Towards an agroecological transition in Southeast Asia: Cultivating diversity and developing synergies

Jean-Christophe Castella and Jean-François Kibler

June 2015

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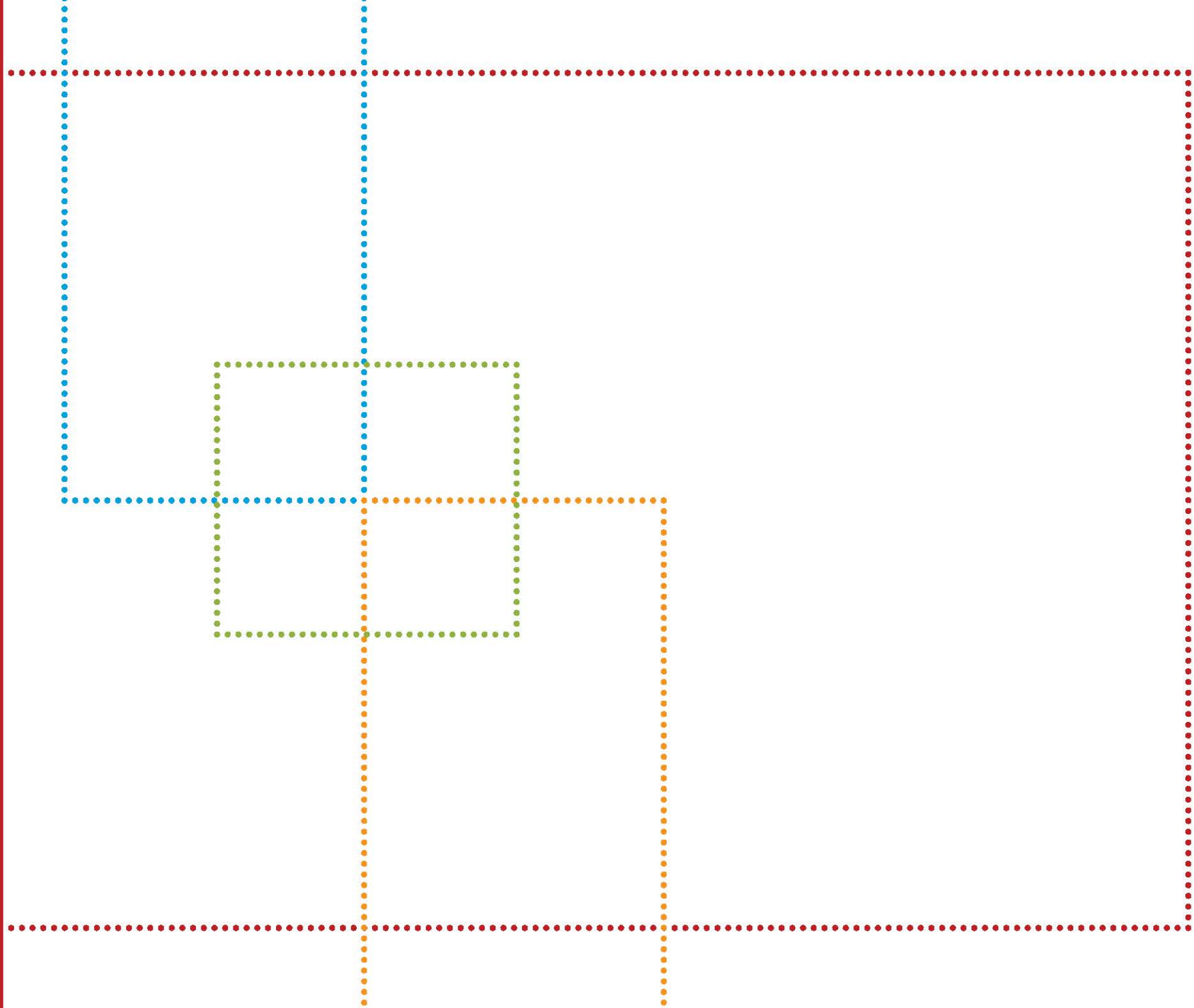

About GRET

Gret is a French development NGO which for 38 years has been acting from the field to policy level, to fight against the poverty and the inequalities. Its professionals intervene on a broad range of topics in order to provide sustainable and innovative responses for a fair development.

About ALiSEA

The Agroecology Learning alliance in South East Asia is an innovative regional initiative aiming at facilitating and organizing exchanges, learnings and cooperation between government, civil society, research institute, universities and private sector stakeholders about agro ecology. Its regional secretariat is located in Vientiane, Lao PDR.

This publication has been produced with the support of ALiSEA and can be obtained from its regional secretariat by contacting Pierre Ferrand (ALiSEA Regional Coordinator) at ferrand@gret.org

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FOREWORD

The world today is facing many challenges, among which demographic pressure and the natural resources of the earth, we are reaching the limits of. The demographic factor is directly linked with the food security issue since it is imperative that we produce more in order to feed our growing population. To this must be added the evolution of alimentary diet which accompany the progressive improvements we have seen in the lives of the poorest segments of the population. Having reached the outer physical limits of our planet, we can only intensify each farming acre's productivity so as to preserve the natural areas still left to us, such as forests, while avoiding the non-sustainable development of marginal lands. When we include the stakes related to nutrition and climate change, it is easy to understand the complexity of the challenges facing us. This is particularly true in Southeast Asia due to the immense demographic pressure felt in most countries[1].

Agroecology provides an answer to this challenge: by increasingly mobilising the natural interactions between soils and plants in cropping systems which act upon their functional complementarity in order to reproduce sustainable natural systems in a farming environment. Agroecology opens the way for more sustainable and efficient intensification than classical farming systems which have gradually move toward artificialization of the environment. Agroecology options are many and varied: conservation agriculture, agroforestry, livestock-aquaculture-agriculture integration, system of rice intensification… For the most part, these options integrate a humanist dimension which gives mankind its full place in the production process. They can also adapt to a great diversity of existing ecological and socio-economic situations. Their progress is, however, slow and laborious due to the technical, cultural and economic inertia which slow down the learning process and delay operational applications on the ground and their conceptual dissemination. This is also due to the fact that over the past half century the great majority of development schools of thought, especially in Southeast Asia, have adopted the principles of the green revolution based on the triad of "improved varieties – chemical fertilisers and pesticides – mechanisation". The entire system of training and extension was slowly built around these ideas which gradually became implicitly part of the dominant "technical culture".

This document, entitled "Towards an agroecological transition in Southeast Asia" is but one step in meeting those challenges.

The French Agency for Development has been funding agroecological projects for the past twenty years with some success. This commitment corresponds to our ambition which consists of contributing to the development of sustainable and fair agriculture to protect the smallholders while reducing poverty and limiting the extension of agriculture onto forest land. In doing so, we also address the double challenges of nutrition and climate change.

Olivier Gilard, AFD Vientiane, June 2015

1 Thus far only Laos is the only exception to this rule, although its unfavourable topography must be taken into account

PREFACE

Starting from the early 1990s, a multitude of national and regional initiatives have emerged in the Great Mekong Sub-Region for supporting ecological intensification of agriculture or agroecology.

The French Agency for Development (AFD) has been a very active supporter of these initiatives, especially in relation to the promotion of Conservation Agriculture and the establishment of the Conservation Agriculture Network for South East Asia (CANSEA).

In addition to its initial focus on Conservation Agriculture and with the objective of widening the scope of agroecology by including all other "schools" such as Organic Agriculture, Agroforestry, Integrated Pest Management, System of Rice Intensification…, the AFD commissioned a study to better understand regional and national agroecology dynamics and initiatives, their strengths and weaknesses as well as the main issues at stake for their large scale dissemination.

The authors conducted this study in 2013 in the six countries of the GMS, through a review of the literature combined with country based consultation workshops in Cambodia, Laos, Myanmar and Vietnam and expert surveys in Thailand and Yunnan-China.

This publication aims at sharing some of the study's key findings, and at providing a broad, yet non-exhaustive, overview of the current situation of agroecology in the Great Mekong Region.

The document is organised in 2 main parts. Section I takes stock of the diversity of practices, actors and experiments related to the main schools identified in the six countries: organic farming, IPM and integrated crop management, home gardens and VAC, SRI, Conservation Agriculture, Agrofrestry.

In Section II, the authors point out common challenges and issues at stake for scaling agroecology up in the region and testify to the interest of regional stakeholders for promoting synergies through networking in order to foster scaling up and visibility of agroecology in the region.

