FARMS SUSTAINABILITY ASSESSMENT IN THE MEKONG REGION

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Eve-Anna SANNER

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ENSAT supervisor: Jean-Pierre SARTHOU, teacher-researcher

GRET supervisor: Pierre Ferrand, ALiSEA regional coordinator

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Abstract

The Mekong Region has undergone rapid socio-economic growth over the past two decades which deeply transformed farming systems and the relations between remote rural areas and increasingly affluent urban centers. The majority of the regional land area shows medium- to high-levels of degradation, resulting from the loss of natural vegetation, mono-cropping, poor soil conservation technique and cultivation on fragile and easily-erodible soils in upland areas. A process of agricultural intensification can be observed and each country in the Mekong Region is at a different stage of this process and experiencing different levels of land degradation and loss of biodiversity. With these observed trends but also a growing concern about food security, it is interesting to address the issue of farms sustainability. In this context, the presented study is designed to evaluate the sustainability of a sample of agro-ecological farms in the Mekong Region.

The objective of the project is to assess the agro ecological, social and economic sustainability of innovative farms led by young farmers in the Mekong region. The focus is on sustainability objectives specific to agro ecological farming systems and on youth. Young people are key actors in influencing the social norm among their communities. Targeting youth, especially in rural areas, can have a significant impact on poverty alleviation and social integration, as they have proven to be good promoters of innovative solutions.

The conduction of the study goes through the creation of a sustainability assessment model adapted to the regional context. ALiSEA Sustainability Assessment is derived from an existing sustainability assessment tool named IDEA (Indicateurs de Durabilité des Exploitations Agricoles) and based on the possibility of assessing the sustainability of an agricultural system by the quantification of technical, spatial, economic and human characteristics and by practices judged favorable to biophysical and social environments. Sixteen farms led by young farmers were identified and assessed in Cambodia, Laos, Myanmar and Vietnam. After interviewing the farmers, collecting the data, processing it and getting a final result in the form of a spider web, a case study specifying the results for each dimension is written for each farm involved in the study. The results are positive as 81% of the farms get a score in agro-ecological dimension higher than 55 out of 100. The level of integration of agro ecological practices by farmers is strong, as the combination of three or four of these practices concerns 89% of farms. The scores for the social dimension range from 45 to 81 out of 100. The most outstanding farms with a strong social impact are farms offering a wide range of learning experiences such as agro-tourism, volunteering experiences, internships, university partnerships. In addition, 69% of the farmers are involved in innovation network. The scores for the economic dimension are more contrasted and range from 25 to 73 out of 100.

This study introduces a first overview of the sustainability of a small sample of farms. Despite the reduced sample size, we could observe some sustainability strength and weaknesses for each dimension and especially identify good agro-ecological practices.

Key Words: Mekong Region, Sustainability Assessment, Young Farmers

Résumé

La région du Mékong a connu, ces vingt dernières années, une croissance socio-économique rapide ce qui a transformé en profondeur les exploitations agricoles et les relations entre les zones rurales éloignées et les centres urbains de plus en plus peuplés. La majorité des terres de la région du Mékong se sont vues dégradées, dégradations moyennes à fortes résultants de la perte de végétation, de la monoculture, de mauvaises techniques de conservation des sols et de culture sur des sols fragiles et sujets à l'érosion dans les zones d'altitude. Un processus d'intensification de l'agriculture s'observe, chaque pays de la région en étant à un stade diffèrent et faisant l'expérience de différents degrés de dégradation des terres et de perte de la biodiversité. Ces tendances, accompagnées d'un intérêt croissant pour la sécurité alimentaire mettent au cœur du débat la question de la durabilité des exploitations agricoles. Dans ce contexte, l'étude présentée a été menée dans le but d'évaluer la durabilité d'un échantillon d'exploitations agro-écologiques dans la région du Mékong.

L'objectif du projet est d'évaluer la durabilité agro-écologique, sociale et économique de fermes innovantes menées par de jeunes agriculteurs dans la région du Mékong. Le focus est placé sur les objectifs de durabilité propre aux exploitations agro-écologiques et sur les jeunes agriculteurs. Les jeunes sont des acteurs clés car influencent les normes sociales au sein de leur communauté. Viser les jeunes, particulièrement dans les zones rurales, peut avoir un impact significatif dans la réduction de la pauvreté et l'intégration sociale car ce sont de bons promoteurs de solutions innovantes.

La première phase de l'étude a consisté à créer un modèle de diagnostic de la durabilité adapté au contexte régional. « ALiSEA Sustainability Assessment » est dérivé d'une méthode existante d'évaluation de la durabilité appelé IDEA (Indicateurs de Durabilité des Exploitations Agricoles) et basée sur la possibilité d'évaluer la durabilité d'un système agricole par la quantification de caractéristiques techniques, spatiales, économiques et humaines et par des pratiques jugées favorable aux environnements biophysiques et sociaux. Seize exploitations agricoles menées par de jeunes agriculteurs ont été identifiées et évaluées au Cambodge, Laos, Myanmar et Vietnam. Apres s'être entretenus avec les agriculteurs, avoir collecté les données, les avoir traité et obtenu le résultat final sous forme de « spider web », une étude de cas spécifiant les résultats obtenus pour chaque dimension est rédigé pour chaque exploitation ayant pris part à l'étude. Les résultats sont positifs puisque 81% des exploitations ont obtenu un score plus haut que 55 sur 100 pour la dimension agro-écologique. Le niveau d'intégration des pratiques agro-écologiques par les agriculteurs est fort puisque la combinaison de trois ou quatre de ces pratiques concernent 89% des exploitations. Le score pour la dimension sociale varie de 45 à 81 sur 100. Les fermes dont l'impact social est le plus important sont celles qui offrent un grand choix d'expériences d'apprentissage comme l'agro-tourisme, le volontariat, les stages et des partenariats avec des universités. De plus, 69% des agriculteurs sont impliqués dans un réseau d'innovation. Les scores pour la dimension économique sont plus contrastés et varient de 25 à 73 sur 100.

Cette étude introduit une première vision de la durabilité d'un petit échantillon d'exploitations agricoles dans la Région du Mékong. Malgré la taille réduite de l'échantillon, il a été possible d'observer des forces et des faiblesses pour chaque dimension et également d'identifier de bonnes pratiques agro-écologiques.

Mots clés: Région du Mékong, Diagnostic de durabilité, Jeunes agriculteurs

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Introduction

This report is divided into five parts. Firstly, an in-depth description of the context of the case study will be given, then the methodology of the study will be presented. This will be followed by an analysis of collected data, as well as subsequent results. The final part is dedicated to discussions and perspectives of the study.

Presentation of GRET

a) GRET

GRET is an international development Non-Governmental Organization, founded in 1976 and governed by French law, which acts from work on the ground all the way up influencing policy, with the aim of providing durable and innovative answers to the challenges of poverty and inequalities. In 2016, GRET counted 714 professionals working on 150 projects in 22 countries.

Presentation of the project

a) ACTAE

ACTAE is a project jointly led by Gret and Cirad which have been working on agro-ecological transition in the Mekong region (Cambodia, Laos, Myanmar, Vietnam) since May 2015. The main objective of the project is to establish sustainable and effective mechanisms enabling the creation of synergies between initiatives that contribute to agro-ecological transition in Southeast Asia. The project especially targets at helping small-scale farmers adjust their practices and gradually change their production systems. The project has a duration of 3 years and has been financed by AFD amounting 2.5 million of euros.
Although there are many initiatives to support agro-ecological development in the Mekong region, this is the first attempt to use local networks to create links between all actors and form a strong coalition of organizations at different levels that is capable of influencing the public authorities and increasing support for alternative agricultural practices.

b) ALiSEA

With the support of GRET for its emergence, ALiSEA (https://ali-sea.org) is an innovative platform to network all initiatives supporting the agro ecology movement across the Mekong Region (particularly Laos, Cambodia, Vietnam and Myanmar) while feeding public policies and supporting wider dissemination of successful alternative agricultural practices.
The network intends promoting a unifying agro ecology concept for gaining higher visibility and influence, generating public support, and establishing a learning process to facilitate an agro ecology transition in the region (Cambodia, Laos, Myanmar and Vietnam), i.e. supporting farmers in transitioning from their current practices to agro ecological practices through

gradual transformation of their farming systems. ALiSEA functions as a platform to share and discuss real issues encountered at multiple levels (i.e. from grass-root level actors to policy makers) and influence on policy dialogue. It provides reflexion and feedback mechanisms for all stakeholder groups. ALiSEA intends increasing agro ecological practices visibility and impacts. Such regional agro ecology transition supports the emergence of healthy and resilient food systems and the creation of innovative and fulfilling jobs for the rural youth while sustainably preserving natural resources.
In April 2018, ALiSEA counted 81 member's organizations.

Figure 1. Member per country

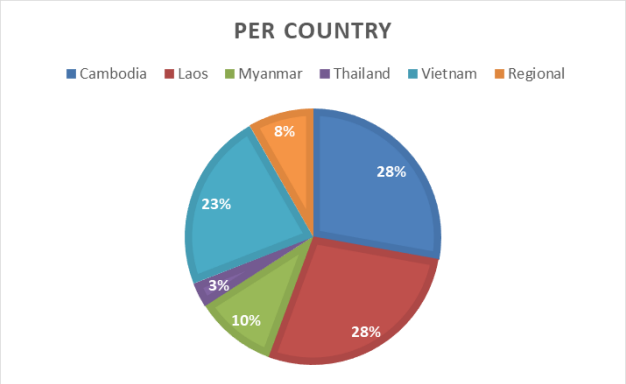
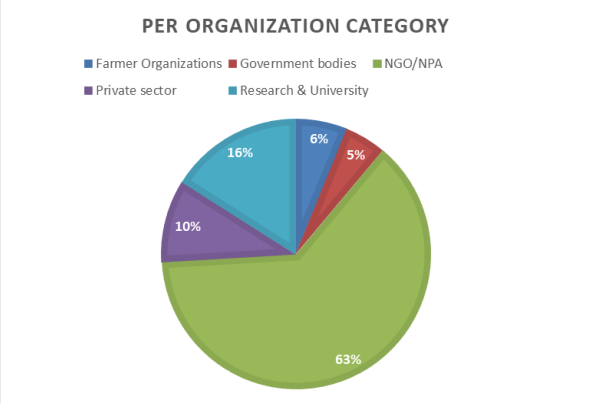
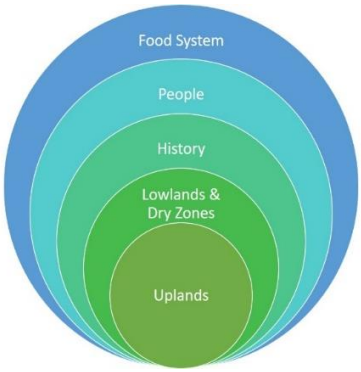


Figure 2. Member per organization category



ALiSEA was launched in 2015 with a very broad agenda and opened to all propositions from its growing members. Thus, most of the activities implemented over the past 3 years have been identified and prioritized by ALiSEA's members themselves (thematic workshops, small grants, studies…). Such activities can be gathered around 5 main themes.

Figure 3. ALiSEA activities 5 main themes



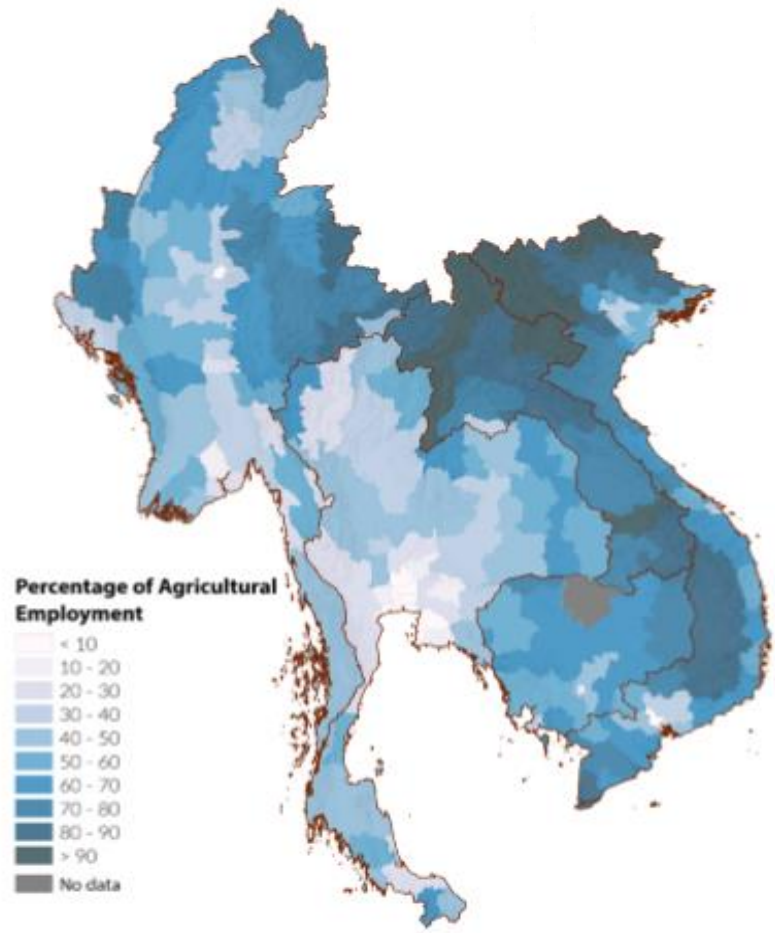
Uplands	**Mountainous farming communities' development (including climate change adaptation, gender, indigenous knowledge valorisation…)**
Low Lands & Dry Zones	Floating rice in Mekong delta, Home gardening and vegetable cultivation in Central Dry Zones of Myanmar
History	Actions linked to the work done under EFICAS and CANSEA project addressing agrarian transition in Cambodia and Laos
People	Main focus has been put on Youth and how to change the narrative towards agriculture (how to make agriculture sexy again / attract youth in agriculture?)
Food System	Activities related to bring AE products to the market and increasing their value added…

PART I. Context of the study

I.1 Agriculture in the Mekong Region

The Mekong region lies at the intersection of Southeast, East and South Asia, between two Asian giants: China and India. It comprises five countries that host the Mekong river watershed: Cambodia, Lao PDR, Myanmar, Thailand and Vietnam. 237 million people are distributed across the region, region that counts 329 ethnic groups speaking 410 distinct languages making the region one of the most ethnically-diverse in the world. This region is also a global biodiversity hotspot, with a high degree of ecological and agricultural diversity.
The past farming systems until the late 90s were mainly based self-subsistence production. Even though comprising a vast majority of rural, the Mekong Region has undergone rapid socio-economic growth over the past two decades which deeply transformed farming systems and the relations between remote rural areas and increasingly affluent urban centers.
However, agriculture still plays a crucial role in the region, remaining a good job provider. Indeed, in Cambodia, Laos and Myanmar, the share of agriculture in GDP is high, even though it saw an important drop from 2010 to 2016 to 26.7, 19.5 and 25.5 percent, respectively.
The proportion of the population engaged in agriculture has also declined, but at a much slower rate and remains relatively high (80% in Laos and 70% in Vietnam).

Figure 4. Proportion of population engaged in agriculture, by province



(Source: MRLG, State of Land report, 2018)

Rural-to-urban migration flows are important, and related to urbanization and the opportunities offered by growing industry and service sectors. Cross-border migrations can be observed and tend to rise, associated with workers, especially the young, not willing to pursue farming activities in Cambodia, Laos and Myanmar. The young workers are seeking employment in urban center, ready to relocate to Thailand in most cases. These movements reflect the inability of rural areas to provide adequate opportunities for the younger generation.

A trend towards shift cropping can also be observed. Cropping has partially shifted away from the overwhelming dominance of rice in favor of commodity crops. This shift from local, diversified cultivation systems has brought a profound degree of simplification: six crops alone—rice, cassava, maize, sugarcane, rubber and oil palm—now command fully 80% of all agricultural land in the Mekong. It seems that many countries in Southeast Asia are engaged towards an intensification of agricultural production, applying Green Revolution practices to encourage mono-cropping for the export market. This “modernization” of agriculture goes along with an increase in chemicals use. During 1996-2006 Asia’s consumption of chemical pesticides has continued to grow while fertilizer use rose at an average of 3.2 per cent a year, compared to the global average of 2.1 per cent; chemical fertilizer use per hectare in Asia is now twice that in the rest of the world. Moreover, state intervention is notable in the provision

in the provision of subsidized inputs (fertilizer, power and water), credit, guaranteed prices for farmers, extension services, land reform (especially in China and Vietnam) and significant budget spending (an average in Asia of over 10 per cent of government budgets during 1975-1990) (Curtis, 2012).

The majority of the regional land area shows medium- to high-levels of degradation, resulting from the loss of natural vegetation, mono-cropping, poor soil conservation technique and cultivation on fragile and easily-erodible soils in upland areas. The erosion of the natural capital base is a pressing concern, with both immediate and long-term effects, particularly for those whose reliance on agriculture and forest resources, the poorest segment of society, is most direct. Each country in the Mekong Region is at a different stage in the process of agricultural intensification, and experiencing different levels of land degradation and loss of biodiversity. Agricultural intensification has evolved differently and had different ecological impacts in each country, depending on their particular history, rate of demographic change, modes of economic development and the agro-ecological potential of their ecosystems. In addition, agribusiness companies are playing a more and more visible role in the management of land, impacting smallholder farmers. Agricultural land is unequally distributed among these smallholder farmers. The average landholding size per agricultural household varies widely between countries, from 0.7 ha in Vietnam to 3.1 ha in Thailand. Except in Laos, the average area of landholding per agricultural household has declined over the last 10 years.

In this context it has become essential to encourage the dissemination of agro-ecological practices that are seen as convincing and proven alternatives to the dominant agri-food system, in order to strengthen family farmers' capacity to innovate. Convincing evidences need to be brought to highlight the contribution of small-holder's famers to food sovereignty.

I.2 Apparition of agro ecology in South East Asia

In the last decade, most governments in Asia have begun promoting some forms of sustainable agriculture, partly in recognition of the problems with conventional farming. Yet, South East Asian governments are not making a decisive break with conventional farming and do not have national sustainable agriculture strategies in place (Curtis, 2012). However, alternatives to conventional farming emerged in the 1980s. In Thailand, for instance, alternative agricultural movements, such as the Alternative Agriculture Network (AAN) established by farmers and local non-government organizations (NGOs) were left some political space to exist. In Vietnam and also, to a lesser extent in Cambodia and Laos, the end of the 1980s marked the end of subsidized chemical input supplies due to the collapse the Soviet Block. Myanmar also shifted to a market-based economy at around the same period. In these countries, alternative cropping practices emerged at that time to compensate for the lack of chemical agricultural inputs more than as a reaction to land degradation or environmental issues related to the intensive use of agrochemicals such as in Thailand and China (Castella et al, 2015). Agro-ecology initiatives were really born in the Mekong Region in the 2000s, promoted by national and international NGOs as part of a global movement that spread across the region. These initiatives encourage more sustainable land uses, production of healthier

food, and conservation of traditional knowledge and practices. More recently, these practices have been valorized as part of “climate smart” agricultural strategies.

I.3 Agro ecological practices in South East Asia

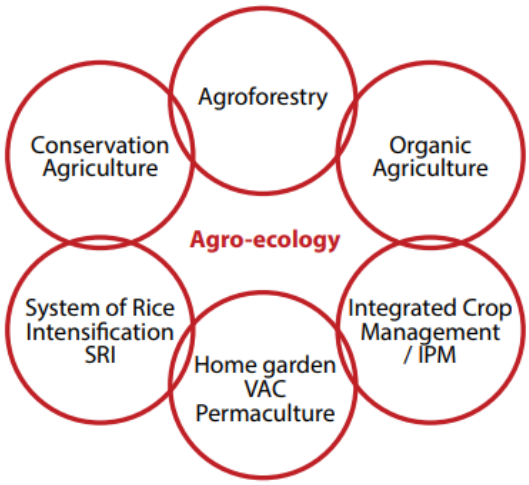
In the framework of this project, the scope of agro ecology practices refers to the five historical principles that have been defined by Miguel Altieri.

