors, 500 000 LAK in cash for investment, no paddy, and no cattle

Activities and land allocation in the uplands (e.g. crops, livestock, forest management) are left to players' decision.

5. Course of the game

Five rounds are played (about 5-6 hours in total). Each round includes five phases:

Phase 1 – Initial conditions and farm resources allocation

Each player selects agricultural activities and land uses based on rice needs of the family, expected income, available capital, land, livestock, and labor force. Color pins are used to identify the land user and the livestock owner (figure 4).

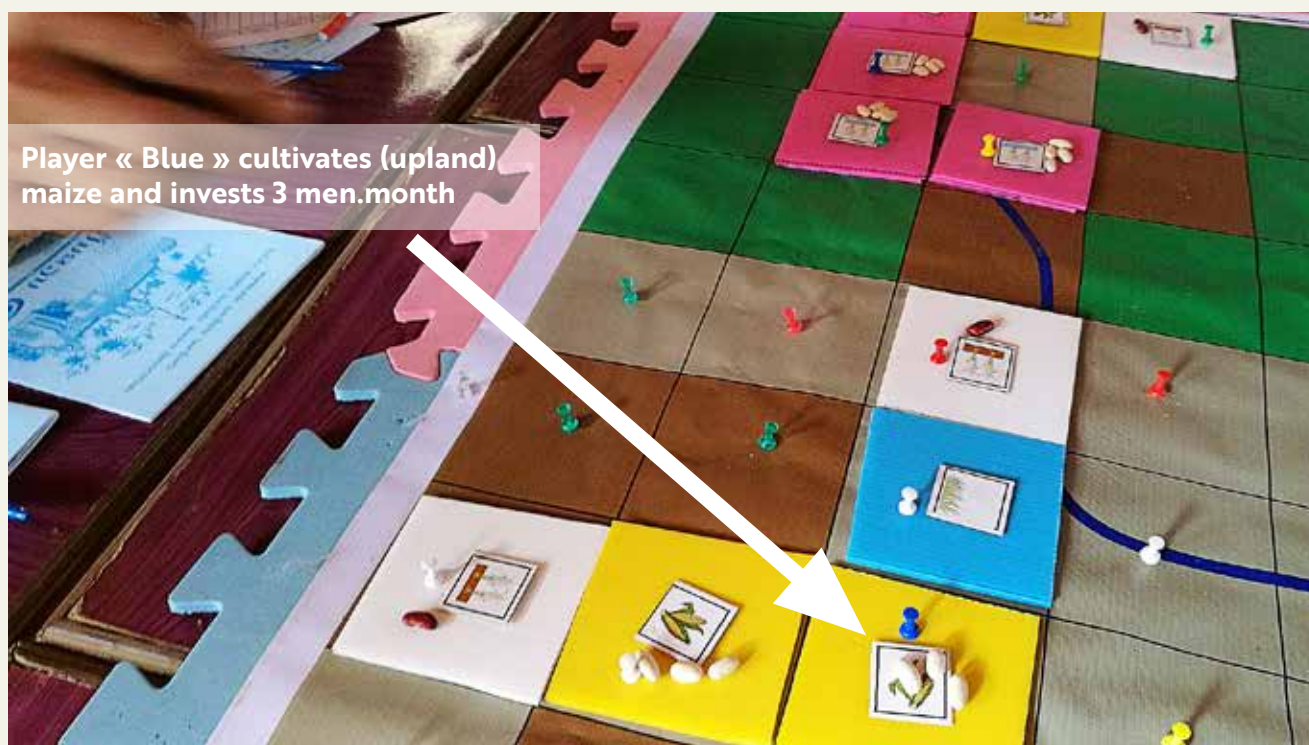


Figure 4: Board at initial stage



Phase 2 – Hazards and risk management

This phase is only played starting round 2 or 3 once the players understand well the rules of the game. In Round 1, go directly to Phase 3.

The Game Master asks a player to throw the dice to introduce an unexpected climatic, agronomic or economic events with different impacts for players (Table 4).

Players' responses to these unpredictable events reflect their adaptive capacity to changes.







Dice	Unpredictable events and impacts for players
	Bad year for livestock , an epidemic killed the young non-vaccinated cattle. No income from traditional free roaming cattle this year. In addition, cardamom pollination is low (-20% income) and stick lack production is limited (-50% income).
	Bad climatic year , late rainfall leads to decrease in upland crops and paddy rice production and income (- 20% income). Fruit trees also give bad yields (- 20% income).
	Market price for annual and perennial crops (e.g. maize and fruits) are down (-20% income)
	The demand for cattle, cardamom and stick-lack is high (+10% increase)
	Market price for cattle drops (-30% income).
	The demand for winter vegetable is low; vegetable are difficult to sell (-20% income).