CONTENT

Towards an agroecological transition in Southeast Asia:
Cultivating diversity and developing synergies

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2 Listed by alphabetic order

List of acronyms

AAN	Alternative Agriculture Network, Thailand
ACIAR	Australian Centre for International Agricultural Research
ACISAI	Asian Centre of Innovation for Sustainable Agriculture Intensification, AIT, Bangkok
ADB	Asian Development Bank
ADDA	Agricultural Development Denmark Asia, International NGO
ADG	Belgian NGO Aide au Développpement Gembloux
AFA	Asian Farmer Association
AFD	French Agency for Development
AIT	Asian Institute of Technology
AMAF	ASEAN Ministers of Agriculture and Forestry
ASB	Alternatives to Slash-and-Burn
ASDSP	Association pour le Soutien au Développement des Sociétés Paysannes, Lao PDR
ASEAN	Association of South East Asian Nations
ASFN	ASEAN Social Forestry Network
ASOCON	Asia Soil Conservation Network for the Humid Tropics
CA	Conservation Agriculture
CANSEA	Conservation Agriculture Network for Southeast Asia
CASRAD	Centre for Agrarian Systems Research and Development, Vietnam
CCAFS	CGIAR Research Programme, Climate Change, Agriculture and Food Security
CEDAC	Centre d'Etude et de Développement Agricole Cambodgien, Cambodia
CGIAR	Consultative Group for International Agricultural Research
CIFOR	Centre for international forestry Research
CIPM	Community IPM
CIRAD	Centre for International Research on Agricultural Development, France
CIRD	Cambodian Institute for Research and Rural Development, Cambodia
CMES	Centre for Mountain Ecosystem Studies
COrAA	The Cambodian Organic Agriculture Association, Cambodia
CPWF	Challenge Programme Water and Food, CGIAR
CRP	CGIAR Research Programmes
DNFE	Education Ministry's Department of Non-Formal Education, Thailand
DOAE	Department of Agricultural Extension, Thailand
EU	European Union

FAO	Food and Agriculture Organisation of the United Nations
FFS	Farmer Field Schools
GAA	Welthungerhilfe, German Agro Action
GAP	Good Agricultural Practices
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit, German International Cooperation Agency
GMO	Genetically Modified Organisms
GMS	Great Mekong Sub-Region
GRET	Groupe de Recherche et d'Echanges Technologiques, France
IAARD	Indonesia Agency for Agriculture Research and Development, Indonesia
IBI	International Biochar Initiative
ICM	Integrated Crop Management
ICRAF	World Agroforestry Centre
IFOAM	International Federation of Organic Agriculture Movements
INGO	International NGO
IPM	Integrated Pest Management
IRD	Institut de Recherche pour le Développement, France
IRRI	International Rice Research Institute
ISM	Integrated Soil Management
IWMI	International Water Management Institute
KIB	Kunming Institute of Botany, Yunnan, China
LDD	Land Development Department, Thailand
MAF	Ministry of Agriculture and Forestry, Lao PDR
MAFF	Ministry of Agriculture, Forestry and Fisheries, Cambodia
MARD	Ministry of Agriculture and Rural Development, Vietnam
MI	The Mekong Institute
MOAG	Myanmar Organic Agriculture Movement Group, Myanmar
M-POWER	Mekong Programme on Water, Environment and Resilience
MRC	Mekong River Commission
MSEC	Managing Soil Erosion Consortium
NAFRI	National Agriculture and Forestry Research Institute, Lao PDR
NGO	Non Governmental Organization
NOMAFSI	Northern Mountainous Agriculture and Forestry Science Institute, Vietnam
NPA	Non for Profit Association
NTFP	Non Timber Forest Products

OA	Organic Agriculture
PADAC	Projet d'Appui au Développement Agricole du Cambodge
PADETC	Participatory Development Training Centre, Lao NGO
PAN	Pesticide Action Network Asia Pacific
PEAC	Pesticide Eco-Alternative Centre, Yunnan, China
PES	Payment for Environment Services
PGS	Participatory Guarantee System
PUAC	Peri-Urban Agricultural Centre, Cambodia
RECOFTC	Regional Community Forestry Training Centre for Asia and the Pacific, The Centre for People and Forests
SAEDA	Sustainable Agriculture and Environment Development Association, Lao PDR
SALT	Sloping Agricultural Land Technology
SANRM	Sustainable Agriculture and Natural Resource Management, Vietnam
SDC	Swiss Agency for Development and Cooperation
SEARCA	Southeast Asian Regional Centre for Graduate Study and Research in Agriculture
SEANAFE	South-East Asia Network for Agro-Forestry Education
SIDA	Swedish International Development Agency
SFRI	Soils and Fertilisers Research Institute, Vietnam
SRI	System of Rice Intensification
SUMERNET	Sustainable Mekong Research Network
TEF	Thai Education Foundation, Thailand
TOA	Towards Organic Asia
TOTA	Thai Organic Trade Association, Thailand
UNDP	United Nation Development Programme
VAC	Vuon, Ao, Chuong in Vietnamese which means garden/pond/livestock pen
VNFU	Vietnamese Farmers Union, Vietnam
VOA	Vietnam Organic Association, Vietnam
WASWAC	World Association of Soil and Water Conservation
WCS	Wilde Conservation Society
WFTO	World Fair Trade Organisation
WOCAT	World Overview of Conservation Approaches and Technologies
YAAS	Yunnan Academy of Agricultural Sciences

ABSTRACT

This study provides a stock taking of the practices, actors, experiments (e.g. success stories, constraints to adoption) related to agro-ecology in the Mekong countries. A review of the literature was combined with country-based consultation workshops (Cambodia, Laos, Myanmar, Vietnam) and expert surveys (Thailand, Yunnan-China). During the workshops and consultations, preliminary results from the initial desk studies were presented and discussed with key stakeholders of agro-ecology in each country.

By addressing the whole range of agro-ecological practices such as Conservation Agriculture (CA), as well as also agro-forestry, SRI, integrated agriculture, organic agriculture…, the study identified potential partners (118 research organisations, government agencies, NGOs, private companies in the six target countries) who can enrich a future network with a diversity of experiences. Expectations of the main players in the agro-ecology arena vis-à-vis a new regional agro-ecological network were incorporated in the exploration of governance scenarios for a vibrant regional network.

The national consultations identified a continuum of practices under the term "agro-ecology", which made it difficult for participants to delineate clear boundaries between their approaches or schools. Many projects combine different approaches so as to offer local farmers a panel of technical options they can adapt to their own circumstances, needs and capacities. In addition, both donors' communities and farmers' communities are open to agro-ecology approaches and are willing to combine/integrate them in their practices.

Observed tensions between schools (e.g. organic conversion versus a transition to more sustainable practice) are often limited to leaders of the different schools who tend to defend their position in a very competitive market for donor support. In reality, most farmers adopt a subset of the principles proposed by each school and rarely a complete technical package. As a consequence, trying to delineate precise boundaries between schools will divide more than synergise and may widen the gap between agro-ecology discourses and field/farm realities.

As the goal is to bridge the different schools instead of dividing them, **networking activities should primarily focus on the principles underlying the different practices**. Tenants of the different schools easily agreed on their common principles and the scope of agro-ecology. Some participants noted that while the word "agro-ecology" is new to them they have worked in accordance with its principles for many years using other terms such as sustainable agriculture, smart agriculture, etc. It is therefore important for future action to engage all stakeholders in developing a common understanding of agro-ecology and a shared vision of its future in the Mekong Region.

The consultation addressed the six most significant agro-ecological schools/practices found in the region, namely: organic agriculture, integrated farming, home gardens, system of rice intensification (SRI), CA and agro-forestry. Well known practices such as **Integrated Pest Management (IPM), SRI, CA and agro-forestry have expanded and gained visibility thanks to the top-down support of key international**

institutions, respectively FAO, Cornell University, CIRAD and ICRAF. These international institutions implement their activities through government agencies in the different countries and have organised regional networks with the support of international donors. International and local NGOs joined the movements later on to support extension activities with farming communities. Some project teams also became national NGOs when their project ended in order to maintain their momentum beyond the project period. On the other hand, the **organic movement appears as a bottom-up process with farmers and local activists** getting organised and linking up with other groups to support their activities and to gain recognition. They ultimately federate as members of national associations and up to the International Foundation of Organic Agriculture Movements (IFOAM) which provide them with technical support and certification service.

This **diversity of practices and governance mechanisms should be considered as an asset and not a constraint for facilitating the transition to agro-ecology**. While they all have their strengths and weaknesses, it appears that all thematic networks need to first strengthen their own activities before opening to others. This is particularly the case for **CANSEA, which should consolidate its activities** related to CA before opening up to other schools and stakeholder groups including non-research institutions. With a strong portfolio of projects and recognised achievements it will be much easier to engage with others in the future with the support of a regional agro-ecology network or federation of networks.

Such **a regional umbrella to agro-ecology movements** is deemed necessary (i) to open existing initiatives to other schools and stakeholder groups, (ii) to provide more flexibility and reactivity to the existing 'top-down' networks and (iii) to strengthen existing national agro-ecological networks and develop synergies with the regional thematic networks.

Lastly, during the consultations, key stakeholders agreed that priority should be given to the issues faced by smallholder farming systems and only deal with agribusinesses in relation with their interactions with smallholders or impacts on family farming. The purpose of a future regional agro-ecology learning alliance should be to accompany the agro-ecology transition in the region, i.e. supporting smallholders in transitioning from their current practices to agro-ecology techniques through gradual transformation of their farming systems.