Figure 5. Agro-ecology: five historical principles (Altieri, 2005)

Recycling biomass and nutrients	Managing organic matter and biological activity in the soil	Minimizing resource loss or waste	Fostering biodiversity	Optimizing beneficial biological synergies
Combining animal and plant production	Giving value to animal waste	Capturing the maximum amount of light	Raising / Attracting useful organisms	Relying on trophic networks
Recycling nutrients through trees. Spreading biomass at the soil surface	Making and using compost	Minimizing water losses	Integrating trees and crops	Combining ecological niches
	Providing litter to increase biological activity in the soil	Fighting erosion	Intercropping	Relying on functional complementarities between species
	Avoid tilling so as to increase biological activity in the soil			
	Enriching the soil with litter			

The six main agro-ecology practices found in the Mekong Region and that have been looked at specifically in the study, are the following: organic agriculture, integrated farming/home gardening / VAC, system of rice intensification, conservation agriculture, integrated pest management, and agro-forestry.

Figure 6. Main agro-ecological practices in the Mekong region



- **Organic agriculture** uses the health of soils, ecosystems, and people and relies on ecological processes, biodiversity and natural cycles to provide products produced without chemical inputs. According to IFOAM, organic agriculture should also promote fair relationships and be managed in a way that is socially and ecologically responsible. Organic agriculture is understood as a practice and does not refer to the certification. Most of the farmers interviewed were not organic agriculture certificate holder.

- **Integrated Crop Management / IPM** uses ecosystem resilience and diversity for pest, disease and weed control and recommend use of pesticides when no other options is effective

- **VAC (Vuon, Ao, Chuong in Vietnamese)** incorporates livestock, aquatic resources and crops in one farm system and so leads to increases in protein production and balance the crops needs of nitrogen. It also limits the need to import inorganic and organic sources of nutrients.

- **Permaculture** promotes designed landscapes which mimic the patterns of ecosystems while producing food, fiber and energy.

- **SRI (System of Rice Intensification)** is an agro ecology approach for increasing rice productivity by reducing plant density, improving soil and reducing water application.

- **Conservation agriculture** reduces the amount of mechanical soil disturbance, promotes the use of cover crop and the diversification of crop species grown in association so that soil can be conserved and available moisture used more efficiently.

- **Agroforestry** incorporates multifunctional trees into agricultural systems, and collective management of nearby forest resources.

Part II. Sustainability assessment of farms in the Mekong Region

II.1 Methodological framework

II.1.a Mobilized concept

A) SUSTAINABILITY ASSESSMENT IN THE MEKONG REGION

Over the past decades, several publications have highlighted the potentialities of agro ecologically based farming systems, especially in challenging environments (degraded soils, dry areas…) and/or in the face of climate change. « *Agro-ecological (AE) approaches are seen as convincing and evidence-based alternatives towards sustainable agriculture. They clearly aim at strengthening innovation capacity of family farms, as well as the recognition of their contribution to food sovereignty in the region. They cover technical, economic, societal and policy dimensions of agricultural production respectful of environment. They also contribute to poverty alleviation, food security, climate change mitigation and adaptation. However, relying*

on conventional metrics to measure the performance of farming systems, it is hard to make the case for agro ecology. To understand the impact of agro ecology requires assessing the sustainability through a different lens. ».
Within this framework and alongside with these objectives, ALiSEA supported the launch of a pilot research to highlight innovative approaches developed at the level of some agro ecological farms led by young farmers.

Sustainable development has been defined by FAO as "*the management and conservation of the natural resource base, and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations. Such sustainable development (in the agriculture, forestry and fisheries sectors) conserves land, water, plant and animal genetic resources, is environmentally non-degrading, technically appropriate, economically viable and socially acceptable*". (FAO Council, 1989).

Sustainable development has numerous definitions and developing and implementing a sustainability assessment to measure the agro ecological, social and economic impact of farming systems has proven very challenging. A wide range of methods are available, each of them pursuing a specific objective. Moreover, the specificities of each region make it even more complicated to use a method designed for a given region.

The objective of the project is to assess the **agro ecological, social and economic sustainability** of innovative farms led by **young farmers** in the Mekong region. The focus is on sustainability objectives specific to agro ecological farming systems.

The assumptions behind our method are the following:

-Agro ecology

- Seeks to produce diversified and high quality food
- Optimizes and maintains biodiversity
- Enhance the ecosystem's fertility
- Limit the use of non-renewable resources by recycling existent nutrients and biomass
- Avoid contaminating the environment and people by eliminating the dependency on external synthetic inputs
- Contribute to the fight against global warming

- Agro ecology is ecologically sound as agro ecological approaches rely on low cost, locally available inputs and complementarities between the elements of agro-ecosystems (plants, animals, trees, soil, and water)

- Agro ecology is socially beneficial as it encourages farmers' participation, community building and it builds upon traditional and local communities knowledge in improving agro-biodiversity and local natural resources while increasing food availability and improving nutrition;

- Agro ecology is economically beneficial, as it promotes fair, short distribution networks and a collaborative relationship between producers and consumers, while enhancing farmer's independence and reducing poverty.

With ALiSEA SA, the sustainability of a farm is assessed in terms of agro ecological, social and economic sustainability. The purpose of ALiSEA SA is to assess farms led by young farmers in the Mekong Region on a common framework based on the three dimensions of sustainability. Using a harmonized approach contributes to making sustainable farms more measurable, verifiable and visible. ALiSEA SA results will be used for learning and communication purposes. Through this assessment the objective is to communicate on farming innovation, support the implementation of innovation networks, exchanges across farmers from different South East Asian countries.

B) IDEA METHOD

ALiSEA Sustainability Assessment is derived from an existing sustainability assessment tool named IDEA. The IDEA method (Indicateurs de Durabilité des Exploitations Agricoles or Indicators of Sustainable Farm Development) was created upon request of the General Board for Education and Research of the French Ministry of Agriculture which, since 1996, aims at assessing and diagnosing the sustainability of agricultural systems. It was developed by a multidisciplinary team made up of researchers in agronomy, technical institutes, and agronomy schools. Over the period 2003 to 2017, successive improvements in its formulation and weighting took place after its indicators' robustness, sensitivity and relevance were tested. IDEA is based on two rationales: a sustainable agriculture should be ecologically healthy, economically viable and socially fair and human. A sustainable agriculture should contribute on one hand to the sustainability of the territory in which it entrenches, and secondly, should provide global environmental services. Then, a sustainable farm is a farm which is viable, livable, transmissible and reproducible.

The newly released version 4 is based on the possibility of assessing the sustainability of an agricultural system by the quantification of technical, spatial, economic and human characteristics and by practices judged favorable to biophysical and social environments. Its structure is based on *three dimensions of sustainability: agro-environmental, economic and socio-territorial* (Vilain et al, 2008).

The 11 objectives of a sustainable agriculture taken into account in IDEA version 4 are the following:

1. Maintain natural resources (biodiversity, water, soil, air)
2. Maintain nonrenewable resources
3. Maintain/develop landscapes
4. Fight against global warming
5. Contribute to food security and sovereignty
6. Contribute to employment and to territory development
7. Promote animal health and welfare
8. Promote economic viability and continuity of the farm
9. Contribute to quality of life
10. Keep independence and autonomy
11. Promote ethical actions and commitments

The sustainability of a farm is based on a conceptual framework of IDEA taking into account the 11 objectives/stakes mentioned previously which are themselves based on the 5 properties of sustainability: capacity to produce and reproduce goods and services, robustness (resilience/adaptability/flexibility), territorial anchorage, autonomy, global responsibility.

The three dimensions are divided into themes on which 54 indicators are distributed. Indicators values are aggregated hierarchically by theme, so that each dimension is rated on a scale from 0 to 100. Indexes of the dimensions are not aggregated and the degree of sustainability of the farm is given by the smallest ratio obtained between the three dimensions. This approach avoids compensations between dimensions, but assumes tradeoffs among themes of the same dimension (Vilain et al, 2008).

IDEA method has proven efficient to compare production units with similar contexts in terms of production type, soil and climate. It has been widely adopted in Europe and has had more than 1500 applications in France from 1997 to 2007.

IDEA is an efficient method specifically adapted to the European context. Therefore, ALiSEA Sustainability Assessment had to be simplified and modified for two main reasons:

-to provide references and an interpretation of the results suitable to the local context

-to enable users who are not familiar with assessment tools to get a clear understanding of the tool and be able to use it without heavy training

Therefore, ALiSEA SA provides an interpretation of the major themes of sustainability and is a template for farm sustainability assessment. Indicators for each theme are proposed in order to facilitate measuring progress towards sustainability in a harmonized reporting format.

C) OTHER METHODS

Other methods have also inspired ALiSEA sustainability assessment, especially SAFA (SUSTAINABILITY ASSESSMENT OF FOOD AND AGRICULTURE SYSTEMS).

SAFA method was developed by the Food and Agriculture Organization of the United Nations in 2004 for assessing the impact of food and agriculture operations on the environment and people. The vision of SAFA is that food and agriculture systems worldwide are characterized by all four dimensions of sustainability: good governance, environmental integrity, economic resilience and social well-being. SAFA is a holistic global reference framework for the assessment of sustainability along agriculture, forestry and fisheries value chains (SAFA Guidelines, 2004).

Figure 7. SAFA Framework

(Source: FAO)

Although not directly relevant in the framework of the study, the method proved useful in inspiring the design of indicators. Indeed, the 116 indicators were analyzed for selection and some of them were adapted to suit ALiSEA SA vision and objective.

II.2.a Sustainability assessment model

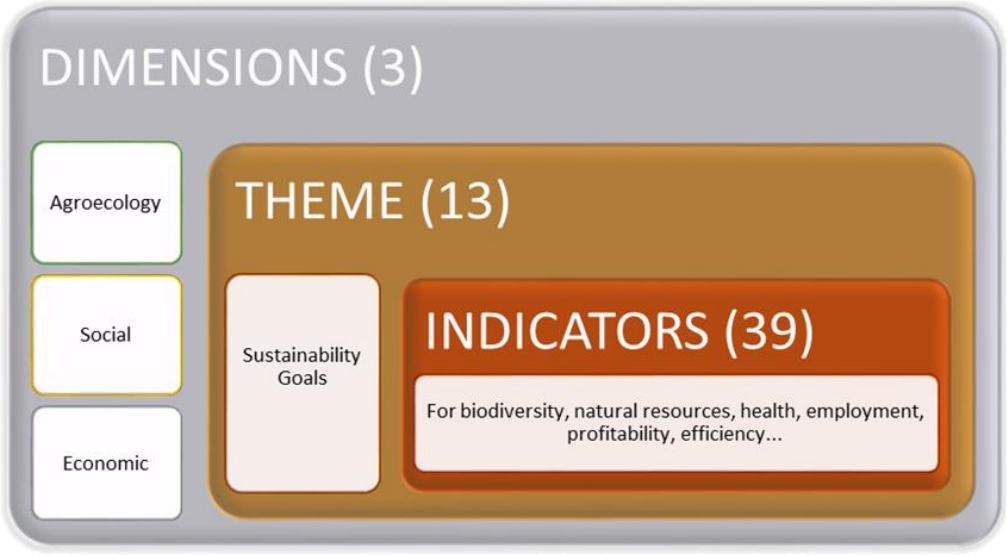
A) MODEL PRESENTATION

In order to fulfill the objective of creating a tailor made model, suitable to the regional context, a set of actions had to be defined and followed:

- **Defining** a range of reliable, easy-to-understand indicators applicable to the Mekong Region
- **Measuring** agro ecological, social and economic parameters through the design of a dedicated and user-friendly assessment tool
- **Assessing** the sustainability level of different type of agro ecological farming systems in the four-targeted countries (Cambodia, Laos, Myanmar, and Vietnam)
- **Compiling** the most successful and innovative case studies, aiming at inspiring and convincing not only the active members within the network but also conventional farmers, policy makers and consumers about the impact of such farming practices

The ALiSEA Sustainability Assessment (SA) Framework begins with the three dimensions of sustainability: agro ecology, social and economic. These dimensions are broad, encompass many aspects and are translated into a set of themes. Each theme is measurable through indicators. ALiSEA SA Indicators document provides the guidance for the application and calculation of these indicators.

Figure 8. ALiSEA Sustainability Assessment Framework



Themes: these are distributed in a set of **13** core sustainability issues, or "Themes", with associated sustainability goals.

Indicators: these are distributed in a set of **39** indicators which identify the measurable criteria for sustainable assessment for the theme.

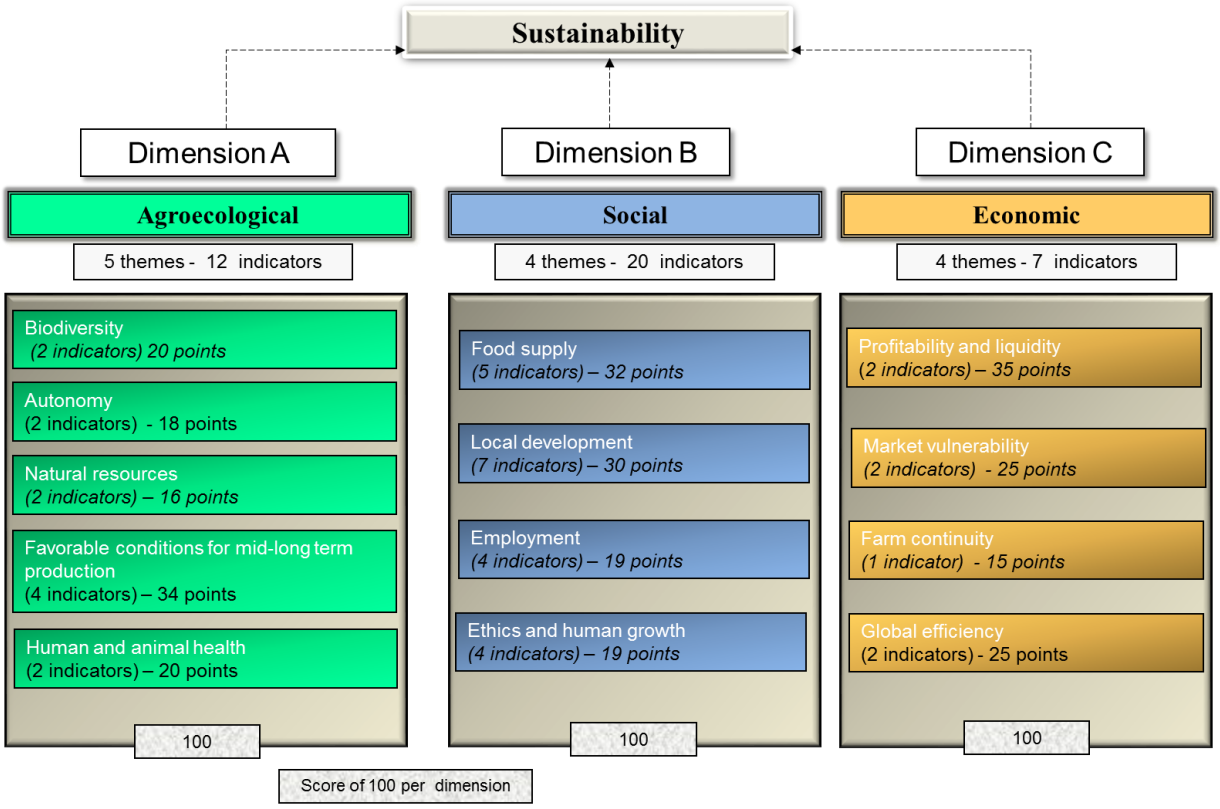
B) CHOICE OF INDICATORS

How are the indicators calculated?

General principles:

- System of evaluation based on quantitative and qualitative information
- System of points capped
- 3 dimensions with the same weight (0 to 100) split into themes
- Sustainability units determining the grading allocated to each indicator

Figure 9. Ratios of aggregate approach



For each indicator:

- Assignment of a maximum grade for each indicator to cap the total number of sustainability units
- Global grading: accumulated number of sustainability units granted for each indicator of a given dimension
- Grading meaning: the higher the grade, the more sustainable the farm for a given dimension

C) INDICATOR WEIGHTING

In order that all dimensions are weighted equally (score of 100 per dimension), it is necessary to weight indicators in instances where there are multiple indicators at the theme level. When themes only have one indicator, no weighting is necessary.

The indicators within the ALiSEA SA have varying weight in terms of their likelihood to fulfill the theme objective. Some indicators can be considered very accurate, because the information collected can come from a visual observation on the farm (diversity of species, biodiversity management, maintain plant protection system…). Some indicators can be less accurate, as they give only a good estimate of the situation or come from farmer's allegations (many social indicators rely on farmer's allegations as well as economic indicators as there is no reliable accounting system for farms in the considered region).

For these reasons, ALiSEA SA is trying to take these limitations into consideration and to provide a relevant weight according to the indicator relevance.

A list of all indicators selected can be found below with their respective score:

Figure 10. List of indicators

Dimension	Theme	Indicator	Number	Score
Agroecological Dimension	Biodiversity /20	Diversity of species grown	A1	10
		Biodiversity management	A2	10
	Autonomy /18	Autonomy in energy, equipment and seeds	A3	10
		Autonomy in N	A4	8
	Natural ressources /16	Water consumption	A5	8
		Energy efficiency	A6	8
	Favorable conditions for mid-long-term production /34	Water efficiency	A7	10
		Boost soil fertility	A8	12
		Maintain plant protection system	A9	8
		Secure availability of material means of production	A10	4
	Human and animal health /12	Reduce the impact on the air quality	A11	4
		Reduce veterinary treatment	A12	8
Social Dimension	Food supply /32	Food production	B1	10
		Contribution to the global food balance	B2	5
		Production quality	B3	7
		Losses and wastes	B4	5
		Social and cultural link to food	B5	5
	Local development /30	Services to the territory	B6	3
		Direct selling	B7	8
		Promotion of local ressources	B8	5
		Promotion of local knowledge	B9	5
		Farm accessibility	B10	3
		Management of non organic waste	B11	3
		Innovation network	B12	3
	Employment /19	Contribution to employement	B13	6
		Collective work	B14	4
		Quality of work	B15	3
		Training	B16	6
	Ethics and human growth /19	Involvement in the community	B17	8
		Action of transparency	B18	5
		Quality of life	B19	3
		Remoteness	B20	3
Economic Dimension	Profitability and liquidity /35	Net Income	C1	25
		Liquidity	C2	10
	Market vulnerability /25	Market diversification	C3	15
		Diversification and client relationship	C4	10
	Farm continuity /15	Farm continuity	C5	15
	Global efficiency /25	Gross efficiency of production process	C6	15
		Inputs sobriety in production process	C7	10

Part III. Data collection

III.1 Farm selection

III.1.a Young organic farmer

Why focusing on young farmers?

Youth is generally seen as having lost interest in farming in the Mekong region. Young people are less likely to engage in farming activities as such work is frequently associated with limited opportunities, little prestige, lack of independence, drudgery, and low returns (Sofie Mortensen, 2018). However, agriculture is still a major job provider for the young population of the Mekong region: as an illustration, more than two third of young people in Cambodia are relying on agriculture for their livelihoods (OECD, 2015). Furthermore, if the share of young people working in agriculture has decreased over the past decades, this cannot only be explained by a growing lack of interest of young generations for farming. Indeed, farmers are facing difficulties – insecure farming livelihoods, land resources, decreasing environmental services – are limiting the opportunities for young people to develop farming activities (Sofie Mortensen, 2018). The access to land for young people is made difficult by the demand for land of large-scale companies for industrial agriculture or hydropower projects, which are taking away land from smallholders. According to a study on Laos, young people are forced to emigrate as lands are acquired for large economic development projects such as hydropower and large-scale monocrop plantations (Barney, 2012). Other factors are limiting opportunities for young people to have secure livelihoods in farming, including climate change impacts, decreasing soil fertility, and declining environmental services driven by polluting agriculture practices, and the lack of access to source of funding to start farming activities.