Table 4. Example of unpredictable events as played with dice



Phase 3 – Outcome harvesting

All players get (annual) income based on land uses and activities, taking into account impacts from economic and climatic hazards.

Each player has to generate sufficient money to cover family needs, to pay back loans and interest rate to the bank (if any credit), and to pay charges related to children education (if any).



Phase 4 – Debriefing

Each player is asked about the choices (s)he made, the gains or losses (s)he got from his/her choices, and his/her feelings as compared to other players choices. Events such as live-stock diseases or crop failures in the game is expected to trigger discussions – search for alternative practices, e.g. introduction of legume crops, etc. that require individual and/or collective action.



Phase 5 – Preparing next round

Players who generate surpluses can invest (Table 3). Those who generate deficits can borrow from other players or from the bank to cover their family needs.

Upland crop fields are updated, i.e. turned into regenerating fallow1 while regenerating fallow1 are turned into regenerating fallow2 (Table 1)

Facilitators adapt the course of the game to players' actions. Usually, only local land uses and activities are proposed to players during Round 1 for them to learn the rules. Innovative systems are introduced in Round 2 or Round 3.



EXAMPLE OF PLAYERS LAND USE CHOICES AND LAND USE DISCUSSIONS

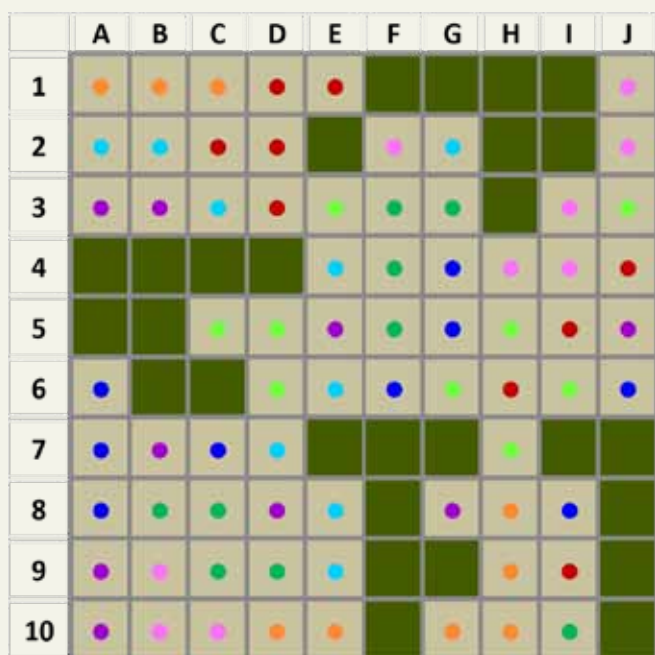


Figure 5: Land allocation in ROUND 1

ROUND 1

The total village agricultural area is composed by 100 cells. At the beginning of the game, the board is made of:

- 72 cells of fallow (e.g. cell A1);
- 28 cells of forest (e.g. cell E2);
- 0 cell of paddy field.

The 8 players select their fields (9 cells per player, in fallow area) and make their land ownership visible on the board using color pins (Fig. 5)

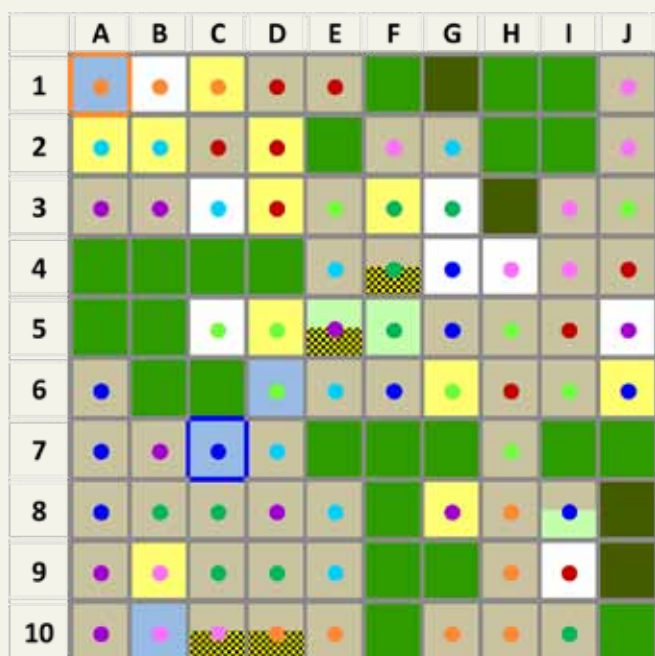


Figure 6: Land use as selected by players during ROUND 1

Players choose to grow mainly maize (yellow cells, e.g. A2, C1...) and rice (white cells, e.g. B1, C3...).