Rain fed rice cultivation, Northern Rakhine State, Myanmar

INTRODUCTION:

A NON-EXHAUSTIVE REVIEW OF AGROECOLOGY EXPERIENCES

1. AGROECOLOGY: AN UNIFYING CONCEPT COVERING A DIVERSITY OF SCHOOLS

As a polysemic concept, agro-ecology is understood in many different ways according to one's background and experience. For the purpose of this study, a common "scope of agro-ecology" was proposed by team members located in the different countries of the Mekong Region, and was used for guiding the literature review and stakeholder consultations. A practical way of addressing the scope of agro-ecology was to identify key principles that would guide and unify the stakeholders involved. Five historical principles have been defined by Miguel Altieri for agro-ecology. They mainly apply to the farming systems and agro-ecosystem levels.

Agro-ecology: historical principles (Altieri 2005)

1. Enhanced recycling of biomass, optimising nutrient availability and balancing nutrient flows.

2. Securing favourable soil conditions for plant growth, particularly by managing organic matter and enhancing soil biotic activity.

3. Minimising losses due to flows of solar radiation, air and water by way of microclimate management, water harvesting and soil management through increased soil cover.

4. Species and genetic diversification of the agro-ecosystem in time and space.

5. Enhanced beneficial biological interactions and synergisms among agro-biodiversity components thus resulting in the promotion of key ecological processes and services.

Additional principles have been formulated, e.g. by Stassart et al. 2012. They aim at widening the scope of agro-ecology to include such considerations as food system, biodiversity, agro-ecological transition, resilience and adaptability and participation of the whole society. We mention here four of these principles.

Agro-ecology: some additional principles

1. Valorise agro-biodiversity as an entry point for the (re)conception of agriculture and food systems guaranteeing autonomy of farmers and food sovereignty.

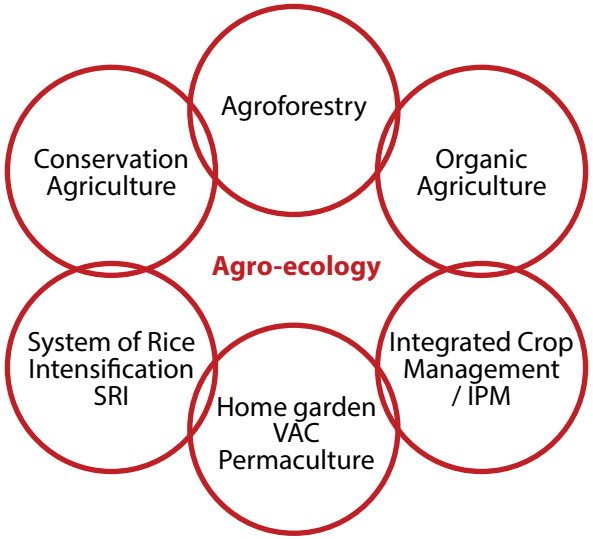
2. Valorise knowledge diversity (local/traditional know-how and practices, layman knowledge and expert knowledge) in the definition of research problems, the definition of people concerned, and in finding solutions.

3. Work on agro-ecosystems with a perspective of fostering agro-ecological transition in the long term, giving importance to properties of adaptability and resilience.

4. Promote participatory research driven by the needs of society and practitioners, while at the same time guaranteeing scientific rigor.

The next section takes stock of the status of the six main agro-ecology practices found in the Mekong Region, namely: organic agriculture, integrated farming/Home Gardening / VAC, system of rice intensification, conservation agriculture, Integrated Pest Management, and agro-forestry (Figure 1).

Figure 1. Main agro-ecological practices in the Mekong countries



2. AGROECOLOGY IN SOUTHEAST ASIA: A HISTORICAL PERSPECTIVE

Farmers in the Mekong region have historically practiced subsistence-based integrated farming combining crops, livestock and trees in complex landscape mosaics. Paddy rice grown in the lowland and upland rice produced as part of long term rotational agriculture have long been the main staple food all over South East Asia. Agricultural practices relied on strong ecological knowledge built over many generations by subsistence farmers. Shifting cultivation systems with an integrated fallow period for restoring soil nutrients, home gardens characterised by a high biodiversity, the practice of agro-forestry based on nitrogen-fixing trees were all based on agro-ecology principles. Shifting cultivation, once widely practiced by upland farmers all over the region has largely vanished due to increased population pressure combined with government policies for the conversion of temporary land use to permanent land use. All countries in the Mekong Region have engaged in a process of so-called agriculture 'modernisation' by applying the practices of the Green Revolution to export-led mono-cropping. Southeast Asian countries have reached different stages in the process of agricultural intensification and also in land degradation and biodiversity depletion associated with the generalisation of input-intensive cropping practices. Depending on their respective history, demographic changes, economic development patterns and agro-ecological potential of their landscapes, agriculture intensification has evolved at a different pace and had variable ecological impacts throughout the region.

In the 1970s, the *Thai* government favoured the emergence of an export-led commercial agriculture while the *Chinese* government faced with increasing demographic pressure promoted the intensification of agriculture to preserve food security. Different development priorities led to similar patterns of agricultural intensification based on new crop varieties and intensive use of chemical inputs. But in Thailand, alternative agricultural movements, such as the Alternative Agriculture Network (AAN) established in the 1980s by farmers and local non-government organisations (NGOs) were left some political space to exist while in China alternative practices were not officially allowed.

In *Vietnam* and also, to a lesser extent in *Cambodia* and Laos, the **end of the 1980s** marked the end of subsidised 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. The countries that were less opened to international market were less impacted by the Green Revolution, leaving their most remote regions with their traditional subsistence agricultures, and therefore adopted alternatives practices because of the lack of agrochemical supplies rather than as reaction to environmental concerns.

In the 2000s, "**modern agro-ecology**" initiatives in the Mekong countries were largely pushed by national and international NGOs as part of a global movement that spread across the region. This countermovement to the global trend of agricultural intensification promotes more sustainable land uses, production of healthier food, and conservation of traditional knowledge and practices. More recently, these practices have been valorised as part of "climate smart" agricultural strategies.

3. TAKING STOCK OF AGRO-ECOLOGY EXPERIENCES IN THE REGION

A non-exhaustive review of agroecology experiences in the Mekong Region, which is reported here, was conducted as part of the feasibility study for a new project funded by the French Agency for Development (AFD) to support the Agroecology Transition in the Mekong Region. Another component of the study, which is reported elsewhere[3], aimed at analysing existing regional networks related to the management of natural resources and drawing lessons for the governance of a future agroecology learning alliance.

3 Castella J.C. and Kibler J.F. 2015. Actors and networks of agro-ecology in the Greater Mekong Subregion. Technical Notes, AFD, Paris.

Preparation of liquid compost, Cambodia

LITERATURE REVIEW

In each country, we listed past or current initiatives in the domain of agro-ecology, including institutions, projects and contact persons involved in agro-ecology. The description and analysis of agro-ecology experiences addressed the following aspects:

- Characterisation of main stakeholders (government, NGOs, farmers' organisation, funding agencies…) active in the promotion of agro-ecological practices,
- Assessment of the level of adoption of agro-ecological practices by farmers (particularly looking at the level of adoption « without » or « after » project support), constraints faced by stakeholders for strengthening effective adoption of agro-ecological practices in the country,
- Inventory of gaps in literature reviews to be filled through consultation workshops or expert interviews.

CONSULTATIONS

Questionnaires were sent to the contact persons identified during the previous phase together with invitations to take part in national consultation workshops. The information initially available from the literature review was gradually refined using participant responses to the questionnaires.

Expert consultations (Thailand, Yunnan) and consultation workshops (Cambodia, Laos, Myanmar, Vietnam) were then conducted in 2013. They helped update and validate the information gathered from the literature. They were also used to assess the interest of the different partners in taking part in a regional network on agro-ecology, i.e. participants' expectations towards a potential regional network on agro-ecology.

Between 13 and 25 participants took part in the national consultation workshops (Table 1). The relatively limited number of participants allowed for real and lively discussions to take place beyond the individual presentations of participants activities related to agro-ecology.

Altogether, 105 persons were involved in the consultation process (both consultation workshops and expert consultations) and 118 institutions with different status (i.e. governmental, non-governmental, civil society, private companies) were identified as involved in agro-ecology in the region. Country reports were finally incorporated into a comparative analysis across the six target countries. Lessons learnt from existing institutional mechanisms were then used to develop scenarios for a future agro-ecology network in the Mekong Region that were discussed during a consultation workshop organised in Vientiane on December 6, 2013 with partners from all GMS countries.

A list of all institutions participating in the consultation workshops is enclosed in annex of this report.

Rural market,
Northern Rakhine State,
Myanmar

SECTION I.

DIVERSITY OF AGROECOLOGY EXPERIENCES, PRACTICES AND ACTORS IN THE MEKONG REGION

1 ORGANIC AGRICULTURE

INTRODUCTION

Organic agriculture aims at sustaining the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and natural cycles adapted to local conditions, rather than the use of chemical inputs with potentially adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved.