Although young people are facing difficulties, we also need to look at young generations and young farmers as a source of hope for the future of sustainable agriculture. Young people are a key to support the transition towards agro ecology. The new generation is now facing issues and challenges inherited from the past development choices, witnessing the strong effects of global warming and environmental degradation. Such worrying trends in environmental degradation and climate change, combined with a rising sensitization on the benefits of agro ecology, have resulted in the emergence of a large group of young agro ecology promoters. In the context of rising mobilization of youth for sustainable agriculture, numerous young people in the Mekong region have led innovative agriculture initiatives. By settling organic farm, sometimes combined with ecotourism or organic restaurants, young farmers get economic benefits along with the satisfaction of producing safe food and supporting local biodiversity.

Young people are key actors in influencing the social norm among their communities. They are particularly sensitive to issues such as workers migrations, abandonment of agriculture, child labor, health…Targeting youth, especially in rural areas, can have a significant impact on poverty alleviation and social integration, as they have proven to be good promoters of innovative solutions to tackle the issues mentioned previously.

III. 1 b Focus group: smallholders farm

ALiSEA SA aims to be applicable to both large and small-scale farms. However, ALiSEA focus group is the smallholders' farm, family-operated farm. Indeed, out of the 2.5 billion people in poor countries living directly from the food and agriculture sector, 1.5 billion people live in smallholder households. Smallholders provide up to 80% of the food supply in Asian and Sub-Saharan Africa (FAO, 2012). Smallholders farmers are among the most vulnerable as they face many challenges like volatile weather due to the effects of climate change, volatile prices, access to land, access to financial services.

ALiSEA believes that smallholder agriculture plays a significant role in food security and sustainable development. Such farming systems can help eradicating hunger and poverty. Moreover, this agriculture is of cultural and social importance and can also be a transition engine to innovative access to markets closely linking producers and consumers.

There is no universally agreed definition of family farms as definitions depend on context, production, geography and other factors. These can be based on size, assets and/or other factors, such as dependency on family labor.

ALiSEA definition of smallholders is the definition adopted for the 2014 International Year of Family Farming: "*Family farming (also family agriculture) is a means of organizing agricultural, forestry, fisheries, pastoral and aquaculture production which is managed and operated by a family and predominantly reliant on family labor, including both women's and men's. The family and the farm are linked, coevolve and combine economic, environmental, social and cultural functions." (FAO, 2014)*

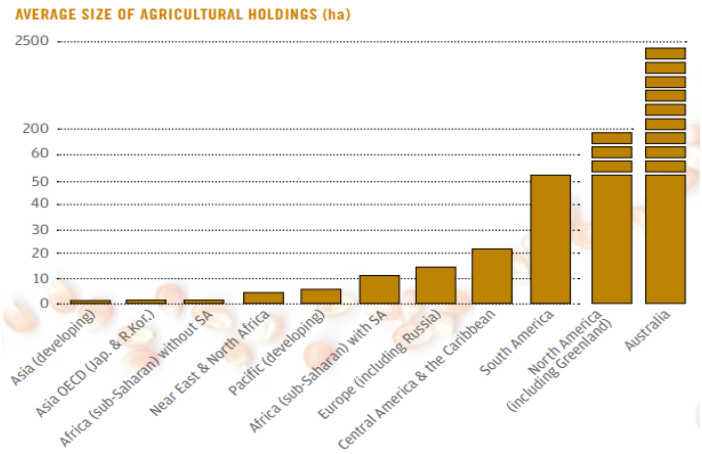
ALiSEA SA requires that smallholders meet all three of these criteria:

- Size: manage areas considered small for their production and region
- Mechanization: use no or little mechanization
- Labor: use mainly family labor for production

Regarding the size, for the purpose of ALiSEA SA and based on the average size of agricultural holdings in ha in developing Asia, a maximum limit of 10ha* per smallholders is adopted.

(*two exceptions: Tam Viet, Vietnam (17ha) and Saw Htoo Baw, Myanmar (12ha))

Figure 11. Average Size of Agricultural Holdings



(SOURCE: FAO 2012)

III.2 Study Area

III.2.a Countries involved and district selection

The farmers identified and interviewed for the study were selected by ALiSEA national secretaries in Cambodia, Laos, Myanmar and Vietnam based on their involvement in the transition towards sustainable agriculture and/or their work with local NGOs (Green Community Development Association in Laos) or ALiSEA partners (Y-Farm and KMF).

Figure 12. Mapping of farms involved in the study

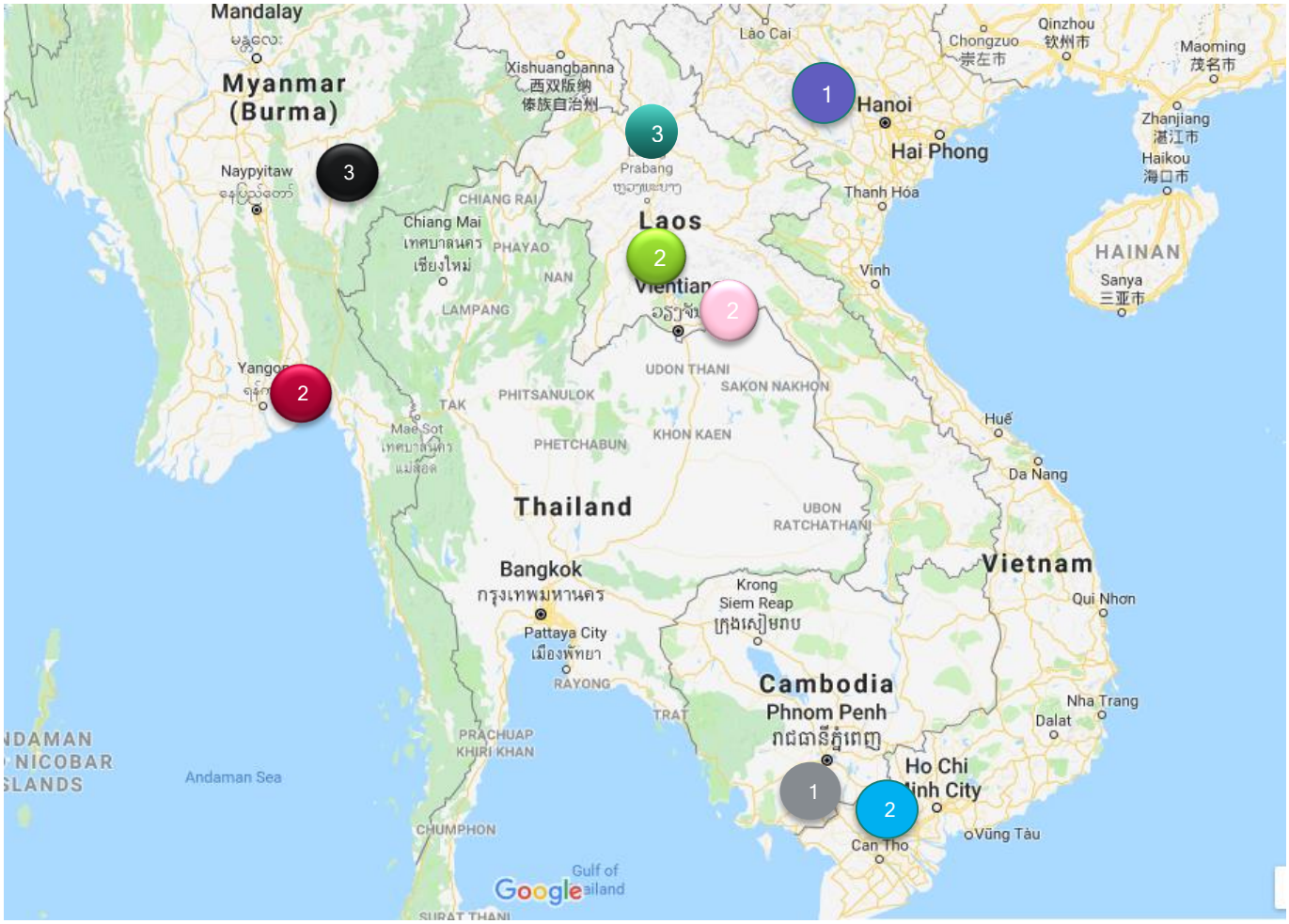


Table 1 – Farms in Laos

Number	Name	Farm	Location	GPS coordinates
1	Lae	Pomalok Farm	Pakguam District, Vientiane capital	
2	Soumboun	Soumboun Farm	Phonehong District, Vientiane province	
3	Kithong	Nathong Farm	Phonehong district, Vientiane province	
4	Somchit	Panyanivej	Sikhotthabong District, Vientiane capital	18°01'07.9"N 102°35'25.4"E
5	Ken	Green Organic Farm	Phonxay district, Luang Prabang	19°58'59.8"N 102°23'33.0"E
6	Lee	Lee7Farm	Luang Prabang	19°47'58.8"N 101°59'48.0"E
7	Om	Mekong Eden Farm	Chomphet district, Luang Prabang	19°51'13.2"N 102°01'56.9"E

Table 2 – Farms in Vietnam

Number	Name	Farm	Location	GPS coordinates
8	Vo Van Tieng	Tam Viet	Hong Ngu, Dong Thap Province	10°50'26.7"N 105°16'54.3"E
9	Thanh Dat	Ech Op	Ap My Phu, Phong My Quy, Long Xuyen, An Giang Province	10°21'03.2"N 105°25'55.2"E
10	Ta Thi Nguyen	Ta Thi Nguyen	Vien Village, Tan Duc, Phu Binh District, Thai Nguyen	

Table 3 – Farm in Cambodia

Number	Name	Location
11	Davon	Prey Kabas district, Takeo province

Table 4 – Farms in Myanmar

Number	Name	Location	GPS coordinates
12	Kyaw Myo Thu	Paya Gyi Shae village, Thapyin Pin village, Nyaung Shwe, Shan State	20°32'06.8"N 96°51'18.3"E
13	Tin Hla	Pekon Myauk Kone Ward, Pe Khon Township, Shan State	19°48'45.9"N 96°56'31.8"E
14	U Khin Maung	Lwere Lone village, Pe Khon Township, Shan State	19°50'41.5"N 96°53'49.6"E
15	Ye Htut Aung	Tha Byay Kone village, Thanlyin Township, Yangon Region	
16	Saw Htoo Baw	Tha Bite Kone village, Hle Gu Township, Bago Region	17°15'44.4"N 96°14'26.4"E

III.2.b Partners

In the view of replicating / upscaling the implementation of this sustainability assessment across the region, ALiSEA has partnered with local organizations known for their work with young farmers:

- Kalyana Mitta Development Foundation (KMF) member of Towards Organic Asia (TOA) in Myanmar and NEED Myanmar
- Y-Farm in Cambodia and in Vietnam

Kalyana Mitta Foundation, initiated as Buddhist Youth Empowerment Program in 2008, acts in favor of the empowerment of young Buddhists to become socially engaged for social transformation. The program resulted in 34 Alumni Core Groups and reached out more than 1500 youth. The fields in which youth are engaged as various and go from development sectors such as community development, gender equality, environmental conservation to social justice movement such as land grabbing issues and public awakening. KMF also holds training on sustainable agriculture and we were able to meet and interview four alumni who benefited from those in Shan State, Myanmar.

Y-Farm, The Mekong Youth Farm Network (Y-Farm), was created by a group of determined youth from countries in the Mekong Region (Vietnam, Cambodia, Thailand, Myanmar, Laos) and is a part of the Warm Hold Association, which is a non- profit organization that does charity work in the south of Vietnam. Y-Farm objective is to support young organic farmers and to strengthen the network of innovative farms across the region. Y-farm focuses on five main fields/issues that relate to youth development and sustainable agriculture in the region including: training courses and farm improvement, youth exchange on farming and sustainable agriculture, startup/agricultural innovation upon student's return home, farm marketing and entrepreneurship, youth volunteering. We were able to meet three farmers involved in Y-Farm network in Can Tho province, South Vietnam and one farmer in Takeo province, Cambodia.

III.3 Survey

The farmer's field surveys were conducted based on a questionnaire that can be found in Appendix 1. The interview usually took three to four hours and was followed by a farm tour. A member of ALiSEA team was always present for translation purposes. The interviews were usually individual interview, which are more efficient and easier to get more accurate data.

When collecting information in a field survey, basic information regarding the farm had to be documented. This includes information such as the farm name, location, land size and distribution and brief background of the farm.
For the next step of collecting data for indicators, for some indicators, data collection can be difficult. Most of the information are collected via a farmer interview and a personal inspection of farm and fields. This means that there is a part of subjectivity coming from the personal inspection that might be reflected in the ALiSEA SA results.
Low levels of documentation for smallholder farmers can also have an influence on data quality and SA results. This is specifically the case for indicators in the economic dimension as farmers do not keep proper accounting data that can be consulted. Data collected for economic indicators mainly rely on estimations.
These estimations are made by the farmer based on previous year's results (yields, quantity sold, prices…). Estimations can also be made for quantities: example: quantity of fuel per year, and assume their carbon emissions impact from this estimate.

Part IV. Results

The last step consists of combining the documentation from the previous steps into a Sustainability Assessment Report. The collected data is processed through an excel based model. After interviewing the farmer with the questionnaire, the analyst should refer to the excel model and provide an answer for each indicator. Each answer will lead to a score (refer to figure 10 list of indicators) and the total score will lead to a score by dimension that can then be visualized on a spider web. An explanation for each indicator, its specific weight and score is provided in Appendix 2.

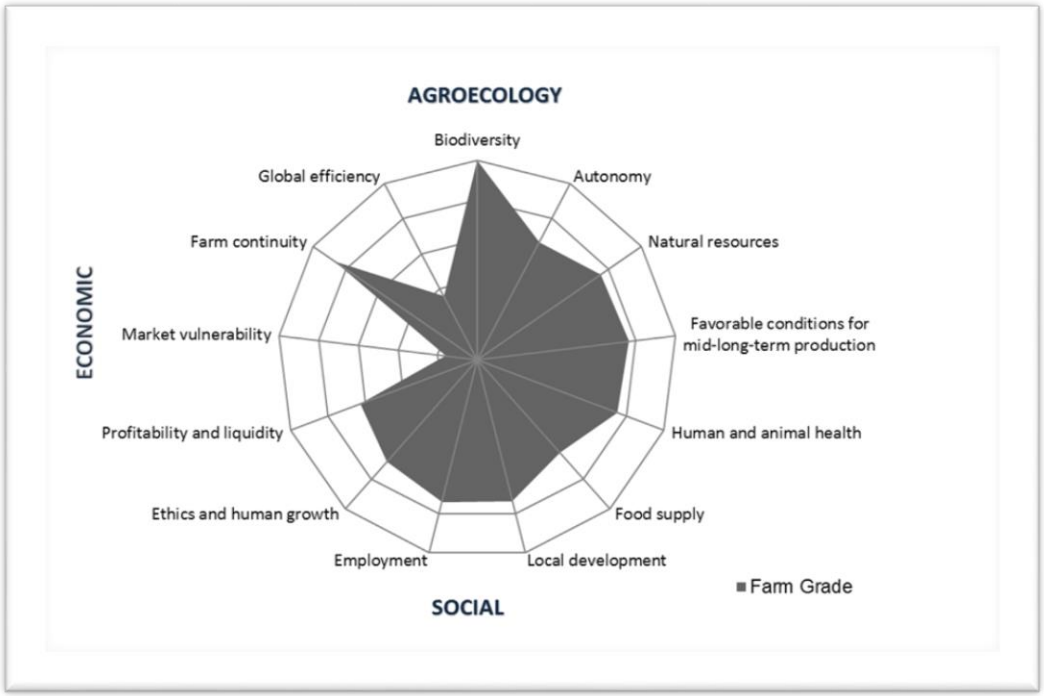
IV.1 Case study

IV.1 a Information contained in the study

Sustainability is a complex topic and even with aggregation of the indicators and themes, understanding all of this data can be challenging and difficult to communicate. A critical review enhances the quality, credibility and transparency of the assessment. The information and ratings included in a report/case study should be supported by documentation that could be reviewed and understood by someone other than the report author.
Data visualizations helps to better understand the concepts and relationships between themes in the three dimensions. Data Visualization is a method of presenting information in a graphical form.

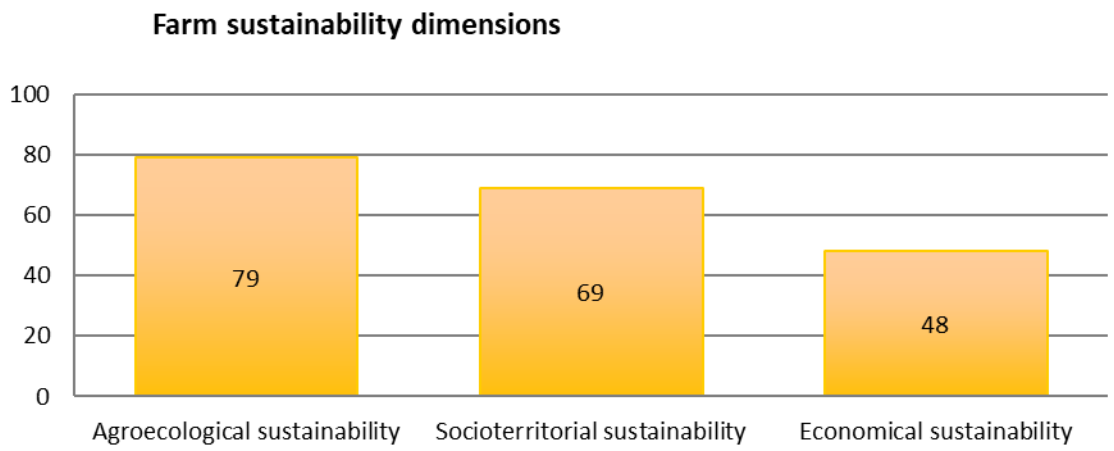
A possible illustration of the sustainability assessment is provided in Figure 13. This visualization of the ALiSEA SA sustainability assessment is depicted in the polygon of a hypothetical farm. A line connects theme according to their respective grade, forming a shape in grey color that represents the sustainability result for the hypothetical farm.
If the line is close to the center of the spider web, the indicators in the theme did not received a good grade. If the line is close to the border of the spider web, the indicators in the theme received the best grade possible.

Figure 13. Sustainability assessment spider web



Another way of looking at the results is through each dimension score. A possible illustration of the sustainability assessment by dimension is provided in Figure 14.

Figure 14. Sustainability assessment per dimension



IV.1 b Case study description

After interviewing the farmers, collecting the data, processing it and getting a final result in the form of a spider web, a case study specifying the results for each dimension is written for each farm involved in the study.

Each case study counts two pages and contains the following information:

- A brief explanation of what is sustainability assessment
- Name of the farm, country, climate information with average rainfall and average temperatures of the specific location of the farm
- Logo specifying which main agro ecological practice (the three most common being SRI, organic agriculture and integrated farming) is implemented at the farm
- Key figures of the farm: land size, utilized agricultural land and exact location
- A brief description of the farmer and his/her farm
- Agro ecological sustainability: a description of crops grown, natural resources utilization and agro ecological techniques used plus a few words about the agro ecological performance
- A farmer message expressing his/her motivations about sustainable agriculture
- Social sustainability: a description of actions taken by the farmer to share his/her knowledge, promote sustainable agriculture and the impact on his/her community
- Economic sustainability: a description of the economic results of the farm with a focus on his/her selling strategy
- Spider web: a visualization of the farm spider web that displays the results for each dimension and themes

Figure 15. Case study example page 1

SUPPORTING FARMERS IN THE TRANSITION TOWARDS AGROECOLOGY

ASSESSING FARM SUSTAINABILITY IN SOUTH EAST ASIA

What is Sustainability Assessment?