Player "Pink" decides to grow improved forages (blue cell, B10) as he already grows forages in real life. Players "Orange" (A1), "Blue" (C7), and "Light green" (D6) follow him.

Players "Pink" (C10), "Orange" (D10), "Purple" (E5) and "Green" (F4) choose to grow vegetables (black-yellow chessboard cells) as cash crops.

All players use Forest for non-timber forest products (NTFP) collection (green cells).

The Facilitator exposes the problem of roaming cattle that might damage the 4 forage plots. "Orange" and "Blue" decide to fence their plots (color bars surrounding cells, Fig. 6) but "Pink" and "Light Green" do not have sufficient financial resources.

The Facilitator proposes land exchange between farmers to regroup forage plots, as well as collective fencing of forage areas to reduce fencing costs. However, no player wants to go collective. We observe that there are limited interactions between participants during this first round and general agreement to go individually.



Figure 7: Land allocation at the beginning of ROUND 3

ROUND 3

At the beginning of round 3, agricultural land available for annual crops (rice, maize) is getting limited (Fig. 7).

Plots cultivated in Round 2 are turned into fallow (cells with red cross) while plots cultivated in Round 1 are not yet suitable for cultivation (second year of fallow, cells with one red bar).

The Facilitator proposes to the players to inter-crop rice/maize with pigeon pea, a legume that allows reducing fallow period duration (1 year instead of 2). Pigeon pea also allows producing stick lac and getting some income during fallow period.



Figure 8: Land use as selected by players during Round 3

Most of players decide to grow maize inter-cropped with pigeon pea (orange cells, e.g. D1) or rice with pigeon pea (black cells, e.g. E1).

Player "Green" decides to increase its area under domesticated cardamom (neon green cells, A5, B5).

Forage plots established in Round 1 and 2 are used for animal grazing (light blue cells; e.g. E8, E9).

The Facilitator exposes the risks of epidemic diseases and animal mortality (which is one of the hazard played with dice). He proposes to farmers to invest into vaccination and to collectively define a vaccination calendar to be followed by all livestock owners.

All farmers agreed to vaccinate their animals twice a year against foot and mouth disease and haemorrhagic septicaemia, that are described as the two main epidemic diseases for large ruminants.

6. Variations

Possible introduction of external players, e.g. foreign investors, policy maker who may introduce new regulations (e.g. ban on pesticide use, land management rule) or opportunities (e.g. new market outlet) to see how players respond individually and collectively.

7. End of the game

After the 5th Round, a collective debriefing is organized. Players are asked about their opinions about the game process, the final map of land use systems and their personal achievements as players.

Analysis of trade-offs between cropland versus remaining natural resources, potentially increased inequalities between rich and poor households, short-term decisions vs long-term strategies, etc. Similarities between the game and the reality of the village or situation of individual players are discussed.

After the game, post-game surveys can help better understanding farmers' behaviors in the game based on their reality. Data collected during the game in the Excel spreadsheet can be further used for research purpose.

A short video by EFICAS project presents farmers' experience regarding the EFICAS Game: <https://www.eficas-laos.net/resources/videos>





The Eco-Friendly Intensification and Climate-resilient Agricultural Systems (EFICAS) project was an action-research project jointly implemented by CIRAD (Centre de coopération Internationale en Recherche Agronomique pour le Développement) and DALaM (Department of Agricultural Land Management under Ministry of Agriculture and Forestry of Lao PDR) and co-funded by The French Development Agency (AFD) and the European Union (EU) from 2014 to 2019.

The EFICAS project aimed to engage farming communities into the participatory design of agro-ecological alternatives for sustainable agricultural intensification in the mountainous provinces of northern Laos.

The EFICAS project designed a game to explore eco-friendly intensification of agriculture and sustainable development scenarios with farmers in the northern uplands of Lao PDR. Through this game, the players engage into participatory land use planning, explore alternative development pathways, and learn how to prioritize options for sustainable land management.

This manual - from the EFICAS Know-How Series – aims to introduce this game to development practitioners and research institutions who engage farming communities into eco-friendly intensification of agriculture.

More information at: www.eficas-laos.net

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With financial supports from