In the Mekong countries, organic production is dominated by **rice, vegetable, coffee, tea and fruit trees**. Some wild products collected from forests and fallow lands, which are traditionally consumed by local farmers, are also certified and sold as organic.

In *Thailand*, Green Net and the Earth Net Foundation estimate that the area under organic farming increased from just over 2,100 ha in 2001 to 21,701 hectares in 2005 and 34,079 hectares in 2012, representing 0.16 percent of the total agricultural land area (21 million hectares) and employing an estimate of 7,405 farming families (GreenNet 2012 - http://greennet.or.th). While still marginal in terms of area and production volume, Thai organic agriculture has been growing at a steady rate fuelled by export opportunities. According to the 2010 IFOAM report, the certified organic area in Vietnam was some 21,000 hectares, equivalent to 0.2% of the total cropped area of which 7,000 ha was for

Organic Agriculture principles (http://www.ifoam.org)

1. Principle of Health: OA should sustain and enhance the health of the soil, plants, animals, humans and the planet as one and indivisible (i.e. this implies to avoid the use of fertilisers, pesticides, animal drugs and food additives that may have adverse health effects).

2. Principle of Ecology: OA should be based on living ecological systems and cycles, work with them, emulate them and help sustain them (i.e. production is to be based on ecological processes and recycling).

3. Principle of Fairness: OA should build on relationships that ensure fairness with regard to the common environment and life opportunities (i.e. natural resources used for production and consumption should be managed in a way that is socially and ecologically just and should be held in trust for future generations).

4. Principle of Care: OA should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the environment (i.e. no GMOs).

aquaculture (shrimps mainly). *China* is the third largest producer of organic products. Organic farming is practiced on 2.3 million ha, which represents 2 % of the total agricultural area of China. The organic food industry is growing by 30% per year. Despite discrepancies between this information obtained from our country studies and the data available from the FiBL-IFOAM survey presented in Table 2, it is clear that **organic agriculture still represents a very small percentage of the overall agricultural areas (between 0.1 and 0.3%)**. This data will need to be gradually refined by the future regional project.

Organic vegetable growing, Cambodia

The status of organic agriculture in the six countries under study results from a combination of (i) the historical trends presented above that determine the experience and strength of national organic agriculture movements, (ii) the level of support provided by the governments to organic agriculture in the form of policies, subsidies or certification schemes and (iii) support from international NGOs and development programmes to less advanced countries.

Table 1. Status of organic agriculture in Mekong countries in 2011

Country	Area (ha)	% Organic	Producers
Cambodia	8 284	0.15	5 182
China	1 900 000	0.36	
Laos	3 843	0.16	2 178
Myanmar	202	0	13
Thailand	34 830	0.18	7 405
Viet Nam	23 400	0.23	4 385

A REVIEW BY COUNTRY

In Cambodia, Lao PDR, Myanmar and Vietnam organic agriculture emerged in the 2000s, pioneered by international NGOs and Development agencies that supported national agencies and/or NGOs in their endeavour to organise organic farmers groups and cooperatives, promote local and national organic markets and develop certification schemes. In some cases, the project was turned into an NGO to sustain activities after the end of project funding period. tions and the environment (i.e. no GMOs).

CAMBODIA

In **Cambodia** several programmes led by GIZ and Oxfam Quebec supported the *Centre d'Etude et de Développement Agricole Cambodgien* (CEDAC) in promoting organic rice production among farmers since 2003. Organic rice producer groups and associations were established in the framework of the Community Based Rural Development Programme which GIZ implemented in collaboration of CEDAC. It is interesting to observe that organic rice production was often seen as the second step after the adoption of SRI practices, which encourage farmers to reduce the use of chemical pesticides and fertilisers. Encouraging wildlife protection, the Ibis rice programme of the *Wilde Conservation Society* (WCS) supported the establishment of a village marketing network, which buys organic rice from farmers at a premium price. The Ibis rice is labelled as a "Wildlife Friendly" brand, following the certification standard of Wildlife Friendly Enterprise Network. In 2001, the *Peri-Urban Agricultural Centre* (PUAC) was created by the Belgian NGO Aide au Développpement Gembloux (ADG) to strengthen support to the production of high added value and chemical residue free vegetables and the organisation of the commercialisation channel of the farmer production to hotels, restaurants and supermarkets in Phnom Penh. In 2009 the ADG project was converted into an agricultural cooperative and the PUAC became an autonomous agency legally registered at the Ministry of Agriculture, Forestry and Fisheries (MAFF). In 2009, *the International Volunteer Centre of Yamagata* (IVY), a Japanese NGO, started to support two village Women's Association Farmers Associations which were engaged in organic vegetable cultivation in Svay Rieng Province. An agricultural cooperative was set up that today includes 544 vegetable producers and buys three tons of vegetables per month. The *Cambodian Organic Agriculture Association* (COrAA - www.coraa.org) was created in 2006 to federate the many initiatives of this kind in a national organic agriculture movement that is government recognised and supported.

LAOS

In **Laos**, a Swiss NGO, *Helvetas* has been supporting the emergence of organic rice production and corresponding market since 2005 while *CIRAD*, a French research institute, supported organic coffee production in the Boloven Plateau (Paksong) and the geographic indication for 'kay noy' rice variety. Both worked in close partnership with the Ministry of Agriculture and Forestry (MAF). They were instrumental in drafting a decree on organic agriculture standards and creating the Clean Agriculture Development Centre (CADC) and a Lao Certification Body (LCB) as part of the Department of Agriculture (MAF) in 2005. Other INGO, like *OXFAM* or *CCL* (*Comité de Coopération avec le Laos*), worked directly with local communities or supported them in partnerships with national Non-Profit Associations (NPA) such as SAEDA, ASDSP or PADETC.

As a whole, these organisations have promoted organic farming systems through:

- Capacity building of agricultural department staff on technical and marketing issues;
- Support to producer groups and farmer organisations;
- Development of an organic value chain, processing agricultural products through the supply of appropriate equipment; and
- Certification and standardisation of agricultural products (including organic and fair trade certifications).

There is *no formal national network on organic and sustainable agriculture* but rather many partnerships or relationships between government agencies (MAF) and NGOs or between NGOs and NPAs.

MYANMAR

In **Myanmar**, organic farming is also recent despite failed attempts to sell organic sugar to the European market in the early 2000s. The sugar factory passed the inspection for certification but the country was hit by US and EU economic sanctions for political reasons and could not export its products.

As in Cambodia and Laos, the most recent attempts to develop organic agriculture in Myanmar were led be international NGOs, such as *GRET*, which supported local NGOs and farmer groups. The *Myanmar Organic Agriculture Movement Group* (MOAG) provides an umbrella for organic farming initiatives at the national level. MOAG is the only national organisation to issue *organic certificates* in Myanmar other than foreign certification agencies. There are three types of certificates: Organic Certificate for organic inputs, Organic Certificate for organic farming, and Organic Certificate for organic processing. Up to now, two companies have already applied for organic inputs production (e.g. organic fertilisers) and 12 farms and orchards for organic farming certificates. MOAG is working with *Myanmar Green Network* which is a group working to improve the environment nationwide. MOAG is providing training support to stakeholders of the organic movement in collaboration with national NGO, INGO and occasionally other interested public organisations.

On the private sector side, the *Myanmar Fruits, Flower, and Vegetables Producers Entrepreneurs' Association* (MFFVPE) which was established in 2006 and is affiliated to Union of Myanmar Federation of Chamber of Commerce and Industry (UMFCCI) provides control on the marketing of organic products.

Between land and water, rice cultivation, Ayeyarwaddy Delta, Myanmar

VIETNAM

In **Vietnam**, organic agriculture is also a new concept as consumers' awareness about food safety is still limited. In 2005, a Danish NGO, *ADDA* was funded by DANIDA to start the largest initiative in organic farming in collaboration with a national mass-organisation, the *Vietnamese Farmers Union* (VNFU). The project aimed at increasing awareness and knowledge of farmers on organic agriculture, and assisting them to produce, certify and market organic products. The Adda-VNFU project established 25 farmer groups producing organic products in nine provinces. On an area of 70 ha they produced organic vegetables, rice, orange, litchi, grapefruit, tea and fresh water fish. They also trained 120 farmers on organic production. The ADDA-VNFU organic project collaborates with *MARD* to support development of national organic standards and certification. In 2006 the government set up a national standard to guide organic productions. ADDA-VNFU also developed a *Participatory Guarantee System* (PGS) to promote organic vegetables for the domestic market. Since 2008, other international NGOs such as IUCN/SNV (shrimp farming), Veco (vegetables), and research institutions such as CIRAD (tea) are engaged with national partner institutions in clean agricultural practices, value chain development through different certification mechanisms: PGS, Geographical Indication, social certification and trademark registration. The private sector is also engaged in the organic sector with companies directly involved in farming organic products for export (e.g. *Hiep Thanh - Ecolink*). The increasing number of stakeholders involved in organic agriculture are now organised in a *Vietnam Organic Association* (VOA).