ALISEA self-developed method assesses the sustainability of agricultural production at the farm's level. Information on the economic, social and environmental situation is collected to form a spider web representing the three dimensions of sustainability.

The spider web helps in visualizing the sustainability level reached by each farm in ALISEA network and to identify potential improvements. The use of this assessment tool reflects an ambition to invest time and capacities into a network of sustainable farms set as outstanding example of success in the transition towards agroecology and ready to be change makers.

MEKONG EDEN FARM
LAOS

Seasonally tropical (rainy season: April to October)

~ 1600 mm/year

Avg max: 26°C - Avg min: 18°C

Key Figures

Land size: 4ha

UAL: 2ha

Location: Pakleaung village, Chomphet district, Luang Prabang province

Om Phonepasith, a young social entrepreneur and farmer, started his ecological project, Mekong Eden Farm, in February 2016 on a piece of land in the jungle by the Mekong riverside.

Om studied macro biology in Vientiane and nutrition in Poland for two years. After getting his bachelor degree, he worked for GIZ in Sayaboury Province where he started SuDHiCA in 2015. Sustainable Development for Highland Communities Association (Sudhica) was formed with the goal of improving the livelihoods of remote village communities in Sayaboury Province. Facing difficulties to access foreign grants in this province, he decided to move to Luang Prabang a year later to start Mekong Eden Farm, a farm and social enterprise.

With the help of a small team and volunteers, Om manages to grow a great variety of plants from all over the world on 2ha.

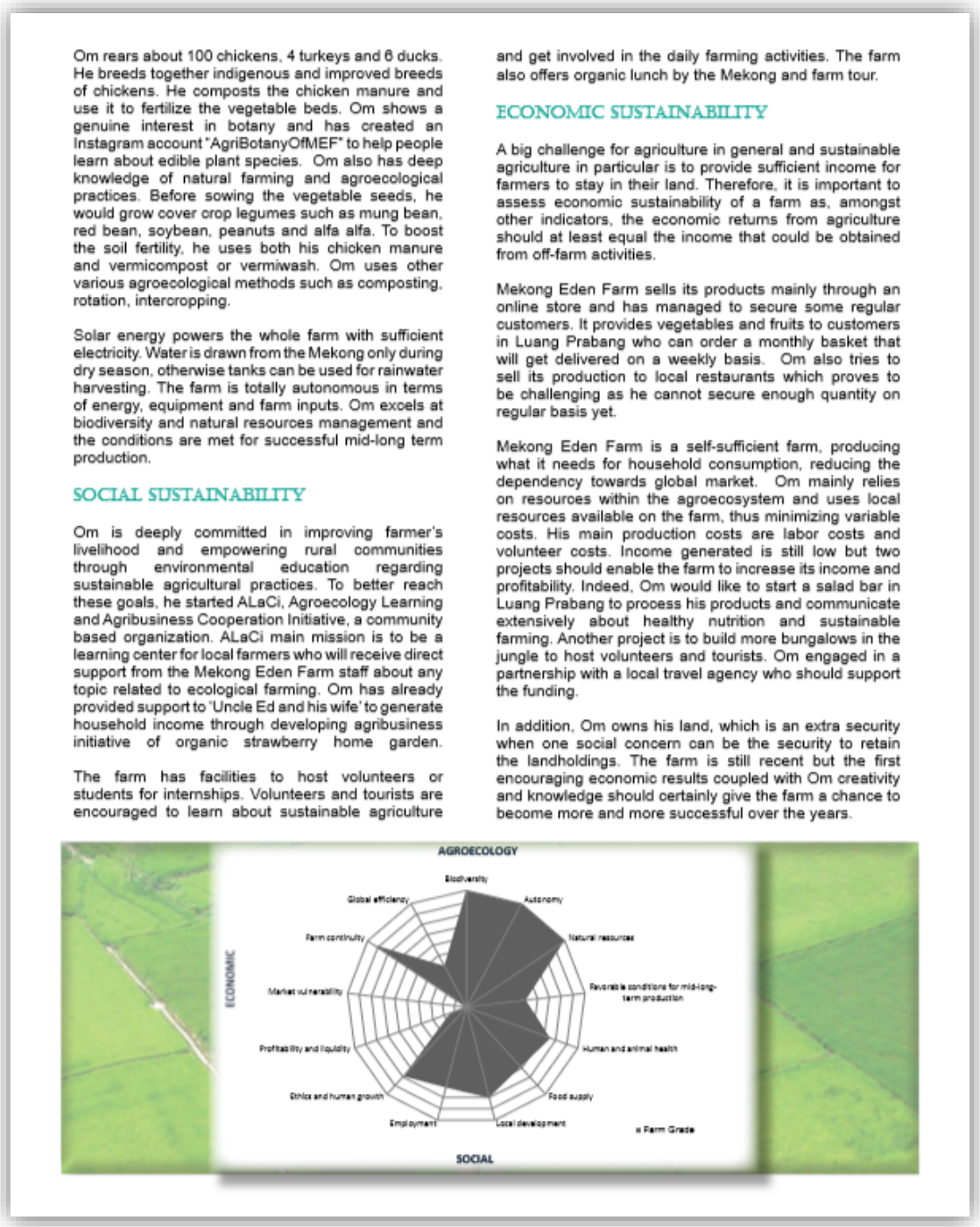
AGROECOLOGICAL SUSTAINABILITY

Organic agriculture can help preserving biodiversity and soil fertility while reducing pollution, eutrophication and greenhouse gas emissions (Pimentel et al., 2005; Mäder et al., 2002). Agroecological practices are very important in organic agriculture to ensure stable ecosystems and preserve biodiversity.

In Mekong Eden Farm, a high diversity of vegetables grows along with fruit trees. Om grows nearly hundred species: local vegetables as well as western vegetables and even rare vegetables like physalis, purple sweet corn or red ogra.

"We are doing things differently. Not only are we doing organic farming but also ecological farming"

Figure 16. Case study example page 2



Om rears about 100 chickens, 4 turkeys and 6 ducks. He breeds together indigenous and improved breeds of chickens. He composts the chicken manure and use it to fertilize the vegetable beds. Om shows a genuine interest in botany and has created an Instagram account "AgriBotanyOfMEF" to help people learn about edible plant species. Om also has deep knowledge of natural farming and agroecological practices. Before sowing the vegetable seeds, he would grow cover crop legumes such as mung bean, red bean, soybean, peanuts and alfa alfa. To boost the soil fertility, he uses both his chicken manure and vermicompost or vermiwash. Om uses other various agroecological methods such as composting, rotation, intercropping.

Solar energy powers the whole farm with sufficient electricity. Water is drawn from the Mekong only during dry season, otherwise tanks can be used for rainwater harvesting. The farm is totally autonomous in terms of energy, equipment and farm inputs. Om excels at biodiversity and natural resources management and the conditions are met for successful mid-long term production.

SOCIAL SUSTAINABILITY

Om is deeply committed in improving farmer's livelihood and empowering rural communities through environmental education regarding sustainable agricultural practices. To better reach these goals, he started ALaCi, Agroecology Learning and Agribusiness Cooperation Initiative, a community based organization. ALaCi main mission is to be a learning center for local farmers who will receive direct support from the Mekong Eden Farm staff about any topic related to ecological farming. Om has already provided support to 'Uncle Ed and his wife' to generate household income through developing agribusiness initiative of organic strawberry home garden.

The farm has facilities to host volunteers or students for internships. Volunteers and tourists are encouraged to learn about sustainable agriculture and get involved in the daily farming activities. The farm also offers organic lunch by the Mekong and farm tour.

ECONOMIC SUSTAINABILITY

A big challenge for agriculture in general and sustainable agriculture in particular is to provide sufficient income for farmers to stay in their land. Therefore, it is important to assess economic sustainability of a farm as, amongst other indicators, the economic returns from agriculture should at least equal the income that could be obtained from off-farm activities.

Mekong Eden Farm sells its products mainly through an online store and has managed to secure some regular customers. It provides vegetables and fruits to customers in Luang Prabang who can order a monthly basket that will get delivered on a weekly basis. Om also tries to sell its production to local restaurants which proves to be challenging as he cannot secure enough quantity on regular basis yet.

Mekong Eden Farm is a self-sufficient farm, producing what it needs for household consumption, reducing the dependency towards global market. Om mainly relies on resources within the agroecosystem and uses local resources available on the farm, thus minimizing variable costs. His main production costs are labor costs and volunteer costs. Income generated is still low but two projects should enable the farm to increase its income and profitability. Indeed, Om would like to start a salad bar in Luang Prabang to process his products and communicate extensively about healthy nutrition and sustainable farming. Another project is to build more bungalows in the jungle to host volunteers and tourists. Om engaged in a partnership with a local travel agency who should support the funding.

In addition, Om owns his land, which is an extra security when one social concern can be the security to retain the landholdings. The farm is still recent but the first encouraging economic results coupled with Om creativity and knowledge should certainly give the farm a chance to become more and more successful over the years.

IV.2 Analysis of results: farm sustainability

The results of the farm assessments sustainability are gathered in a booklet downloadable on ALiSEA website (ali-sea.org). The booklet presents the methodology detailed above as well as all the case studies written in the framework of the study. It will be published on ALiSEA website and the results will be presented during both the Regional Forum on Agroecology (Agroecology Futures) in Siem Reap, Cambodia (5th – 8th November 2018) and the Towards Organic Asia Partners Meeting in Vientiane, Laos (December 2018). It will give an opportunity to increase the visibility of these young farmers and, during the TOA partner meeting, to gather, share experiences and exchange information.

The methodology of the study and two case studies (Lee7Farm, Laos and Davon Farm, Cambodia) were presented by two members of ALiSEA team at the MELA conference (Mekong Extension Learning Alliance) held in Nonthaburi, Thailand from the 20th to the 25th of August.

In addition to the booklet, the data collected from the farmers enabled to identify several interesting results that will be detailed below.

First of all, the main farmer's motivations identified to switch from chemical to organic or more sustainable farming or SRI are:

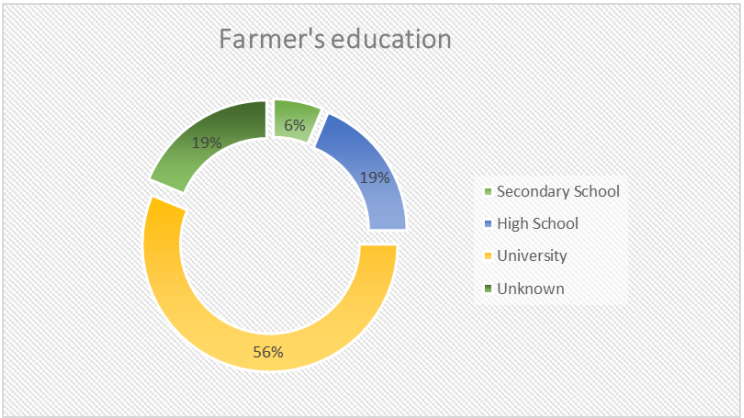
- Less or no chemicals: using less or no chemicals at all are favorable for the farmers and his/her family health
- Self-sufficiency: farmers can be self-sufficient in safe and healthy food
- Use of local resources: using local resources and resources available at the farm instead of chemicals reduce costs
- Farmers are their own boss and can manage their farm and time their own way
- Family motivations: farmers can take care of their family land and parents/siblings

In overall, farmers have reported some challenges they have to face:

- Access to quality seeds, especially organic seeds: organic seeds are available in Thailand but not yet to a big extent in neighboring countries
- Access to market: middlemen are often a good option to access the market. However, when farmers want to sell without intermediaries, they point the absence of awareness and sometimes interests from customers and thus the difficulty to sell the products at a premium price compared to conventional products
- Marketing issues: promoting their products is not always an easy task for farmers who are not comfortable with marketing their products. Without specific training they do not know how to create differentiation, they often do not use a label and therefore suffer competition from conventional products
- Lack of adequate information and technical knowledge: weak extension services to train farmers in sustainable agriculture practices

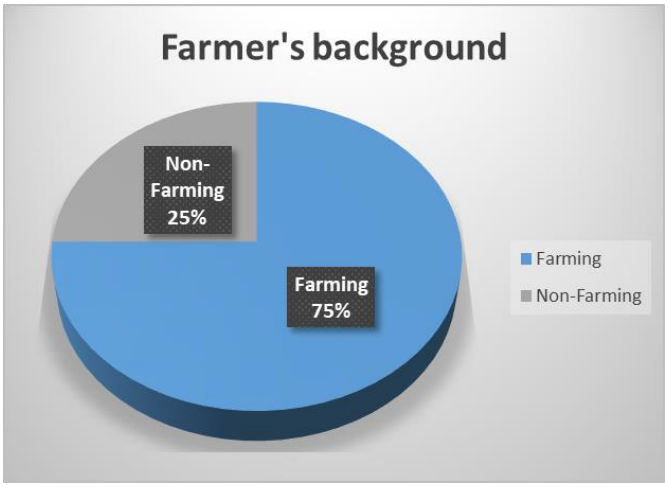
Prior to detailing the results by dimension, farmer's main characteristics can be found below:

Figure 17. Farmer's education



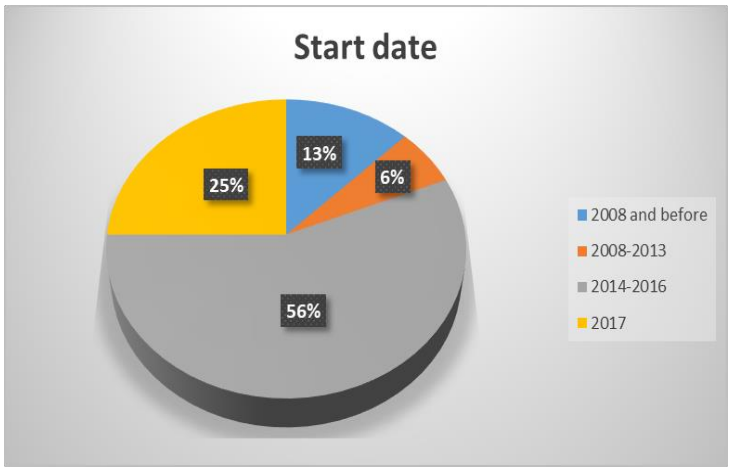
A majority of farmers surveyed graduated from the university.

Figure 18. Farmer's origin (farming/non farming)



A vast majority of farmers surveyed are coming from farmer's family and most of them took over the family farm.

Figure 19. Farm starting year



81% of the farms surveyed implemented agro ecological practices recently: 56% started over the last 4 years and 25% started last year.

IV.2 a Agro ecological sustainability

For the 16 farms surveyed, the scores for the agro ecological dimension range from 34 to 80 out of 100.
81% of the farms get a score higher than 55 out of 100, thus a majority of the farmers are good at:
– producing and managing organic matter, which represents a key element for the agro-ecological transition (manure, organic matter in soils). 63% of them rears livestock which enable them to have manure available at the farm. A vast majority of farmers surveyed compost the manure with rice husk, vegetables or leaves leftovers/wastes. 25% of them use vermicompost or vermiwash from earthworms as a fertilizer.

– growing a diversity of crops, which contributes to the population's food security. All of the farmers interviewed practice rotation, sometimes crop associations, and 23% of them even include legumes in the rotation.
– managing natural resources: farmers try to preserve water and draw only the necessary amount from local rivers. A vast majority of them rely on rainfall during rainy season for their crops, especially for rice. 44% of the farmers use water efficient system and draw water from their own ponds or local rivers.
– managing biodiversity: farmers try to preserve biodiversity, landscape diversity and soil by applying anti-erosion measures such as hedgerows, grass stripes, trees in their plots to favor the presence of insects or even to restore natural habitats.

Most of the farmer's agricultural practices are now involving modern technologies such as mechanized ploughing and harvesting. Few of them do not want to invest in tractor or do not have enough funds to invest in equipment and still use traditional techniques such as animal ploughing.
SRI techniques still mainly rely on human labor for sowing and transplanting but harvesting is usually done mechanically. 63% of farmers hire local manpower mainly for harvesting activities.

Circular agriculture is largely applied. It mainly focuses on the reuse, reduction and recycling of materials and energy in agricultural production systems. Circular agriculture is a good way to control pollutants and also reduce agricultural waste in order to realize a positive cycle of ecology in agricultural production systems.

Certain types of farms identified in this study were found to be more favorable to the development of agro ecological practices and systems: 3 farms out of 16 obtained a score of 80. When integration between crops and livestock is strong, the farmer decreases its costs by relying on resources such as manure available on the farm to boost the soil activity be it by composting the livestock manure or by applying it directly in the fields. In these farms, livestock was found freely grazing in the fields and kept in stables only at night. This system enables the farmer to save feeding costs and animals manure directly fertilizes the plots. Some farmers also integrate fodder crops in their rotation (most likely corn). The farmers who do not rear livestock need to buy manure from external sources sometimes far from their village (it is the case for the farmers located in mountainous area in Shan State, Myanmar). Farmers who practice rice mono-cropping (mainly rice) on a majority of their plots were also found to get lower score on the agro-ecological dimension.

IV.2 b Focus on agro ecological practices

The use of agro ecological practices by small scale farmers was analyzed to see which practices are most commonly known and used by farmers. The results can be found on the figures below:

Figure 20. Use of agro ecological practices by small scale farmers in Laos

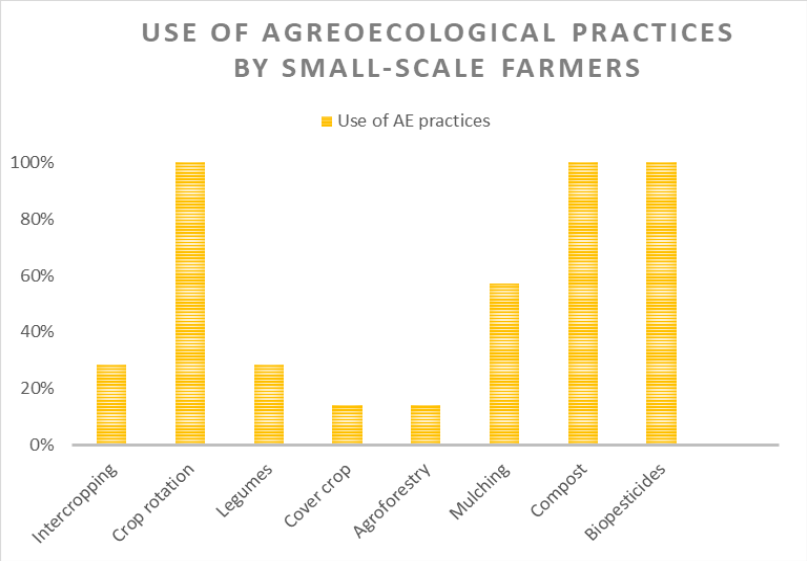


Figure 21. Use of agro ecological practices by small scale farmers in Vietnam

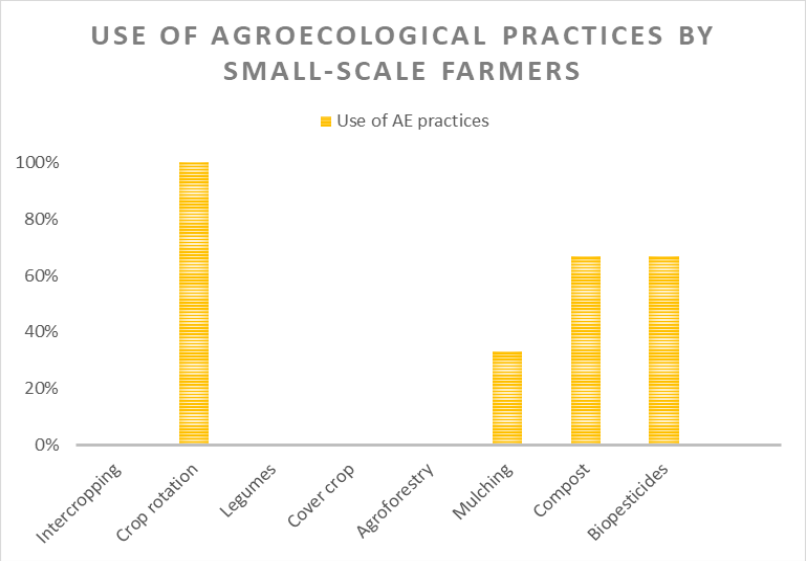
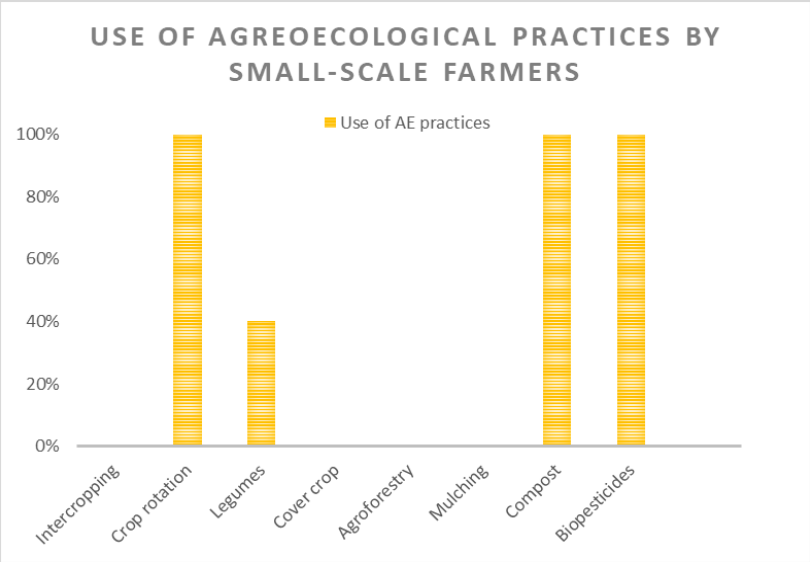


Figure 22. Use of agro ecological practices by small scale farmers in Myanmar



The tables above are a representation of the agro ecological practices used by the farmers. Although they are commonly using agro ecological practices, they each have their own individual understandings of the meaning of sustainable agriculture. For some of them it means no chemicals at all but to some it might just mean using fewer pesticides and mineral fertilizers. However, farmers are systematically aware that sustainable agriculture means the conservation of soil, natural resources and biodiversity. In addition, farmers are systematically aware that crop rotation decreases risks of crops diseases and pests' attacks and practice it in a vast majority of cases. Compost and homemade bio pesticides are also used in a vast majority of cases. Compost recipes varies from a country to another but the basis remain rice husk and animal manure with variations depending on available local resources. The same applies for bio pesticide with a wide use of garlic, fermented fruit trees leaves and fermented tobacco leaves in all countries involved in the study.

As shown on the tables, some practices are not widely spread and used. It is the case for cover crop or agroforestry. However, the level of integration of agro ecological practices by farmers is strong, as the combination of three or four of these practices concerns 89% of farms.

IV.2 c Social sustainability

The scores for the social dimension range from 45 to 81 out of 100. The most outstanding farms with a strong social impact are farms offering a wide range of learning experiences such as agro-tourism, volunteering experiences, internships, university partnerships. These farms are not yet providing a lot of job opportunities for youth in their community but offer internships and volunteering experiences and are good promoters of sustainable farming practices.
69% of the farmers surveyed are engaged in training activities at their farm and welcome farmers willing to learn new practices such as compost or bio pesticide making.
69% of the farmers are involved in innovation network: 5 belongs to Y-Farm, a young farmers Mekong Region network, 2 belongs to NEED alumni, 3 belongs to KMF alumni and 1 benefited from a project funded by ALiSEA. These networks enable the farmers to transfer and share knowledge across the region and also receive occasional technical supports, which is essential as there is a lack of training on sustainable agriculture in the region.

IV.2 d Economic sustainability

Estimation of costs of production and income is important as it enables farmers to determine the profitability of their farm to improve their economic well-being even for small scale productions in developing countries, where traditional smallholder farming and family-based agricultural activities are the predominant form of agriculture. During the interviews, no tools used by farmers were identified to estimate and analyze their production process such as cash and non-cash farm inputs, daily return for labor, losses and even sometimes yields. Only one or two farms out of the 16 were writing some expenses and revenues on a dedicated notebook. The other economic results are based on farmer's estimations.

As a result, decision making process of farmers is often not based on up-to-date economic status of their farm in order to optimize labor use, which is an important factor for farmers for adapting innovative or improving cropping or animal systems. In addition, there is a lack of economic data for organic / sustainable farms and even economic data on farming in general in the Mekong Region which makes comparison and statistics difficult. It is hard to know if farmers are making a decent profitability compared to conventional farmers or their peers.

We tried to compute income (crops, livestock, agro-tourism income, off-farm income when applicable) and costs of production for each farm surveyed based on the farmer's estimations and then compare the net revenue with the minimum wage of a worker in each country involved in the study even if it is far from being satisfying. It is therefore difficult to identify the effectiveness and efficiency of current production techniques in terms of economic returns yet an attempt was done to collect economic data and the results are presented below. The scores for the economic dimension range from 25 to 73 out of 100, the figures below provide some explanation to these scores.

All data are computed for the seasonal year September 2017- September 2018. Due to the absence of economic records it was very difficult to get reliable economic data for the previous years.

Figure 23. Income breakdown for farms in Laos

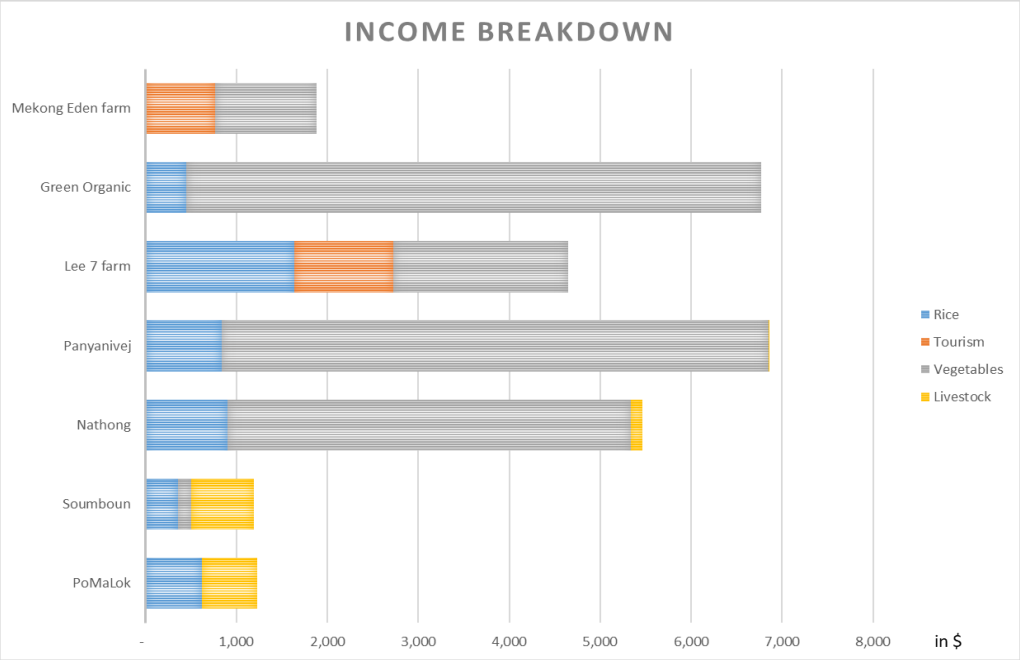


Figure 24. Net revenue and cost of production/UAL for farms in Laos

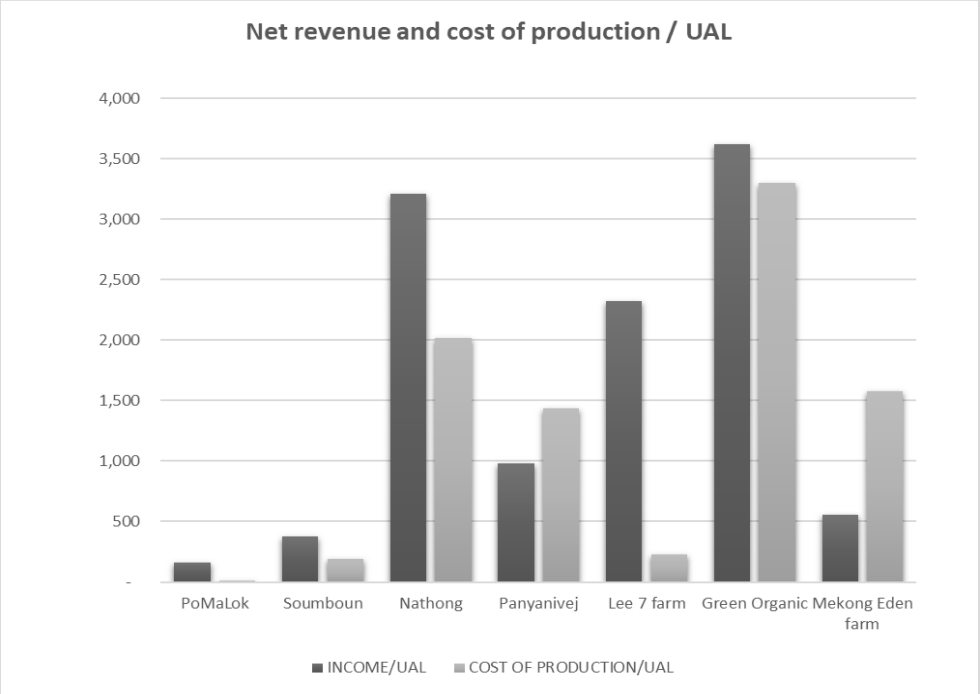
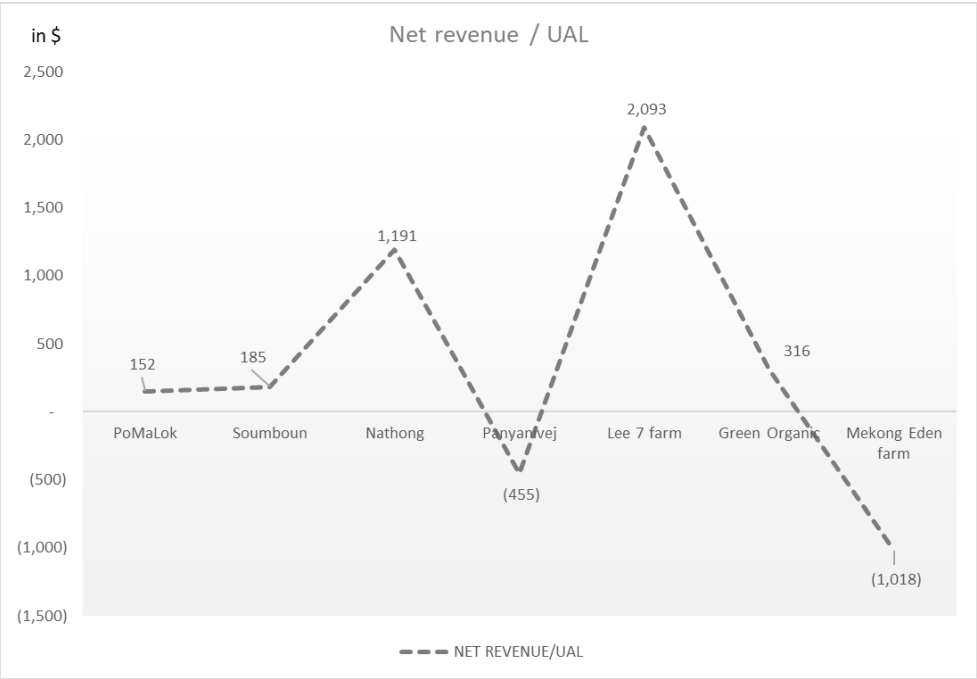


Figure 25. Net revenue/UAL for farms in Laos



The income for farmers surveyed in Laos range between 1.224$ and 6.854$ (average 4.004$). Panyanivej and Green Organic are the farms with the highest incomes. These two farms benefit from their good location, close to cities where there is a demand for organic products (Vientiane and Luang Prabang). Both of them have invested a lot in marketing, they have a distinguishable logo, a website, a Facebook page where orders can be placed online. They are also focused on expatriates' markets and offer agro-tourism activities. Lee7Farm has a similar profile. However, they are not the most economically sustainable given their high cost of productions. This is especially the case for Panyanivej that made the choice to invest in staff but which does not yet enjoy enough profitability to absorb such costs.

On the contrary, Nathong and Lee7farm benefit from good income and are sustainable economically as they manage to keep costs of production low mainly by relying on local resources available at the farm, especially Lee7Farm.

Figure 26. Income breakdown for farms in Vietnam

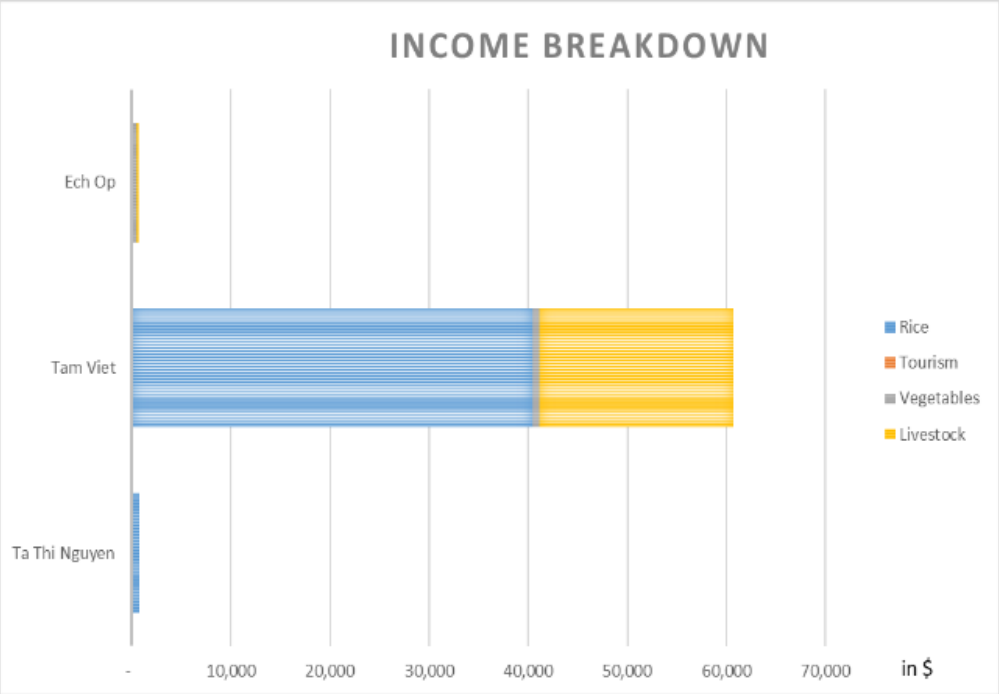


Figure 27. Net revenue and cost of production/UAL for farms in Vietnam

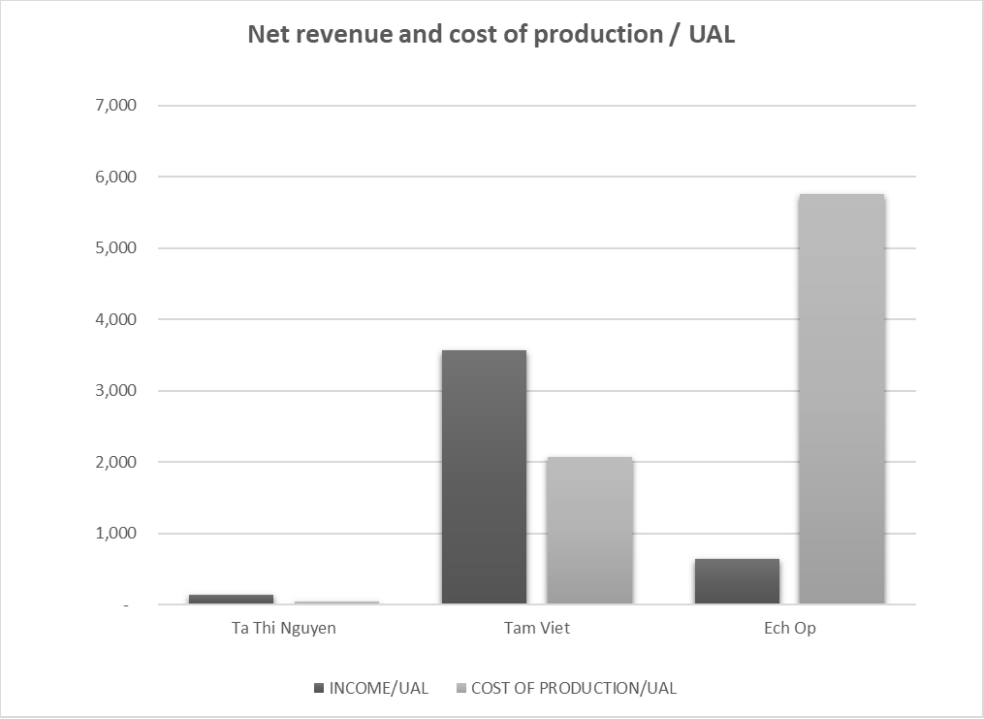
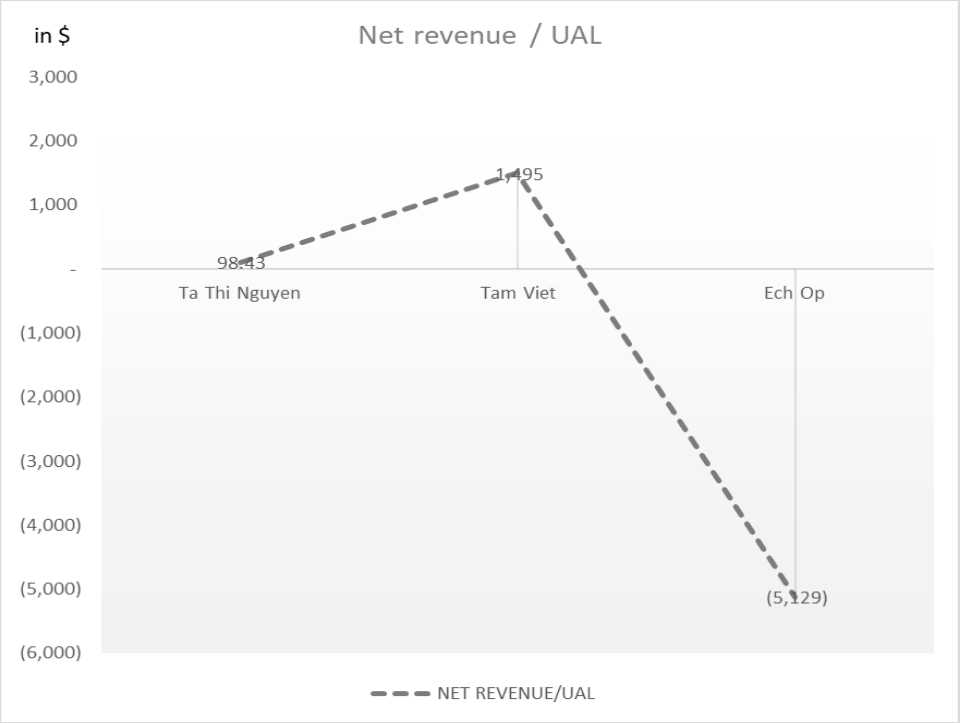


Figure 28. Net revenue/UAL for farms in Vietnam



The income for farmers surveyed in Vietnam range between 698$ and 60.641$. The three cases are very specific. Ta Thi Nguyen holds a small plot, grows vegetables for her family consumption and survives by selling rice. Her revenue has improved since she started practicing SRI but remains small and she belongs to the category of farmers which obtained a score below 50.