THAILAND

In **Thailand**, the *Alternative Agriculture Network* and later on the *Sustainable Agriculture Foundation Thailand* spearheaded organic farming in the 1990s. Farmers' groups throughout north-eastern Thailand developed sustainable agriculture techniques based on the local ecology and expanded their positive impacts by training and educating other members of their communities through farmer field schools (FFS). In addition, joint activities with *La Via Campesina, Grain, ENGAGE*, and a number of other international non-governmental organisations provide opportunities to publicise the situation of Thai organic farmers at the global level. The *Green Net Cooperative* has been registered as a cooperative under the Ministry of Agriculture and Cooperatives since 1993 to serve as a marketing channel for small-scale organic farmers by combining organic agriculture and fair-trade as its core policies. Green Net is a member of the International Federation of Organic Agriculture Movements (IFOAM) and the World Fair Trade Organisation (WFTO). The *Earth Net Foundation* received registration as a non-profit organisation in 2000. The Foundation's main objective is to promote and support initiatives related to the production, processing, marketing and consumption of organic food, natural products and ecological handicrafts. Their main targets are small-scale producers and marginalised farmers. Beyond promotion of organic agriculture in Thailand, these organisations have supported the emergence of organic movements in Yunnan and Lao PDR through exchange visits and collaboration with International NGOs active in the neighbouring countries. The Thai Organic Trade Association (TOTA) was founded in 2005 with a common goal of enhancing the organic movement in Thailand. Over the years, the TOTA has become an important player in the country's organic business. The TOTA members consist of private companies involved with certified organic production and trade.

Yellow sticky traps against cruciferae flee beetles, Siem Reap Province, Cambodia

The *agribusiness sector* also initiated organic projects. Local entrepreneurs with linkages to overseas markets have seen business opportunities in the emerging organic markets. As they often lack knowledge on organic production, they engage local researchers and government agencies in helping them with farm conversions. They also tend to use services of foreign organic certification bodies as suggested by their overseas trading partners. These early pioneers appear to be large-scale businesses with export facilities. However, as the domestic market emerges, an increasing number of smaller local businesses and entrepreneurs come onto the scene. In the last few years, several new organic business projects were launched and have become important actors in the Thai organic movement.

The active engagement of the *Thai government* in organic agriculture since the early 2000s helped farm conversion to organic practices for both domestic market and exports. Since 2005, Thailand's National Organic Development Plan is supported by various government agencies from three main Ministries: Ministry of Agriculture and Cooperative, Ministry of Commerce, and Ministry of Science and Technology as coordinated by the National Economic and Social Development Board.

In **Yunnan**, as in other parts of China, organic agriculture is expanding rapidly. In China, organic production is mainly targeted to overseas markets and controlled by overseas-based certification companies. In the case of Yunnan, the production of organic foods and other products is mostly targeted to the Chinese market. However, certification processes are too costly, and some producers cannot renew their certification. It is interesting to observe that these producers still use the term "organic", relying on the confidence they have been able to build up among their clientele. Organisations like the *Pesticide Eco-Alternative Centre* (PEAC) are trying to counter this situation by establishing *Participatory Guarantee Systems* (PGS). PEAC, established in 2002, is a non-profit NGO dedicated to the collection, extension and advancement of ecological alternative forms of pest control, elimination of chemical pesticides and development of ecological and organic agriculture, so as to protect both human and environmental health and further promote sustainable development. Policy advocacy is aimed at raising the awareness of decision-makers for pesticide risks. PEAC counts among its major successes the banning of a number of chemical pesticides. PEAC is committed to building up an action network for the reduction of pesticide use and its risks. Its activities were initially limited to Yunnan, but have by now spread all over China. PEAC is strongly interested in forming an international network with the commitment to reduce chemical pesticide use. A previous visit to Thailand during which PEAC staff learned about the strong support of organic farming by the government through paying certification fees for farmers, for example, has shown them the value of learning from different countries in the same region. Similar initiatives by non-profit organisations are worth noticing such as the *TianZi Biodiversity and Development Centre* established near Jinghong in Xishuangbanna or the Centre for Biodiversity and Indigenous Knowledge based in Kunming, which promotes organic and traditional products, conservation of traditional land uses as well as conservation of traditional livelihoods along with the environment that sustains them.

In addition to smallholder agriculture, there is a large number of *organic farms* in Yunnan. The biggest farm, *Huabao Qing Organic Farm*, located just outside of Kunming, is mainly catering to the domestic market. *Manlao River Organic Coffee Plantation*, located near Pu'er in SW Yunnan, 500 km away from Kunming, was founded in 2004 and produces organic coffee on 100 ha out of a total of 10,000 ha of farmland.

Upland rain fed rice cultivation, Houaphan Province, Lao PDR

COMPARATIVE ANALYSIS

The comparative analysis in the six countries shows that organic agriculture emerged recently with the notable exception of Thailand. Volumes and areas of production are still marginal in all countries although they are expanding rapidly, especially in China, under the pressure of better informed customers and export-market opportunities. Most stakeholders in the organic sector started their activities during the past decade and are gradually getting organised with the support of relevant government agencies. In all countries, except Laos, organic agriculture associations have been created to coordinate the different initiatives.

Organic certification and regulation have been playing a key role in the expansion of the organic sector. National networks are in most cases organised around certification schemes which, however, are applied mainly to products for export in order to gain the confidence of overseas consumers. In the domestic market, very few organic products are certified as the cost for independent certification would greatly increase their organic price premium. Other mechanisms for building trust between producers and consumers are being explored to overcome these issues, such as Participatory Guarantee Systems (PGS). They are, however, isolated initiatives or still in their initial stages of testing in the region (e.g. regional ADB project on PGS).

Since 2013, the organic agriculture sector has also benefited from the support of the IFOAM-Asia, aimed at coordinating activities in the region from its office in South Korea. IFOAM Asia is planning to work in synergy alongside Global IFOAM to more effectively further Asian organic movements. It is a regional self-organised and non-profit structure, a membership-based organisation, open to all IFOAM affiliates and other stakeholders of Organic Agriculture in Asia.

Towards Organic Asia (TOA) is a project-based regional network aimed at strengthening organic agriculture in the region though partnerships with national NGOs focusing specifically on organic agriculture. For example, PADETC in Laos is one of its partners. Since 2011, Towards Organic Asia is managed by the coordinating team based at School for Wellbeing Secretariat Office in Bangkok, and works in collaboration with CCFD – Terre Solidaire, Thailand Green Market Network and the Suan Nguen Mee Ma social enterprise.

Other national or regional networks which also contribute to the development and expansion of organic and sustainable farming systems have been identified. Their main areas of intervention are: civil society strengthening (civil society partnership development effectiveness, NPA networks), farmers' organisations (Asian Farmer Association based in the Philippines), value chain development (Sub-working group on agro-business in Laos) or pesticide use reduction (Pesticide Action Network Asia Pacific). A big challenge of these organic networks is to differentiate themselves from initiatives led by international agrochemical companies (e.g. Syngenta, Monsanto) that use the same extension approaches (e.g. FFS) and slogans (e.g. rationalising input use, climate smart agriculture) to promote their products with smallholders.

Organic agriculture in a nutshell

In Southeast Asia, organic production is dominated by rice, vegetable, coffee, tea and fruit trees.

Organic agriculture emerged only recently with the notable exception of Thailand. Volumes and areas of production are still marginal in all countries.

Organic certification and regulations have been playing a key role in the expansion of the organic sector with new initiatives emerging such as Participatory Guaranty Systems.

Organic networks face the big challenge of differentiating themselves from initiatives led by international agrochemical companies.

Organic Market, Xieng Khouang, Lao PDR

2 FROM INTEGRATED PEST MANAGEMENT TO INTEGRATED CROP MANAGEMENT

INTRODUCTION

Integrated agriculture provides high quality food and other products by using natural resources and regulating mechanisms rather than polluting chemical inputs to secure sustainable farming. The agronomic techniques and biological / physical / chemical methods are carefully selected and balanced taking into account the health of people (i.e. farmers and consumers) and of the environment.

Integrated Pest Management (IPM) is defined as "the use of all appropriate techniques of controlling pests in an integrated manner that enhances rather than destroys natural controls. If pesticides are part of the programme, they are used sparingly and selectively, so as not to interfere with natural enemies" (Speerling and Scheidegger, 1995). IPM programmes use observation-based information on the life cycles of pests and their interactions with the environment. This information, in combination with available pest control methods, is used to manage pest damage by the most economical means, and with the least possible risk to people and the environment. IPM takes advantage of all appropriate pest management options including, but not limited to, the judicious use of pesticides. In contrast, organic food production applies many of the same concepts as IPM but limits the use of pesticides to those that are produced from natural sources, as opposed to synthetic chemicals.

FAO introduced IPM concepts through Farmer Field Schools (FFS) in Mekong countries (Thailand, Laos, Vietnam and Cambodia) since 1992-98 based on previous experience in Indonesia. In 1986, a serious infestation of brown plant hopper (BPH) damaged almost the entire rice crop in central Java. The Government of Indonesia asked experts to investigate this problem. They explained that when insecticides are sprayed in rice fields the beneficial insects are killed leading to uncontrollable outbreaks of destructive insects. The FAO Inter-Country Programme for Community Integrated Pest Management (CIPM) was then designed to build farmer's skills in taking more immediate and self-reliant crop management decisions themselves. This marked the beginning of the FAO-IPM activities at the regional scale. In each country, including Yunnan Region in China (not reported below), *FAO worked through relevant government agencies under Ministries of Agriculture*.

Farmer field schools (FFS) were systematically used as an extension approach. FFS is a learning process based on farmer observation and the analysis of the agro-ecosystem. Although the FFS was originally designed and applied in the context of IPM projects, it has been adapted to other development issues. Particularly important from the perspective of agro-ecology was the work on 'living soils'. This became a topic in regular IPM Field Schools, and in some cases it became the basis for FFS on *Integrated Soil Management* (ISM). The aim of the ISM training, just like IPM, was to get farmers and extension agents to apply a scientific process (i.e. simple experiments, collection and analysis of data) that helps them understand interactions between different elements of the local agro-ecosystem and the impact of different interventions.

Gradually, the national IPM programmes shifted to *integrated crop management* (ICM), as they included the good use of fertilizers, identification of pests, theirs impacts and controls and post-harvest techniques. In all countries (except China where the FAO-IPM programme was not implemented), national IPM networks, initially supported by FAO and managed by government extension systems gradually expanded their membership to include international and national NGOs and *diversified their activities from pest management to crop and soil management*.

Inspecting for pests and diseases, Siem Reap Province, Cambodia

A REVIEW BY COUNTRY

Integrated Agriculture principles (http://www.iobc-wprs.org/ip_ipm/IOBC_IP_principles.html)

1. Integrated agriculture is applied holistically (i.e. relies on ecosystem regulation)
2. External costs and undesirable impacts are minimised (e.g.: nitrate contamination, erosion are minimised)
3. The farm is the unit of implementation (i.e. strategies such as balanced nutrient cycles, crop rotations and ecological infrastructures become meaningful only if considered over the entire farm)
4. Farmers' knowledge must be regularly up-dated (e.g.: regular trainings)
5. Stable agro-ecosystem characteristics must be maintained (i.e. least possible disturbance)
6. Nutrient cycles must be balanced and nutrient losses minimised (e.g. leaching), replacement of nutrient exports through sales of commodities, and recycling of farm organic residues
7. Intrinsic soil fertility must be preserved and improved (i.e. fertility is a function of balanced physical soil characteristics, chemical performance and balanced biological activity, including fauna)
8. Integrated Pest Management is used for crop protection (e.g. priority to preventive methods)
9. Biological diversity enhanced (i.e. reduction of pesticide use thanks to well managed biological diversity)
10. Total product quality is sought (i.e.: including non-visible production and social criteria)
11. Welfare of animals must be guaranteed

CAMBODIA

In **Cambodia** the pilot phase of the national IPM programme carried out by the Department of Agronomy and Agricultural Land Improvement (DAALI) of MAFF started in 1993 with assistance and financial support from IDRC, IRRI and FAO. In 1997, Cambodia joined 12 other countries as part of the FAO Southeast Asia Regional Vegetable IPM Programme with core technical and financial support for farmer training from FAO and various donors such as World Bank, UNDP, DANIDA, AusAID and the EU. By 2000, the programme had spread to 14 provinces, focusing on rice, vegetables, mungbean, chili and cassava productions. According to MAFF (2012), 160,000 farmers were trained through the national IPM programme, involving 2530 farmers-trainers, and 673 district staff trainers from the agricultural department. At the end of the FAO regional programme in 2001, Srer Khmer - meaning Field of Cambodia – was established by a group of former FAO Community IPM Programme staff as a local NGO providing support to the national IPM programme. Others organisations have also contributed to the continuation of the programme beyond FAO initial support. For example, DANIDA IPM training project - reduction in use of hazardous insecticides in rice - has been implemented In Cambodia since 2000. The impact evaluation of the project conducted in 2004 showed mixed results with the reduction of 43% in insecticide use, down from 2.9 to 1.6 applications per season and a decrease of pesticide volume of 64% mainly of hazardous pesticides. However the evaluation reports also large differences in pesticide volumes between provinces. Yield and profits were not significantly affected by training, exposed farmers showed a pesticide use similar to non-FFS farmers, and finally a limited diffusion of knowledge and practices within-village (Van den Berg, 2004). The DANIDA IPM project ended by the establishment of Agriculture Technology Services Association (ATSA) which aims to carry over the achievements, impacts, networks and structures created during the five year project.

LAOS

In **Laos**, FAO started to promote IPM practices in 1996 in collaboration with the MAF (plant protection research centre) by the establishment of Farmers' Field Schools (FFS) in Vientiane capital for paddy rice production systems. The promotion and development of IPM practices for vegetable production systems started four years later (2000) also in Vientiane Capital. Since then many international/national projects (e.g. ABP, AgriSud, SNV, Oxfam Belgium with ASDSP) collaborated with local agricultural authorities to promote IPM practices. In 2013, *the IPM programme was active through the Provincial Agriculture and Forest Offices (PAFO) in all provinces* for paddy rice production systems and in eight provinces for vegetable production systems (Vientiane, Vientiane Capital, Xieng Khouang, Oudomxay, Luang Namtha, Phongsaly, Sayaburi and Champassak).

Making Neem leaf solution, Siem Reap Province, Cambodia

MYANMAR

In **Myanmar**, IPM trials were conducted throughout the country after 1986, by the IMP Unit of the Plant Protection Division of Myanmar Agriculture Service. In *2003, UNDP-HDI programme adopted the Farmers' Fields School* (FFS) approach to build the capacity of farmers to learn pest management and the IMP approach. With assistance from UNDP/FAO FFS-based IPM was diffused by the Agriculture Department. The approach appeared to be top down by calling upon the government head office to offer farmers FFS trainings on IPM. Later on the FFS-based IPM training and farmers capacity building process were primarily carried out by the UN-systems agencies such as FAO, UNDP and NGOs. World Concern Myanmar, Yangon –based INGO, worked with IPM programme from 2005 to 2012. Gret has also introduced IPM in Northern Rakhine state between 2005 and 2008 through a Farmer Field School approach addressing both rice and vegetable production (IPM was one of the components of the FFS curriculum).

Installing fruit fly traps, Siem Reap Province, Cambodia

THAILAND

In **Thailand**, FFS-based IPM was also promoted by FAO since *the end of the 1980s*. In the 1990s, however, IPM implementation slowed down to nearly nil due to technology transfer-oriented approaches by entrenched plant protection and extension systems, as well as close and mutually-beneficial relationships between many government staff and the agrochemical industry. In many agriculture intensive regions, *private extension services provided by agrochemical companies pushed farmers to an ever increasing use of pesticides*, trapping farm households in a treadmill of insect resistance and debt. Faced with increasing environmental and economic problems due to pesticide abuse, *IPM principles were revived in the later part of the 1990s*. The Ministry of Education, with support from FAO-CIPM and *Thai Education Foundation* (TEF), pioneered IPM activities with primary school children, a programme that caught the interest of both central level planners and the media. Shortly thereafter, the *Education Ministry's Department of Non-Formal Education* (DNFE), also collaborating with the CIPM and TEF, began conducted training courses for their staff and field schools for both farmers and DNFE students. The other major development during this period came with Royal support to IPM and field schools, with the creation of the *Institute of Biological Agriculture and Farmer Field Schools* (IBAFFS) in the Department of Agriculture Extension (DOAE). The CIPM provided IPM trainers from the region and partial financial support for the initial training courses undertaken by this institute under a Royal Initiative, as well as those conducted by the DNFE. The FAO IPM strategy for Thailand (www.vegetableipmasia.org) is designed to assist Programme partners (Government, Royal Project, NGOs, DANIDA project) in implementing IPM training and assistance towards development of alternatives to toxic pesticides.

VIETNAM

In **Vietnam**, the National IPM Programme was established in 1990 with support from FAO to address concerns regarding heavy reliance on chemical inputs in crop production and protection, which negatively affect smallholder farmers, their livelihoods, consumer health and the environment. As in other countries, the IPM Programme originally aimed to improve farmers' decision-making capacities by enhancing their knowledge and skills to reduce the widespread use of insecticides *first on rice production, then on others crops such as tea, vegetables and corn*. The National IPM Programme was managed by the *Plant Protection Department* (PPD) under the Ministry of Agriculture and Rural Development (MARD). Starting from 1996, the MARD encouraged provincial governments to establish a Clean Vegetable Programme as a response to public concern after studies detected high levels of pesticide residues in fruits and vegetables. Through provincial funds, these provincial government programmes organised training activities on safe vegetable production in almost all of Vietnam's 64 provinces. In recent years, FAO has supported the Vietnamese government's efforts in expanding the number of qualified trainers as well as strengthening the content and methodology of the trainings by introducing the season-long IPM FFS approach as the farmer education model. During implementation PPD received direct support from many entities, including a variety of FAO-funded IPM programmes (for rice, vegetable, cotton), the IPM component of the Agriculture Sector Programme Support (ASPS), the *Biodiversity Use and Conservation in Asia Programme* (BUCAP), and some other agencies and NGOs (e.g. DANIDA, Adda, SEARICE, ACIAR, CIDSE). For example the NGO *Agricultural Development Denmark Asia* (Adda) trained more than 11,000 farmers on IPM vegetable management between 1999 and 2005, showing a significant decrease of insecticide and fungicide use on the target crops. A total of 1,132,654 farmers from 22 provinces in Vietnam have been trained on rice IPM.