Ech Op farm is a recent farm with potential but which high costs of production still weight on its profitability. The farmer has invested in staff and marketing and has managed to secure some customers already but the activity needs to expand in order to provide more income and absorb costs of production.

The case of Tam Viet is very specific and was integrated in the study because it is an outstanding farm model and will provide a good example of how farmer can make a good living out of farming. Tam Viet is a 20ha farm which received a strong support from the Vietnamese government. The farmer sells organic rice and livestock all over the country through various distribution channels. Its proximity to Ho Chi Minch city provide the farm with a large market to supply. Indeed, demand for organic products are booming in big Vietnamese cities. Tam Viet also benefited from the development of the organic food industry, which helped build ties between enterprises and farmers. This approach helps to produce profits, lower risks and improve the quality of organic farming. Companies and farms sign a contract specifying the quantity and price of a certain cash crop for the following season. In the case of Tam Viet, Vinamit lend 20ha to the farm in exchange of the rice production. Vinamit provides seeds, organic fertilizers as well as training and technical guidance if necessary.

Figure 29. Income breakdown for farms in Myanmar

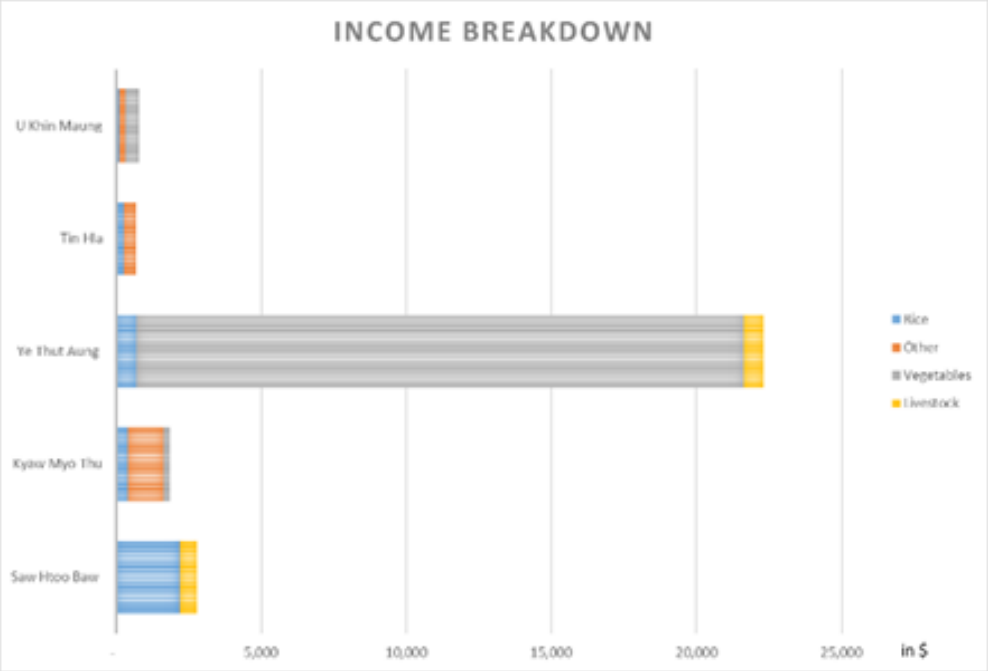


Figure 30. Net revenue and cost of production/UAL for farms in Myanmar

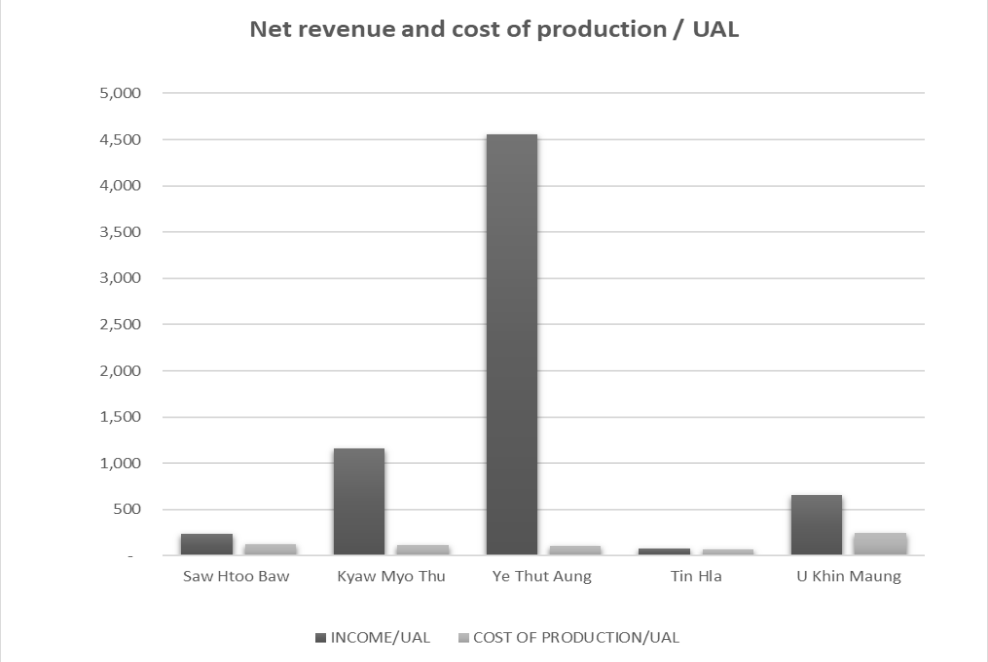
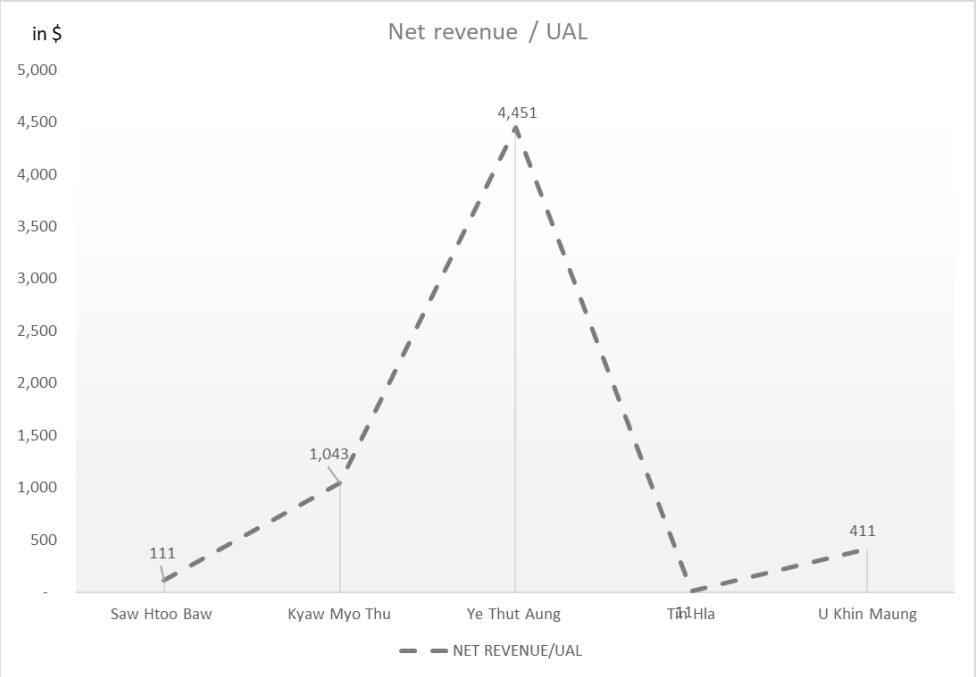


Figure 31. Net revenue/UAL for farms in Myanmar



The income for farmers surveyed in Myanmar range between 686$ and 22.313$. Except for one farm, most of the farmers surveyed get a yearly net revenue/UAL of less than 1043$. Farmers struggle in marketing their products and finding market opportunities especially when they are located far from big cities.

Another issue faced by a minority of farmers surveyed but that need to be highlighted is the access to land. The agro-ecological transition also depends on the degree of security with which farmers can benefit in the long term from the investments they have made in the eco-system. In some cases, especially in mountainous area in Myanmar, farmers are denied this right and government do not register their land, thus exposing them to insecurity regarding landholding retaining.

Agro-tourism offers were identified in 6 farms, representing 38% of the surveyed farms. These services are a potential income-generating stream for farmers practicing sustainable agriculture. In Luang Prabang, Laos, specifically, the local tourism development strategy seems to take into account the interest expressed from tourists for organic agriculture. They are being offered tour visits, farm stay, harvest and cook at the farm activities. These visits are also great initiatives to promote different ecological practices.

Part V. Perspectives and limits of the study

V.1 Limits of the study

- Research and translation

The above results were obtained through translation and might have be altered by misunderstandings regarding some technical terms or losses during the translation. To reduce this bias, the survey questions were as structured as possible.

- Research and farmers

The above results were obtained through semi-structured interviews and specific questions especially regarding economic data. As farmers do not keep track of the income perceived or costs incurred, economic data must be looked at carefully.
The survey length being maximum 3 hours not to overburden the farmers, some information might have been missed out.

- Research and data analysis

The farms surveyed did not represent a significant sample and therefore statistics could not be performed.
In addition, due to poor bookkeeping it was almost impossible to get reliable economic data for the past years; therefore the economic data are analyzed for the year 2017-2018 only which does not provide a clear view on the economic performance of a farm on a long term basis.

V.2 Discussion and perspectives

There is a multiplicity of sustainability paths and not one method exists to assess all of them. Each sustainability assessment requires an initial definition of a context of comparison (which farming systems do we want to compare, what is at stake, what criteria do we want to take into account, with which objectives of sustainability). This study was chosen with the purpose of showcasing agro-ecological innovative farms across the Mekong Region by assessing their agro-ecological, social and economic sustainability based on the same criteria. The aim of the study was to create, based on IDEA method, a tool for assessing farms sustainability in the Mekong Region. Evaluation criteria were tentatively adapted to fit the actual agro-ecological, economic and social conditions of the region.
The first point to be discussed is the fact that evaluation criteria was not done in a participatory manner. Indicators and weights were discussed within ALiSEA team and some other members of GRET among which one expert of sustainability assessment, Laurent Levard, who actively participated in CALAO (Projet Capitalisation d'expériences d'acteurs pour le développement de techniques agroécologiques résilientes en Afrique de l'Ouest). However, I did not receive any help from experts, scientists and farmers. Within a limited time frame, taking into account many different opinions would have made the work complex, in addition there was a very limited time for field testing. Nonetheless, I believe this study would have greatly benefited from a participatory approach involving farmers on one side, who could have given their opinion on the relevance and functionality of the chosen indicators, and experts on the other side who could have shared their expertise on agro ecological, social and economic

specificities to each country. A participatory approach is preferable but is time consuming and could not be implemented in this study.
In addition, a study covering several countries is very difficult to implement and in order to limit complexity, some indicators were set aside because not suitable to all countries. My work to simplify IDEA method surely reduced the level of collectable information. However, I chose to keep easily measurable indicators in the field, practical and basic enough to be understood by everybody in the team and by the farmer as well. It was essential that each actor involved in the study could gain a good understanding of the purpose of the study, its objectives and its applicability in the field. A less complex model with fewer indicators has advantages such as easy replicability across different countries with limited time spent in training but can deprive the data collector from gathering some extra valuable information.

However, I believe this study remains relevant as it allowed us to make observations in the field and to have a first overview of the "performance" of a small sample of farms. Despite the reduced sample size, we could observe some sustainability strength and weaknesses for each dimension (see results section) and especially identify good agro-ecological practices. Even though the economic results should be analyzed cautiously, some trends could be observed such as the presence of high costs of production in most cases except for farmers really applying the concept of circular economy. A very interesting economic indicator to include would be the level of indebtedness but after some field tests it proved very difficult to assess. This study could be improved by including this indicator and also possibly more detailed information on labor time especially for family members. Indeed, organic farming is often associated with highly intensive labor and it could have been interesting to prove this right or wrong through this study. However, it would have required more time on the field and with the farmer and each of his/her family member. Also, farmers do not necessarily keep track of the tasks performed and time for each of them which would have been difficult to track back. Nonetheless, these two indicators are important and would have surely provided interesting information.

As previously said, a fact that should be kept in mind is that transition towards agro-ecology is not straight, ways to achieve it are various and require a continuous process of reflection. What could be observed is that farmers are not equal in knowledge and capacity, which is reflected in the results and their levels of agro-ecological, social and economic success. Depending on their background and level of education, some farmers are lacking knowledge and are reluctant in adopting certain practices due to a poor access to information. Access to information is not easy in some areas and varies from a country to another and it could be a barrier to the adoption of agro-ecological practices. Along with the field work required when conducting farmer's interview, technical videos have been taken highlighting agro-ecological practices used by farmers such as compost or bio pesticide making. These videos are broadcasted on ALiSEA social media and shown to farmers in order to increase their knowledge and inspire them. This is a first step towards information and knowledge dissemination.
It was also observed that some agro-ecological practices are not known or poorly used such as agroforestry or cover crop. Unfortunately due to various reasons, mainly financial ones but also due to a lack of training and knowledge of their staff, governments through their agricultural department cannot always offer training dedicated to farmers. This identified gap

between training need and training offer is partially filled thanks to the work of local NGOs or association but support is needed to expand farmer's knowledge. Some regional network such as Y-Farm or Towards Organic Asia have put an emphasis on the creation of young farmers group across the Mekong Region. Such initiatives are creating synergies between farmers and have proven extremely useful. ALiSEA is engaged in supporting such initiatives and hopefully this will continue.

A real issue remains the bookkeeping of farms and also their marketing strategies. Most farmers do not know how to keep record of their cash in and out flows and do not have clear marketing strategies in mind, while this step is essential to develop a proper monitoring of an agro-ecological system. No specific initiative have been observed regarding this aspect and an emphasis should be placed on creating synergies between farmers to make them stronger and able to face market's price volatility. They need to understand how to keep track of their income and expenses to be able to fix a fair price for their quality products.

In terms of perspectives, it would be interesting to conduct this study over a longer period of time to assess the impact of the transition. This would enable the calculation of the opportunity cost. In terms of economics it would help refining the economic analysis by not only taking into account the benefits of agro-ecological practices but by comparing the gain due to the switch from chemical farming to more sustainable farming, with the loss due to the abandoning of the other technique. This study can be analyzed along with studies on the barriers to adoption to agro-ecological practices. Such studies have been conducted by GRET in Myanmar and Cambodia and by a local NGO, HJA in Laos and helped to put in perspective some results of the study. It was interesting to understand the perceptions and choices of farmers to adopt or not certain techniques and it would be interesting to capitalize on the results of all the studies conducted in the Mekong Region to bring elements of analysis of the barriers and levers to the development of agro-ecological practices and systems. This study brings some initial references to the agro-environmental and socio-economic effects and impacts of agro-ecological practices and systems in the Mekong Region that could be completed by other references gathered in other project, APICI in Cambodia for instance. All these studies put together and valorized could feed the dialogue between various actors such as farmers but also political authorities and cooperation institutions.

To conclude this discussion, I believe such study can serve as a communication tool to promote agricultural innovations and successes in some cases but it should go further than that and be used as a tool for farmers to compare their systems amongst each other and to create a common vision of sustainability. It is a first operational approach of sustainability aiming at bringing awareness amongst the farmer community and to inform them of which innovations are being implemented in the region and on how to replicate them at their level.

Conclusion

In a context of agricultural intensification in the Mekong Region leading to a loss of biodiversity, mono-cropping, poor soil conservation technique and cultivation on fragile and easily-erodible soils in upland areas, it was interesting to address the issue of farms sustainability. The presented study was designed to evaluate the sustainability of a sample of agro-ecological farms in the Mekong Region. As such, it introduced a first overview of the sustainability of a small sample of farms. Despite the reduced sample size, we could observe some sustainability strength and weaknesses for each dimension and especially identify good agro-ecological practices.

This study clearly demonstrated that there is no one way to achieve transition towards agro ecology, it is a continuous process and a reflection in reaction to challenges specific to each country of the Mekong Region. Each farmer has his/her own knowledge, background and understanding of what agro-ecology is and as a result they do not all make the same choices. Agro-ecology is more than ever moving, in constant evolution but we could observe that agro-ecology is:

- Farming practices answering to specific challenges in a given context
- A social movement in search of evolution in reaction to a dominant productive system
- A scientific discipline that suggests a real capacity of reflection and a constant search of solutions and innovations

The reflection initiated by the youth involved in the study needs to be supported and their successes need to be disseminated in order to motive other youth to adopt more sustainable farming practices. With a proper support, these initiatives can evolve, be replicated and have a significant impact on the community and on the way farming is perceived in the Mekong Region. We can hope that these farmers can move further collectively, debate and find solution to social, agronomic and environmental problems they face with the help of political authorities.

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Appendix 1. Sustainability Assessment Questionnaire

Sustainability Assessment Farm Questionnaire

I. GENERAL INFORMATION

Contact detail	Name:	Position:	
		Tel	
Location			

Type of Agroecology set of practices	Specify (crops, techniques)
Conservation agriculture	
Organic agriculture (organic certification / PGS)	
IPM	
Agroforestry	
VAC / Integrated farming system / permaculture	
System of Rice Intensification	
Other	

II. FARM BACKGROUND

Brief background:
When did the farm start? Who established it? What was the main motivations for starting the farm? Who is involved beyond the main farmer (labors, volunteers, other family members, friends…)

III. TECHNICAL DESCRIPTION (AGROECOLOGY DIMENSION)

	Detail information
Land size distribution	Total land size Distribution: forest, crops, gardening, livestock
Farm natural context	Soil Climate Topography Hydrography
Cultivation methods and soil fertility management	sowing date harvesting date inputs used tillage or no tillage? fertilization (N, P, K and quantity if any) rotation (long, short, which species) fallow lands (Y/N, if yes total area of fallow land)
Livestock	number of animals time spent in the farm time spent grazing during the year dung management (quantity of manure collected and spread) bought/sold on the territory or outside
A1- Diversity of species	Main cash crop: field crop, perennial crop, field gardening, nethouse gardening Species: type, number, on which surface, which plots Plots (number, repartition)
A2- Biodiversity Management	Zone of ecological compensation (hedgerows, grassland, fallows, ponds, agroforestry…): many, some, none Non productive zones: none/if some are they managed ecologically (hand weeding, left as such to maintain biodiversity)
A3- Autonomy in energy, equipment and seeds	Use of energy produced on the farm or valorisation of renewable energy: Y/N Self-building of machines or adaptation of existing material: Y/N Autonomy in repairing material: Y/N Use of equipment produced in the farm or in group: Y/N Proportion of area cultivated with seeds produced from the farm or farm transplants (in %):
A4- Autonomy in N	Quantity of N imported on the farm: Quantity of N spread on the farm: Area dedicated to plants fixing N:
A5- Water consumption	Quantity of water consumer (*m3/year or L/year*): Stability of water source (water available during dry season/not available during dry season):
A6- Energy efficiency	*In quantity consumed or price* Electricity: Petrol: Gaz: Wood: Lubricant: Other:
A7- Water efficiency	Type of irrigated crops (field, nethouse gardening, tree crops…) Livestock water consumption (grazing/other) Implementation of water-efficient watering systems: Y/N Water-waste reduction (shut off valves, sprinkler): Y/N Water optimization (Efficient watering material or/and efficient livestock watering): Y/N Recycling and reusing water: Y/N
A8-Boost soil fertility	Area where specific soil organic matter management is implemented (in ha): Straw or rice husk burnt: Y/N Heavy metals contamination: Y/N Permanent soil cover (at least 3 years): Y/N; if yes how many ha? No tillage (direct sowing): Y/N; if yes how many ha? Specific measures to counter erosion (ex: cover crops, agroforestry…): Y/N
A9 - Maintain plant protection system	Use of biopesticides: Y/N Implementation of pest management strategy: Y/partial/N Incidence of pest, diseases, weeds: no incidence, partial incidence, crop destruction
A10- Secure availability of material means of production	Do you have supply problems: in quality Y/N, in quantity Y/N, in delays Y/N Quantity of supply not purchased locally: more than 50% or less than 50%?