COMPARATIVE ANALYSIS

IPM has been widely spread in all countries in the last twenty years. Diffusion has been done through Farmer Field Schools (FFS) with strong involvement of the government ministries (agriculture or education) and support from FAO.

As FAO partners have been trained over long periods they have gradually become autonomous and required less direct support. The *Field Alliance* (www.thefieldalliance.org) was created in 2002 to support and build upon activities similar to those that were supported by the FAO sponsored Regional IPM programme. Those activities include: the development and application of farmer educational approaches such as the Farmers Field School (FFS), community planning, farmer action research, participatory pesticide surveillance studies, local and international advocacy, farmer based information and evaluation systems and environmental education in rural schools. The Field Alliance consists of a Regional Group, National Partners, and Collaborating Organisations. The National Partners are either new NGOs established to play a role similar to the Field Alliance at a country level or existing national NGOs that share the vision of the Field Alliance and have previously implemented IPM training programmes. National partners manage activities in cooperation with a wide range of collaborating organisations, such as community groups, farmers associations, NGOs and the local and national government. The Regional Group provides support to National Partners, especially in Indonesia, Cambodia and Thailand.

Unlike organic agriculture that certifies products, IPM has no certification and thus do not require additional certification costs but on the other hand do not generate additional incomes through higher farm-gate prices. *Good Agricultural Practices* (GAP) *standards aim at recognising good practices in the absence of agricultural product certification*. The diffusion of *GAP* is a multidisciplinary area of work in FAO which has attracted a significant and growing demand for assistance. Over the period 2003 – 2005, FAO has carried out a number of GAP related activities and consultations, focusing on information provision, technical assistance and capacity building to help developing countries cope with changing and globalising food systems and the proliferation of GAP standards. A *GAP Working Group* was established in this context in 2004, bringing together FAO experts on food safety and quality, marketing, commercialisation and trade, plant production, animal production and health, forestry, fisheries, policy assistance and institutional strengthening. All countries in the region were then sensitised to *GAP standards* in a movement to reward best practices in crop management. While commendable efforts have been made to improve agricultural standards through GAP, there is a consensus among actors of agro-ecology that GAP is far from their objectives and is often used to cover agrochemical companies in their promotion of conventional practices using GMO seeds and/or chemical fertilisers and pesticides.

A large number of international and national NGOs have supported integrated farming systems as part of their sustainable agriculture and good agricultural practice endeavours. Under these numerous projects different practices have been combined and adapted by local farmers to their objectives, capacity and needs. Such projects have been reported in all Mekong countries, they build on production systems that have long been practiced in South East Asia and traditionally consist of a mix of crops, livestock and trees managed in an integrated manner.

IPM in a nutshell

IPM widely spread through all Southeast Asian countries over the last twenty years, through Farmer Field Schools (FFS) with the strong involvement of the Ministries of Agriculture and Education as well as support from FAO.

IPM mainly addresses rice and vegetable crops.

IPM has no certification, and therefore no additional certification costs, but does not generate additional incomes through higher farm-gate prices.

Rice harvest,
Siem Reap Province,
Cambodia

IPM vegetable Farmer Field School, Northern Rakhine State, Myanmar

3 HOMEGARDEN – NEW THEORY FARMING AND VAC

INTRODUCTION

This section addresses integrated farming approaches that have been promoted as alternatives to Green Revolution agriculture since the 1990s for *self-sufficient farming*. The ***New Theory farming system*** in Thailand and the VAC system in Vietnam (VAC in Vietnamese is Vuon, Ao, Chuong which means "garden/pond/livestock pen") consist in highly bio-intensive methods of small-scale farming in which food gardening, fish rearing and animal husbandry are integrated. These intensive farming practices, which integrate food and energy systems, make optimal use of land, water and solar energy in order to achieve high economic efficiency with low capital investments.

VAC principles
(http://www.fao.org/docrep/005/Y1187E/y1187e10.htm)

1. Integrated management of garden, fish pond and livestock.

   a. Some products from garden are used to feed fish.
   b. Fish pond provides water, mud and slime for irrigating and fertilising the garden.
   c. Some fish and weeds can be used for livestock nutrition.
   d. Animal manure is used for feeding plants and fish.

As for all integrated farming systems, the output from one subsystem becomes an input to another sub-system resulting in a total effect greater than the sum of the individual sub-systems.

Other schools mentioned in the countries reports such as permaculture or natural farming go along the same lines, differing more by their philosophical background than their actual practices. Permaculture promotes consciously designed landscapes which mimic the patterns and relationships found in nature, while yielding an abundance of food, fibre and energy for local needs. Main ethical principles are: to take care of the earth (provision for all life systems to continue and multiply), to take care of the people (provision for people to access those resources necessary for their existence), to set limits to consumption and reproduction, and redistribute surplus (healthy natural systems use outputs from each element to nourish others).

Permaculture principles
(http://holmgren.com.au/about-permaculture/)

1. Observe and interact: taking time to engage with nature we can design solutions that suit our particular situation.

2. Catch and store energy: develop systems that collect resources at peak abundance.

3. Obtain a yield: Ensure getting truly useful rewards as part of the work done.

4. Apply self-regulation and accept feedback: discourage inappropriate activity to ensure that systems can continue to function well.

5. Use and value renewable resources and services: make the best use of nature's abundance to reduce consumptive behaviour and dependence on non-renewable resources.

6. Produce no waste: Value and make use of all available resources.

7. Design from patterns to details: observe patterns in nature and society, which can form the backbone of the designs.

8. Integrate rather than segregate: put the right things in the right place, fostering relationships between elements so that they work together to support each other.

9. Use small and slow solutions: small and slow systems are easier to maintain than big ones, making better use of local resources and producing more sustainable outcomes.

10. Use and value diversity: diversity reduces vulnerability to a variety of threats and takes advantage of the unique nature of the environment in which it resides.

11. Use edges and value the marginal: the interface between things is where the most interesting events take place. These are often the most valuable, diverse and productive elements in the system.

12. Creatively use and respond to change: it is possible to have a positive impact on inevitable change by carefully observing, then intervening at the right time.

Natural farming : principles
http://www.rivendellvillage.org/Natural-Way-Of-Farming-Masanobu-Fukuoka-Green-Philosophy.pdf

1. No ploughing – because it destroys the cycles of life in the soil,

2. No fertilisers – because they deplete the land from which they are taken and disrupt the balance of the soils on which they are used,

3. No pesticides – because there are no 'pests',

4. No weeding – because there are no 'weeds',

5. No pruning – because a tree left undisturbed knows far better how to grow.

In **natural farming**, the means of production is the power of nature. One can almost say that natural farming means production by nature for the benefit of nature. It involves neither tilling nor fertilising. It does not need watering or weeding.

As permaculture and natural farming are still marginal in the region, they are therefore not explicitly dealt with in this comparative cross country analysis.

A REVIEW BY COUNTRY

In 1993, His Majesty the King Bhumiphol Adulyadej of Thailand proposed a new agricultural theory based on the concept of "Sufficiency Economy". The integrated agriculture and aquaculture system is designed for small-scale farms and takes advantage of the mutually reinforcing linkages between crops, fish and livestock. Under the "New Theory", farm land is divided into 30% rice paddy for self-consumption, 30% field crops, orchard and vegetables, 30% fish ponds and 10% living space and livestock raising. Since 1995 the Office of the Royal Development Projects Board has introduced the New Theory farming system to farmers all over the country through a number of Royal projects. With the cooperation with Royal Development Study Centres located in each region, local agricultural cooperatives and government units such as the Department of Agricultural Extension, the Royal projects distribute seedlings or livestock breeds that have been developed and proven suitable for the area.

THAILAND

The integrated agriculture and aquaculture farming system was introduced into Northeast **Thailand** as a solution to the failure of conventional agriculture. Intensive home garden systems on limited areas were promoted to improve livelihoods in the poorest regions of Thailand through self-sufficient family-based farming. More recently the Thai Department of Agricultural Extension (DOAE) has encouraged farmers to convert to an integrated farming system by stressing the potential increase in income and the decreased risk involved with the production of a variety of produce instead of a single crop under a monoculture system. The DOAE uses a variety of methods to extend the idea of integrated farming including arranging visits for farmers to model integrated farms; regional competitions such as the 'Best Integrated Farm in the Eastern Region'; and seminars for farmers to learn about, and discuss, the mechanics of integrated farming.