A11- Reduce the impact on the air quality	Number of crossing of machine emitting particles: Number of GHG mitigation practice:
A12 - Reduce use of veterinary treatments	Number of veterinary treatment: Plants or essential oil treatments:

IV. SOCIAL DESCRIPTION (SOCIAL DIMENSION)

	Detail information
Technicity required	
Working time (tasks planning)	Weekly work distribution (time spent for production, selling products, harvesting, admin tasks if applicable)
B3 - Production quality	Any geographical indication or specific quality linked to process? Y/N Organic agriculture: Y/N PGS: Y/N
B4- Losses and wastes	Actions to limit losses and wastes (appropriate storage capacity, donation of food left on the field, program on waste awareness): Y/N other
B5 - Social and cultural link to food	Actions fostering link between consumers and producer (open farm day, baskets, fair trade, restaurant in the farm....): Y/N And/or knowledge about food (cooking classes, contribution to local food network...): Y/N Food produced which is not represented or commercialized: Y/N
B6- Services to the territory	Agrotourism: Y/N Pedagogical farm: Y/N
B7 - Direct selling	Value of sales in direct selling or proximity channels: Direct selling: Y/N Proximity selling (collectively, individually): Y/N Selling to local catering or restaurants : Y/N
B8- Promotion of local resources	Proportion of fertilizer bought on the territory: Exchanges (seeds, manure...): Y/N Purchase of animal on the territory: Y/N Use of energy coming from local forest: Y/N Rainwater harvesting: Y/N
B9- Promotion of local knowledge	Contribution to supporting local knowledge: Y/N Sustaining local genetic patrimony (local species, local breed) : Y/N
B11- Management of non-organic waste	Presence of dangerous waste (batteries, chemicals) or heavy waste (plastics, tyres): Y/N Practice to dispose of the dangerous waste (recycling or not): Y/N Risky practices such as burning waste : Y/N
B12 - Innovation network	Innovation network: Y/N Pooling of resources/farm equipment/building: Y/N
B13- Contribution to employment	Job creation on the farm over the last 5 years: Y/N Local seasonal manpower (ex: hired for rice harvesting): Y/N Use of collective work (mutualisation, farmers group): Y/N Common projects (land sharing) : Y/N
B15 - Quality of work	Self-assessment from farmer: Are you satisfied with your work? (score from 0 to 4, 4 being the top satisfaction) Self-assessment from farmer: Drudgery at work (0 to -4, -4 being top drudgery)
B16 - Training	Number of training received: Hosting of young trainees or professionals: Y/N
B17 - Involvement in the community	Involvement in non-farming association in the territory: Y/N Youth mentoring or social experimentation (community work): Y/N Public hosting (free of charge): Y/N
B18 - Action of transparency	Communication of farmer about his/her practices (communicate about organic products when selling at the market, promote organic products in the community...): Y/N Member of a PGS : Y/N

B19 - Quality of life and remoteness	Self-assessment of quality of life from 0 to 6 (6=good quality of life) Self-assessment of the isolation feeling from 0 to 4 (location, social or cultural isolation) (4 meaning no isolation feeling) and quality of access to productive services of the farm (internet, phone, road quality…) (4=good access)
Support received	Technical studies or Training (where and when?) NGO (which one, on what topic), PAFO / DAFO / University (what topic) Private sector (which one, on what topic), Other

V. ECONOMIC DESCRIPTION (ECONOMIC DIMENSION)

	Detail information
Land ownership	Own land: Y/N Rented land: Y/N
Equipment	Type Year of purchase
Labor force	Number Role in the farm Contribution (activities)
Costs of production	Inputs Seeds Workforce Equipment Services Land Energy (electricity, fuel…) Animal food Packaging Manure/compost or other fertilizer Water Other
Yield per crop	Yield per season and per crop: Crop 1 Crop 2 Crop 3 … (should include the production sold but also consumed by household)
C1- Income	Selling prices and yearly income by type of product (rice, each fruits, each vegetables, livestock, fish) Self-assessment on incomes (sufficient or not from 0 to 5, 5=very sufficient)
Loans	Loans (characteristics: purpose, term, amount, repayment)
C2 - Liquidity	Does the farmer have access to financial resources? formal safety nets : Y/N bank credit: Y/N government transfer (food/cash) : Y/N micro-credit institutions: Y/N informal safety nets: Y/N family/friends: Y/N NGO: Y/N

	community groups: Y/N
C3/C4- Market diversification and client relationship	Revenues by subsystem client relationship: how many clients: existence of a contract: Y/N or a long term relationship: Y/N % of income from main client
C5 - Farm continuity	What do you think about the existence of your farm in 10 years? Certain/will exist if possible/will not exist anymore Any development projects? Y/N

VI. AE LAND LOCATION AND TRANSECT LANDSCAPE

VII. FUTURE PLANS

VIII. ADDITIONAL INFORMATION AND SUGGESTION

IX. MESSAGE FROM FARMERS TO FARMERS

Appendix 2. Indicators Guidelines

ALiSEA
Agro-ecology Learning alliance in South East Asia

SUSTAINABILITY ASSESSMENT INDICATORS

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Overview table of indicators per dimension and themes

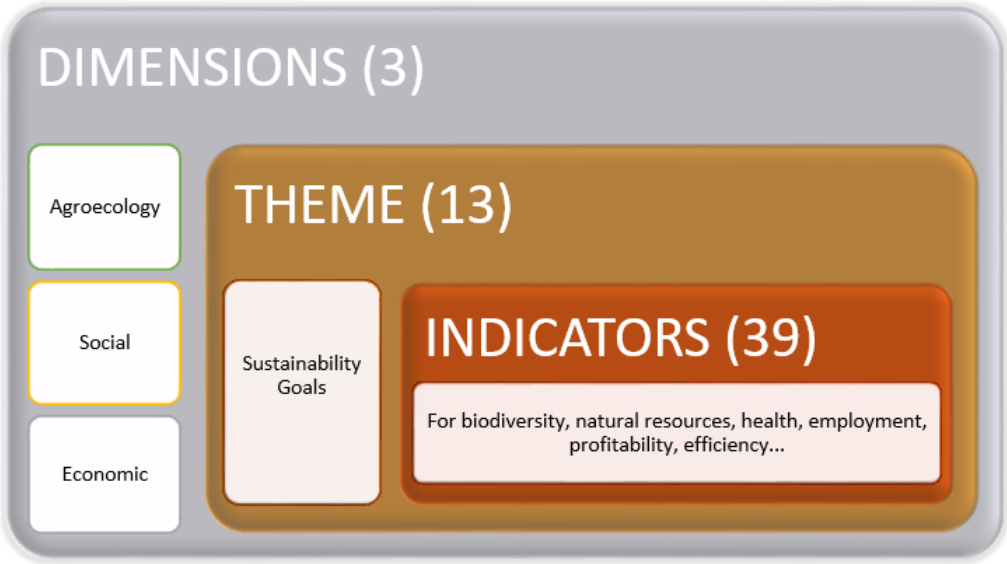
These indicators were defined based on a concept of a sustainable agriculture that should:

- Maintain natural resources (biodiversity, soil, water, air)
- Maintain non-renewable resources
- Maintain/develop landscapes
- Adapt to global warming effects and fight against it
- Contribute to food sovereignty and safety
- Contribute to employment and territory development
- Ensure animal health and welfare
- Ensure economic viability and continuity of the farm
- Contribute to quality of life
- Give freedom of action and independence
- Produce and share knowledge and know-how

Framework

The ALiSEA Sustainability Assessment Framework begins with the three dimensions of sustainability: agroecology, social and economic. These dimensions are broad, encompass many aspects and are translated into a set of themes. Each theme is measurable through indicators. SA Indicators document provides the guidance for the application and calculation of these indicators.

Figure 1. ALiSEA SA FRAMEWORK



Themes: these are refined in a set of **13** core sustainability issues, or "Themes", with associated sustainability goals.

Indicators: these are refined in a set of **39** indicators which identify the measurable criteria for sustainable performance for the theme.

Table of indicators per dimension and themes

Dimension	Theme	Indicator	Number	Score
Agroecological Dimension	Biodiversity /20	Diversity of species grown	A1	10
		Biodiversity management	A2	10
	Autonomy /18	Autonomy in energy, equipment and seeds	A3	10
		Autonomy in N	A4	8
	Natural ressources /16	Water consumption	A5	8
		Energy efficiency	A6	8
	Favorable conditions for mid-long-term production /34	Water efficiency	A7	10
		Boost soil fertility	A8	12
		Maintain plant protection system	A9	8
		Secure availability of material means of production	A10	4
	Human and animal health /12	Reduce the impact on the air quality	A11	4
		Reduce veterinary treatment	A12	8
Social Dimension	Food supply /32	Food production	B1	10
		Contribution to the global food balance	B2	5
		Production quality	B3	7
		Losses and wastes	B4	5
		Social and cultural link to food	B5	5
	Local development /30	Services to the territory	B6	3
		Direct selling	B7	8
		Promotion of local ressources	B8	5
		Promotion of local knowledge	B9	5
		Farm accessibility	B10	3
		Management of non organic waste	B11	3
		Innovation network	B12	3
	Employment /19	Contribution to employement	B13	6
		Collective work	B14	4
		Quality of work	B15	3
		Training	B16	6
	Ethics and human growth /19	Involvement in the community	B17	8
		Action of transparency	B18	5
		Quality of life	B19	3
		Remoteness	B20	3
Economic Dimension	Profitability and liquidity /35	Net Income	C1	25
		Liquidity	C2	10
	Market vulnerability /25	Market diversification	C3	15
		Diversification and client relationship	C4	10
	Farm continuity /15	Farm continuity	C5	15
	Global efficiency /25	Gross efficiency of production process	C6	15
		Inputs sobriety in production process	C7	10

Methodological sheets

AGROECOLOGICAL DIMENSION

Diversity of species grown (A1)

Agroecological dimension (A)

Biodiversity

Description

This indicator refers to diversification of production systems (field crop, perennial crop, field gardening, net house gardening) and the index of diversity of grown species.

Unit of measurement

This indicator looks at the share of utilized area where several species are produced at the same time during the analyzed time-frame.

This indicator is measured by first determining the crop diversity index:

Pure crops	Number of species in pure crops	
Crops in association (including agroforestry)	Number of species in each association	
Crop Diversity Index		0

A matrix crossing the crop diversity index with the presence of dominating species (“crops fairness”) will help determining the final score for this indicator:

		Crops "fairness"		
		Monocrop on 95% or more of UAL	1 to 2 species represent more than 80% of UAL	Other cases
Crop Diversity Index (CDI)	1 to 2	0	3	
	3 to 5		4	5
	6 and +		6	10

For Net house gardening, the score depends on the number of species grown under the net house and whether there is a diversification of species during different seasons.

Rating

The maximum score is given to production system which maintain landscape complexity and with a high diversity of grown species. The maximum score granted for this indicator is 10

Limitations

There is a consensus on the fact that diversity increases robustness of a farm towards climatic hazards and biotical pressure, however there is no consensus on what separate a diverse system from a non-diverse one. In addition, the number of species that are available to production depends on the region climatic conditions.

Biodiversity management (A2)

Agroecological dimension (A)

Biodiversity

Description

This indicator refers to the extent of structural diversity in landscapes (i.e zone of ecological compensation/natural, semi-natural habitats), and its management to assess whether it is favorable or not to natural enemies and pollinator.

Unit of measurement

This indicator is measured through 3 items:

Item1: Presence of zone of ecological compensation which are the following: hedgerows, grassland, fallow, wooded banks, ponds, agroforestry. If there are many, 4 points, some, 2 points, none 0 points.

Item2: Management of non-productive zone (=no crop): 4 points if they are managed ecologically, 0 points if there are no non-productive zone.

Item3: Fallow land or flower stripes to favor pollinating insects: 2 points if such zones exist, 0 points if not.

Rating

The maximum score is given to production system which maintain landscape complexity to favor biodiversity and hosting of natural pest enemies. The maximum score granted for this indicator is 10.

Limitations

This indicator is computed in a more complex way in IDEA method but was simplified and kept to grant points to farmers who maintain non-productive zones which are highly valuable to biodiversity.

Autonomy in energy, equipment and seeds (A3)

Agroecological dimension (A)

Autonomy

Description

This indicator refers to the autonomy provided to a farm thanks to practices such as self-repairing or adapting farm equipment and of saving seeds or other reproductive materials (e.g. tubers) for use from year to year for annuals and for tree fruits. This indicator also looks at whether renewable energy or energy produced in the farm is used in the farm.

Unit of measurement

This indicator is measured through 3 items:

Item1: Use of energy produced on the farm or valorization of renewable energy: if energy is produced on the farm, it will grant up to 4 points.

Item2: Self building of machines or adaptation of existing material, autonomy in repairing material and use of equipment produced in the farm or in group can grant up to 3 points (1 point each).

Item3: If the proportion of area cultivated with seeds produced from the farm or farm transplants exceeds 50%, it will grant 4 points.

Rating

The maximum score is given to production system which maintain non-renewable resources, ensure farm autonomy and independence and maintain local know-how such as seed saving. The maximum score granted for this indicator is 10.

Limitations

Autonomy in N (A4)

Agroecological dimension (A)

Autonomy

Description

This indicator refers to the autonomy of the farm towards nitrogen from external sources. Growing legumes are considered favorable to reaching nitrogen autonomy and this indicator also looks at the area dedicated to plants fixing nitrogen.

Unit of measurement

This indicator is measured through 2 items:

Item1: Computation of the quantity of N imported in the farm versus the quantity of N spread on the farm plots. If this ratio is more or equal to 60%, it grants 6 points, if it is more or equal to 30% it grants 4 points, less than 30% is considered as no autonomy towards external sources and grants no points.

Item2: Area dedicated to plants fixing nitrogen:

% leg in UAL	40%	20%	5%	0%
points	4	2	1	0

Rating

The maximum score is given to production system which maintain non-renewable resources and ensure farm autonomy and independence. The maximum score granted for this indicator is 8.

Limitations

This indicator is detrimental to non-integrated farming systems as this type of farms must rely on external sources to provide them with organic nitrogen.

Water consumption (A5)

Agroecological dimension (A)

Natural resources

Description

This indicator looks at the water use per unit and the access to water during dry season.

Unit of measurement

This indicator is measured through this matrix:

		Pressure of extraction		
		QT < 10 000 m3	10 000 m3 < QT < 30 000 m3	QT > 30 000 m3
Vulnerability in water ressource	Very strong	4	0	0
	Strong	4	2	0
	Average	6	4	2
	Weak	8	6	4

The weaker the vulnerability in water resources, the lower the pressure of extraction, the better score.

If water is accessible during dry season (river, pond, well) 2 more points are granted.

Rating

The maximum score is given to production system which maintain non-renewable resources and act against global warming. The maximum score granted for this indicator is 8.

Limitations

Weighting water withdrawals is difficult when no water counter is available and no reliable public sources exist regarding the quantification of water availability.

Energy efficiency (A6)

Agroecological dimension (A)

Natural resources

Description

This indicator looks at the energy use for the production, per unit (fuel, electricity, gaz...).

Unit of measurement

This indicator is measured through this table where each quantity (or price converted into quantity) should be filled in:

Direct energy				
type	unit	quantity consumed	conversion factor	quantity consumed
			in EFL / unit	EFL
electricity	kWh	0	0.29	0.0
petrol	L	0	1.28	0.0
biofuel	L	0		0.0
natural gaz	kg	0	1.58	0.0
biogaz	kg	0	0.51	0.0
wood	kg DM	0	0.50	0.0
coil	kg	0	0.78	0.0
lubricant	L	0	1.01	0.0
straw	kg	0	0.53	0.0
	Total consumption of direct energy			0.0

A consumption of more than 1200 EFL (equivalent fioul liter) will grant a score of 0:

EFL	300	600	900	1200	
points	8	6	4	2	0

Rating

The maximum score is given to production system which maintain non-renewable resources and ensure farm autonomy and independence. The maximum score granted for this indicator is 8.

Limitations

Quantities are difficult to compute as consumptions are often given in prices.

Water efficiency (A7)

Agroecological dimension (A)

Favorable conditions for mid-long-term production

Description

This indicator refers to practices that aim at saving water. Water conservation refers to any beneficial reduction of water loss, use or waste. Many practices can potentially conserve water, such as maximizing the efficiency of irrigation system, rainwater harvesting or livestock grazing.

Unit of measurement

This indicator is measured through 3 items:

Item1: Irrigated crop: the type of irrigated crop will determine a score between 0 to 4. If livestock is grazing, this will grant 3 points and if an efficient watering strategy (early species, early sowing, mulching, pond, well) has been implemented, it will grant 1 point.

Item2: Water-waste reduction: if there is an efficient watering system in the farm, this will grant 4 points.

Item3: Rainwater harvesting or reused: if such water recycling method is used in the farm, this will grant 4 points.

Rating

The maximum score is given to production system which maintain non-renewable resources, ensure farm autonomy and independence and adapt and act against global warming. The maximum score granted for this indicator is 10.

Limitations

The efficiency and appropriateness of water-saving practices depend on local climate and water availability. Hence, it has to be determined locally what practices are beneficial.

Boost soil fertility (A8)

Agroecological dimension (A)

Favorable conditions for mid-long-term production

Description

This indicator refers to all practices that aim at improving the soil fertility. Depending on the conditions of soils and on the local climatic and geological characteristics, numerous measures can be taken to improve soil fertility such as: application of compost, animal manure to improve nutrient deficiencies and/or organic matter, soil cover or/and no tillage to reduce erosion and improve biological life in the soil.

Unit of measurement

This indicator is measured through 3 items:

Item1: Long time soil fertility: it looks at the area where specific soil organic matter management is implemented (possible actions: compost, ramial chipped wood, crop residues left on the plots, permanent cover crop, no tillage system…)

OM management	60%	30%	0%
points	5	2	0

Straw or rice husk burning grants a negative point.

Item2: Biological life in the soil: it looks at the area where biological life in the soil is maintained through permanent cover and/or no tillage (direct sowing):

Permanent Cover	60%	30%	0%
points	3	1	0

No tillage	60%	30%	0%
points	3	1	0

Item3: Erosion: specific measures (agroforestry, soil cover, terrace, stripes, hurdles…) to counter erosion grant 2 points

Rating

The maximum score is given to production system which maintain non-renewable resources, ensure farm autonomy and independence and adapt and act against global warming. The maximum score granted for this indicator is 12.

Limitations

Consensus on the efficacy and trade-offs of soil-enhancing practices does not yet exist for all practices. It could happen that measures that remove one problem can aggravate another problem.

Maintain plant protection system (A9)

Agroecological dimension (A)

Favorable conditions for mid-long-term production

Description

This indicator refers to the practices implemented to maintain plant protection. First of all, it looks at whether a pest management strategy has been implemented and then how it is implemented (use of bio pesticides and incidence of pests on crops).

Unit of measurement

This indicator is measured through 2 items:

Item1: Pest management strategy:

	Totally implemented	Partially implemented	No PMS
Item 1 : PMS	4	2	0

If bio pesticides are used, 2 points are granted.

Item2: Incidence of pests, diseases, weeds:

	no incidence	partial crop damages	significant damages
Item 2 : Incidence	3	1	0

Rating

The maximum score is given to production system which maintain non-renewable resources and contribute to quality food supply. The maximum score granted for this indicator is 8.

Limitations

Secure availability of material means of production (A10)

Agroecological dimension (A)

Favorable conditions for mid-long-term production

Description

This indicator refers to the degree of dependency from external inputs, especially regarding supply issues: quality, quantity, delays. This indicator also looks at the quantity of supply not purchased locally.

Unit of measurement

This indicator is measured through 2 items:

Item1: Degree of dependency towards external outputs:

No dependency	Minor dependency	Major dependency	Securisation problem
2	1	0	-1

Item2: Quantity of non-local supply: if more than 50% of supply is sourced locally, 2 points are granted.

Rating

The maximum score is given to production system which contribute to quality food supply and human and plant health. The maximum score granted for this indicator is 4.

Limitations

Reduce the impact on the air quality (A11)

Agroecological dimension (A)

Human and animal health

Description

This indicator refers to the number of practices that aim at reducing the GHG emissions from agriculture systems. Many practices can potentially mitigate emissions such as reduced tillage, land-cover, use of non-fossil fuel, reduced deforestation and forest degradation…

Unit of measurement

This indicator is measured through on item: machines emitting particles. If the number of crossings exceeds 4, no points are granted:

NC (nbr crossing)	4	2	0 or 1
Points	0	2	4

The implementation of GHG emissions mitigation practices can grant up to 2 points.

Rating

The maximum score is given to production system which maintain non-renewable resources, ensure farm autonomy and independence and adapt and act against global warming. The maximum score granted for this indicator is 4.

Limitations

This indicator intends to capture the type of activities and practices that the farm has implemented which have effectively reduced the GHG emissions. However, consensus on best practices for dealing with the challenge of reducing GHG emissions does not yet exist.

Reduce veterinary treatment (A12)

Agroecological dimension (A)

Human and animal health

Description

This indicator serves to check whether practices have been implemented that support animal health (plants or essential oil treatments) and that reduce the need for veterinary treatment.

Unit of measurement

This indicator is measured through 1 item:

Item1: Number of veterinary treatments that gives an average number of treatment based on the number of livestock.

Veterinary treatments	0.5	1	2	
points	8	6	4	0

The use of alternative strategy such as plants or essential oil treatments grants 1 point.

Rating

The maximum score is given to production system which maintain animal well-being and health. The maximum score granted for this indicator is 8.

Limitations

Methodological sheets

SOCIAL DIMENSION

Food production (B1)

Social dimension (B)

Food supply

Description

This indicator looks at the proportion of cultivated area dedicated to human and/or animal food.

Unit of measurement

This indicator is measured through 2 items:

Item1: proportion of cultivated area dedicated to human and/or animal food:

values	points
0%	0
50%	3
85%	6

Item2: if there is a production of legumes, vegetables, fruits, it grants 4 points

Rating

The maximum score is given to production system which has a wide variety of production (crop fields, livestock, vegetables, fruits…). This indicator emphasizes agriculture's strategic role in nourishing a world where population is exploding. The maximum score granted for this indicator is 10.

Limitations

Contribution to the global food balance (B2)

Social dimension (B)

Food supply

Description

This indicator looks more specifically at the cultivated area dedicated to protein plants.

Unit of measurement

This indicator is measured through 1 item:

Item1: Proportion of UAL dedicated to protein production. If the proportion is equal or more than 30%, 5 points are granted.

Rating

The maximum score is given to production system which enable the farm to produce enough protein food to be autonomous and provide food to country of origin and doing so contributing to the food sovereignty. The maximum score granted for this indicator is 5.

Limitations

Production quality (B3)

Social dimension (B)

Food supply

Description

This indicator looks at the production quality which could be linked to geographic indication and/or to specific processes, to livestock nutrition or to organic certification or PGS.

Unit of measurement

This indicator is measured through 3 items:

Item1: Process quality: a production of quality linked to territory (Geographical Indication) or to a specific process grants 3 points each.

Item2: Nutritious quality: a production of quality linked to nutritious quality grants 3 points.

Item3: Organic agriculture or PGS: a production of quality certified by an external organic auditor or by participatory guarantee systems grants 5 points.

Rating

The maximum score is given to production system which produce quality food and have certified quality approach. The maximum score granted for this indicator is 7.

Limitations

Losses and wastes (B4)

Social dimension (B)

Food supply

Description

This indicator relates to food losses that occur during production, post-harvest and processing operations and the actions implemented to limit losses and wastes.

Unit of measurement

This indicator is measured through the accumulation of points granted per actions implemented to limit losses and wastes. Each action, appropriate and good quality storage capacity, social action to limit products losses left in the field, involvement in a program of waste awareness and other, grants 2 points.

Rating

The maximum score is given to production system which adopts actions to limit food waste. The maximum score granted for this indicator is 5.

Limitations

Social and cultural link to food (B5)

Social dimension (B)

Food supply

Description

This indicator relates to actions fostering the link between consumers and producers (direct selling at the farm, farm day, baskets), knowledge about food (cooking classes, recipes based on farm products, contribution to local food network), or production of food not heavily produced or represented (ancient varieties).

Unit of measurement

This indicator is measured through 3 items:

Item1: Action fostering the link between consumer and producer: if such action exists, 3 points are granted.

Item2: Action fostering knowledge about food: if such action exists, 3 points are granted.

Item3: Significant production of food not heavily represented or commercialized: if such production exists, 3 points are granted.

Rating

The maximum score is given to production system which promotes local knowledge about food and direct link with customer to raise awareness and educate consumers. The maximum score granted for this indicator is 5.

Limitations

Services to the territory (B6)

Social dimension (B)

Local development

Description

This indicator relates specifically to services to the territory such as pedagogical farm or agrotourism.

Unit of measurement

This indicator is measured through 2 items:

Item1: Agrotourism: if the farm proposes such services, 2 points are granted.

Item2: Pedagogical farm: if the farm proposes such services, 2 points are granted.

Rating

The maximum score is given to production system which promotes local knowledge about food and direct link with customer to raise awareness and educate consumers. The maximum score granted for this indicator is 3.

Limitations

Direct selling (B7)

Social dimension (B)

Local development

Description

This indicator relates to the production valorization through direct selling to consumers, be it households or local catering.

Unit of measurement

This indicator is measured through 3 items:

Item1: Value of sales in direct selling or proximity channels:

% revenue direct selling		5%	10%	15%	20%
item 1	0	0.5	1	1.5	2

Item2: Proximity selling (less than 80 km) collectively and/or individually: selling collectively grants 2 points while selling individually grants 1 point.

Item3: Sale to local catering grants 3 points.

Rating

The maximum score is given to production system which enable the farm to directly benefit from the added value created by its production and by so, contributing to the circular economy. The maximum score granted for this indicator is 8.

Limitations

Promotion of local resources (B8)

Social dimension (B)

Local development

Description

This indicator looks at the promotion of local resources through the purchase of animals or seeds on the territory, the use of energy produced from local resources and the water recycling or reuse.

Unit of measurement

This indicator is measured through 4 items:

Item1: Local sourcing (purchase or exchange): straw/manure grants and livestock. Local purchase or exchange of straw against manure, and livestock grants 1 point.

Item2: Seed exchange grants 2 points

Item3: Use or production of energy coming from agriculture or from local forest grant 3 points

Item4: Water harvesting grants 1 point

Rating

The maximum score is given to production system which contribute to the circular economy by using or exchanging resources available on the territory. The maximum score granted for this indicator is 5.

Limitations

Promotion of local knowledge (B9)

Social dimension (B)

Local development

Description

This indicator looks at the promotion of local knowledge which is part of a territory identity and contributes to the development of the local patrimony.

Unit of measurement

This indicator is measured through 2 items:

Item1: Contribution to supporting local agroecological or cultural knowledge grants 4 points.

Item2: Maintaining and or developing the local genetic patrimony grants 3 points.

Rating

The maximum score is given to production system which contribute to the development of a given territory through the perpetuation of local knowledge and know-hows. The maximum score granted for this indicator is 5.

Limitations

Farm accessibility (B10)

Social dimension (B)

Local development

Description

This indicator looks at the location of the farm and its accessibility in rural or urban area.

Unit of measurement

If the farm is accessible in rural zone, 2 points are granted. If the farm is accessible in urban zone, 3 points are granted.

Rating

The maximum score is given to farms engaging actions to facilitate access to their farms to participate to community life. The maximum score granted for this indicator is 3.

Limitations

Management of non-organic waste (B11)

Social dimension (B)

Local development

Description

This indicator looks at the non-organic waste management, whether there is any hazardous or dangerous wastes and if and how it is recycled or disposed of. The generation of wastes and in particular of hazardous wastes creates disposal problems that can cause social problems (health risks, noxious odors), environmental pollution (leaching from inappropriate disposal, gaseous emissions) and economic damage (cost of disposal and rehabilitation).

Unit of measurement

This indicator is measured through this matrix:

		Presence	Practice
Type of waste			
Dangerous waste	batteries		
	chemicals, medicines		
	Other		
Heavy waste	Plastics and tyres		

When listed above wastes are not present, 1 point is granted. When wastes are recycled 0.5 point is granted.

Rating

The maximum score is given to production system which contribute to the circular economy by recycling non organic waste or limiting health, social or environmental impact when disposing of. The maximum score granted for this indicator is 3.

Limitations

Innovation network (B12)

Social dimension (B)

Local development

Description

This indicator looks at the involvement of the farm in an innovation network promoting innovative agroecological practices and knowledge sharing.

Unit of measurement

This indicator is measured through 2 items:

Item1: Involvement in innovative network grants 2 points

Item2: Pooling of resources / materials grants 2 points

Rating

The maximum score is given to farm enabling the dissemination of knowledge and new, innovative practices through innovative networks. The maximum score granted for this indicator is 3.

Limitations

Contribution to employment (B13)

Social dimension (B)

Employment

Description

This indicator looks at the job creation on the farm and the origin of seasonal manpower (local or not).

Unit of measurement

This indicator is measured through 3 items:

Item1: Employment: UAL/employee:

UAL/employee	item 1
50	0
20	1
10	2
	3

Item2: Creation of jobs on the farm: if a job was created over the last 5 years, 3 points are granted

Item3: Manpower: if more than 50% of seasonal manpower comes from the local area, 2 points are granted

Rating

The maximum score is given to farm contributing to job creation on the territory. The maximum score granted for this indicator is 6.

Limitations

Collective work (B14)

Social dimension (B)

Employment

Description

This indicator looks at collective work provided through mutual support or farmers group. Common projects such as sharing lands or collective selling points are also taken into consideration.

Unit of measurement

This indicator is measured through 2 items:

Item1: Mutual support and membership to a farmer group each grants 1 point

Item2: Common projects grant 2 points

Rating

The maximum score is given to farm engaged in work mutualisation, farmers group or any action that would foster solidarity inside a community. The maximum score granted for this indicator is 4.

Limitations

Quality of work (B15)

Social dimension (B)

Employment

Description

This indicator is based on the farmer self-assessment of his/her satisfaction at work and the drudgery at work.

Unit of measurement

This indicator is measured through 2 items:

Item1: Satisfaction at work is ranked from 0 to 4. A score of 0 corresponds to a poor satisfaction at work while 4 corresponds to a high satisfaction at work. The points granted depend on the farmer self-assessment of his/her satisfaction at work.

Item2: Drudgery is ranked from 0 to -4. A score of 0 corresponds to a low drudgery while 4 corresponds to a high drudgery. The points granted depend on the farmer self-assessment of his/her feeling of drudgery.

Rating

The maximum score granted for this indicator is 3.

Limitations

Training (B16)

Social dimension (B)

Employment

Description

This indicator looks at the number of training attended by the farmer over a year, and the hosting of young trainees or professionals.

Unit of measurement

This indicator is measured through 3 items:

Item1: Training: this item depends on the number of trainings attended by the farmer over a year. Points are granted to a limit of 3.

Item2: Hosting of young trainees grants 3 points.

Item3: Hosting of groups of professionals grants 2 points.

Rating

The maximum score is given to farms willing to learn and share experience through trainings and willing to mentor or host young trainees or professionals to guide and teach them. The maximum score granted for this indicator is 6.

Limitations

Involvement in the community (B17)

Social dimension (B)

Ethics and human growth

Description

This indicator looks at all actions implemented by the farmer to share and disseminate knowledge in the community through mentoring program or social work, public hosting (schools, group of farmers, villagers…) and his/her participation to association.

Unit of measurement

This indicator is measured through 3 items:

Item1: Involvement in non-farming association on the territory grants 3 points

Item2: Youth mentoring or social experimentation (community work) grants 3 points

Item3: Public hosting grants 3 points

Rating

The maximum score is given to farms willing to learn and share experience through trainings and willing to mentor or host young trainees or professionals to guide and teach them. The maximum score granted for this indicator is 8.

Limitations

Action of transparency (B18)

Social dimension (B)

Ethics and human growth

Description

This indicator looks at the actions implemented to promote the quality process engaged by the farmer and at whether the farmer is member of a PGS or not.

Unit of measurement

This indicator is measured through 2 items:

Item1: Communication on the farmer practices (certification, marketing…) grants 4 points

Item2: Member of a PGS grants 3 points

Rating

The maximum score is given to production system which produce quality food and implement actions to promote such quality. The maximum score granted for this indicator is 5.

Limitations

Quality of life (B19)

Social dimension (B)

Ethics and human growth

Description

This indicator is based on a farmer self-assessment of his/her quality of life.

Unit of measurement

This indicator is measured though the self-assessment of the farmer of his/her quality of life. Quality of life is ranked from 0 to 6. A score of 0 corresponds to a poor quality of life while 6 corresponds to a high quality of life.

Rating

The maximum score granted for this indicator is 3.

Limitations

Remoteness (B20)

Social dimension (B)

Ethics and human growth

Description

This indicator is based on a farmer self-assessment of his/her feeling of isolation (location, social or cultural isolation) and his/her feeling of the quality of access to productive services of the farm.

Unit of measurement

This indicator is measured though the self-assessment of the farmer of his/her feeling of isolation and his/her feeling of the quality of access to productive services of the farm (phone, internet, roads…).

Isolation feeling is ranked from 0 to 4. A score of 0 corresponds to a strong isolation feeling while 4 corresponds to a low isolation feeling.

Quality of access to productive services is ranked from 0 to 4. A score of 0 corresponds to a poor quality of access while 4 corresponds to a good quality of access.

Rating

The maximum score granted for this indicator is 3.

Limitations

Methodological sheets

ECONOMIC DIMENSION

Net Income (C1)

Economic dimension (C)

Profitability and liquidity

Description

Net income is an indicator that helps measure the farm's profitability and financial sustainability over time. It is calculated after subtracting cost of production from income. Income are revenues coming from farming activities and other services such as agro tourism or land lending. Cost of production refers to the costs incurred during a given time period to acquire and transform direct materials, so as to produce and sell revenue generating products, goods and/or services. Total cost of production must be less than the total income.

Unit of measurement

This indicator is measured through 2 items:

Item1: Income and cost of production are computed, then costs of production are subtracted from income which gives a net income. The yearly net income is compared to the annual minimum wage:

Number	Points	Income
1	0	significantly less than annual minimum wage
2	8	less than AMW
3	12	close to AMW
4	16	more than AMW
5	20	significantly more than AMW

Item2: Farmer self-assessment on income which is ranked from 0 to 5. A score of 0 corresponds to a poor income while 5 corresponds to a good income.

Rating

Assess the level of income compared to an average citizen in a given country. The maximum score granted for this indicator is 25.

Limitations

Liquidity (C2)

Economic dimension (C)

Profitability and liquidity

Description

This indicator looks at the existing instruments that could support the farmer in case of shock such as crop losses, climatic damage. Agricultural activities are vulnerable and there is a need to access safety nets, especially in periods of crises. Formal safety nets are those which legally guarantee the farm access to financial, economic or social support (i.e. banks, micro-credit institutions, public social programs, government transfers of food or cash). Informal safety nets provide likelihood of support to the farm to cope with the risk and vulnerable situation is facing, but with no legal guarantee (i.e. family, friends, community groups and non-governmental institutions).

Unit of measurement

This indicator is measured through the accumulation of points granted by access to formal or informal safety nets. Each access to a specific safety net grants 2 points.

Rating

The maximum score granted for this indicator is 10.

Limitations

Market diversification (C3)

Economic dimension (C)

Market vulnerability

Description

This indicator looks at the product diversification. For smallholder farmers, it enables a better use of land through crop rotation and the production of several crops and species simultaneously. it could have a direct impact minimizing soil erosion and increasing its fertility, as well as providing other environmental services, such as natural pest and weed control. Furthermore, it gives the enterprise the possibility to generate income all year round, reducing the dependency to seasonal crops and minimizing the risk of mono-cultivation.

Unit of measurement

This indicator is measured through 2 items:

Item1: Proportion of the most productive subsystem:

Weight	points
50%	10
75%	6
100%	4
	0

Item2: Diversification of products:

Products sold	points
3	5
1	3
	0

Rating

The maximum score granted for this indicator is 15.

Diversification and client relationship (C4)

Economic dimension (C)

Market vulnerability

Description

This indicator looks at the client diversification and relationship. A variety of client decreases risk of unsold production, so does a long-term and formalized client relationship.

Unit of measurement

This indicator is measured through 2 items:

Item1: Client diversification with proportion of main clients:

% of TO of main client	points
33%	7
66%	3
	0

Item2: Client relationship

Type contract	points
contract	3
long term	2
cooperative	2
	0

Rating

The maximum score granted for this indicator is 10.

Limitations

Farm continuity (C5)

Economic dimension (C)

Farm continuity

Description

This indicator looks at structure of the farm (plots structure, development projects, secured access to land) and how easy it would be to transmit it in case there is no family to succeed. The farmer can contribute by assessing the level of certainty his/her farm to exist in 10 years' time.

Unit of measurement

This indicator is measured through 2 items:

Item1: Existence of the farm in 10 years

Continuity	points
Certain	8
Most likely	4
Subsistence if possible	2
Likely disappearance	0

Item2: Structure: a good plots structure grants 3 points, land: land ownership grants 3 points, development projects grant 2 points

Rating

The maximum score granted for this indicator is 15.

Limitations

Gross efficiency of production process (C6)

Economic dimension (C)

Global efficiency

Description

This indicator measures the wealth created by the production process. It looks at the farm capable of converting costs of production into a maximum of money coming from the production.

Unit of measurement

This indicator is computed based on income and costs of production: (income-costs of production)/income:

GE	score
0.1	0
0.2	2
0.3	4
0.4	6
0.5	8
0.6	10
0.7	12
	15

Rating

The maximum score granted for this indicator is 15.

Limitations

Inputs sobriety in production process (C7)

Economic dimension (E)

Global efficiency

Description

This indicator looks at the dependency of a farm regarding inputs: the lower the better in a context of non-renewable resources reduction.

Unit of measurement

This indicator is computed based on inputs consumption in kip / ha UAL:

IS in kip/ha UAL	score
500,000	10
10,000,000	5
20,000,000	3
	0

Rating

The maximum score granted for this indicator is 10.

Limitations