The Royal Project Foundation (www.royalprojectthailand.com) implements the New Theory across the whole country through research, development and marketing activities. It provides high quality fruits, vegetables, flowers, coffee, fish and meat (chicken, rabbit and pork) to some of Bangkok's most prestigious restaurants. All Royal Project fruits and vegetables minimally meet the Good Agricultural Practices (GAP) regulations, while they also have a percentage of products that meet Global GAP codes and even organic standards.

VIETNAM

The VAC system developed in **Vietnam** around the same period based on traditional gardening in the fertile Red River Delta. VAC is an acronym of three Vietnamese words: "Vuon" meaning garden or orchard, "Ao", meaning fish pond, and "Chuong", meaning animal sheds. As in the case of New Theory farming, VAC provides diversified agricultural products to meet the complex nutritional demands of *self-sufficient households based on ecological knowledge intensive technique and recycling strategies*. Annual income through VAC farming can be three to five times higher than that derived in the same area from growing two rice crops per year (Morrow, 1995). The VAC system was introduced by the government after the country opened to a market economy in 1986. It was considered as a good alternative to increasing use of chemical products by individual farmers after the agricultural cooperatives were dismantled.

VACVINA was founded in 1986 to (1) promote sustainable agriculture, (2) increase economic and social efficiency of the VAC system, (3) support agricultural diversification into the VAC system, (4) help and consolidate family and collective VAC. There are *Vacvina branches in 30 provinces*. Today the *Vietnam Gardening Association* has about 900,000 members. 2,500 staff from the Vietnam Gardening Association were trained in ToT on VAC Integrated systems. The Vacvina movement also promotes the *production and use of biofertilisers* (reducing NPK fertiliser by 40-45%). VAC and biogas have been promoted and supported nationwide. VAC has integrated biogas with the Vacvina Bio-digester, turning waste into energy. Since 2010, a national programme supported by SNV and other INGOs promotes biogas production in all regions of the country.

Home Gardening, Shan State, Myanmar

COMPARATIVE ANALYSIS

These two examples illustrate national level initiatives / policies which translated into large movements involving a multitude of smallholders. Other initiatives of the same kind have developed in other Mekong countries at more local scales. For example, Gret and a local partner, Mangrove Service Network (MSN), have started testing and introducing such Integrated Farming Systems in the Delta of Ayeyarwaddy in Myanmar after Nargis typhoon (2010 till now).

These initiatives should be recorded in a systematic way to better assess the importance at the regional level of these labour-intensive small-scale farming practices combining food gardening, fish rearing and animal husbandry.

Home gardens and integrated farming in a nutshell:

Integrated farming approaches were promoted as alternatives to Green Revolution agriculture since the 1990s for self-sufficient farming. The New Theory farming system (Thailand) and the VAC system (Vietnam) consist in highly bio-intensive methods of small-scale farming in which food gardening, fish rearing and animal husbandry are integrated.

Main national level initiatives / policies have translated into large movements involving a multitude of smallholders in the region.

Farming landscape, Northern Rakhine State, Myanmar

4 SYSTEM OF RICE INTENSIFICATION

INTRODUCTION

The System of Rice Intensification, known as SRI is an agro-ecological approach for increasing rice productivity (and more recently other crops) by changing the management of plants, soil, water and nutrients.

The System of Rice Intensification (SRI) was originally developed and promoted by Father Henri de Laulanié in Madagascar in the 1980s. It aims at maximising rice crop productivity with lower resource utilisation of such inputs as water and fertiliser. Basic principles of SRI are i) rice seedlings are transplanted very young (usually 8-12 days old), which preserves the original seed nourishment potential by around 40-50% and thereby optimises the potential for tillering and root growth, 2) a single seedling is transplanted per hill instead of 3-4 together to avoid root competition, 3) seeding spacing is widened to 30 cm x 30 cm or more to provide room for profuse root and tiller growth by allowing the plant to monopolise the soil fertility and solar energy, 4) soil is kept moist but well-drained, aerated with a minimum of water applied during the vegetative growth period, and then only a thin layer of water is maintained on the field during the flowering and grain filling stage, 6) weeding is necessary at least once or twice, starting 10-12 days after transplanting, and preferably 3 or 4 times before the canopy closes. Using a rotary hoe - a mechanical push-weeder - has the advantage of aerating the soil at the same time that weeds are eliminated and are left in the soil to decompose so their nutrients are not lost. In addition to the basic concept above, provision of organic matter (compost) to the soil is recommended to help achieve sustainable SRI cultivation practices.

SRI principles (http://sri.ciifad.cornell.edu/aboutsri/methods/index.html#SRIprinciples)

1. Early, quick and healthy plant establishment (e.g. seedlings less than 15 days)
2. Reduced plant density (e.g.: 1-3 seedlings/hill, 25 to 40 cm spacing)
3. Improved soil conditions through enrichment with organic matter (e.g.: natural fertiliser)
4. Reduced and controlled water application (e.g.: only minimum water, keep soil moisture)

As is the case for other agro-ecological practices, not all principles are systematically adopted by farmers as a full package. The figures provided concerning the rapid expansion of SRI in the region therefore mask the large discrepancy between the principles (i.e. components of the practice) and the areas in which the practice is actually adopted.

A REVIEW BY COUNTRY

CAMBODIA

In **Cambodia**, SRI was initially promoted by *CEDAC* - Centre for Studies and Development of Cambodian Agriculture - a national NGO with the support of *GIZ Rural Development Programme* since 2000. SRI was initially tested in the two pilot provinces of Kampot and Kampong Thom. MAFF lent large credibility to this innovative practice by setting up a *SRI Secretariat* under the coordination of DAALI and in cooperation with CEDAC. SRI practices were further *included in the National Strategic Development Plan* (NSDP) *and policy frameworks for 2006-2010*, which aimed to improve rice production and contribute to Cambodian farmers' poverty reduction. In 2007, 80.000 farmers were involved in SRI and cropping 47.000 ha of rice with this innovative practice (Im Sothea, 2008).

SRI assessment studies conducted in Cambodia between 2004 and 2011 showed an increased rice yield of 40 to 60%, a reduction of production costs as SRI requires a lower amount of seed (50% decrease) and chemical fertilisers (50 to 70% decrease), and an increase of farmers' incomes and net profit. One key advantage of SRI is its ability to *show immediate results* during the first season of production, which allows farmers to gain confidence in the technology which greatly facilitates the change from traditional practices to a new agricultural system as very often change is related to risk for smallholders. Currently several SRI training and dissemination programmes can be found all over the country: government institutions at national and local levels, farmer organisations, local as well as international NGOs have been taking over this agricultural innovation and tried it out in various intervention contexts. As mentioned previously, the adoption of SRI practices (which encourage farmers to reduce the use of chemical pesticides and fertilisers) often paves the way to organic rice production.

LAOS

In **Laos**, *Oxfam Australia* supported the Lao National Agriculture Research Centre (NARC) to introduce SRI techniques in Vientiane and Saravan Provinces. Based on its own experiments, the *NARC concluded in 2001 that the likelihood of disseminating SRI throughout Laos was extremely slim* because of: 1) the generally poor water control and absence of individual water management, 2) the poor soil fertility in many areas that would require large quantities of organic fertilisers. More tests were done in 2006/07 by Pro-Net 21 (a Japanese NGO) and the *ADB-funded Northern Community Management Irrigation Sector Project* (NCMI) with the *Department of Irrigation* (DoI) which demonstrated the feasibility of SRI in favourable environments. In 2008, the MAF issued an *official decree so that all provincial line agencies in the country would promote SRI*. As a result the DoI has actively extended SRI techniques in all irrigated areas together with different organisations such as CUSO-VSO, SAEDA, WWF or ADRA Japan. In 2010, the total area under SRI (including NCMI and Pro-Net 21 projects) was 3625 ha for 10666 households.

Impact assessments of the NCMI project has shown that adoption of SRI techniques has been relatively high in Luang Prabang Province (up to 60-70% in some villages) due to the presence of favourable factors such as small paddy areas and high availability of family labour force (due to little external employment opportunities during the dry season). On the opposite, adoption rate is not so good in the other Northern provinces, mainly due to low availability of family labour during the dry season.

MYANMAR

In **Myanmar**, SRI was first introduced to the IPM-FFS trainings in 2000 under the project of the *Metta Development Foundation* in Kachin State. The rice yields were doubled in a single year, attracting a lot of interest for the new practices. Since 2001, Metta conducted more than 600 FFS with SRI in Kachin State with the support of MISEREOR and Swiss Aid. The *GRET-CORAD* project team conducted training sessions in Northern Chin State, GAA (German Agro Action) in Wa Region and Ayaryawady Region and *World Concern* in Kachin, Northern Shan and Mon State. A Consortium of 20 local NGOs, supported by the *Food Security Working Group (a national network)* is also supporting SRI trials. The rapid adoption of the SRI is mainly due to its dissemination through *Farmer Field Schools* (FFS). In 2008, the Metta Foundation, estimated that about 50,000 farmers in Kachin and Shan States are using some combinations of SRI methods. In the Kachin State Project , the average rice yield under SRI methods was 5.5 t/ha compared with traditional yield of 2.5 t/ha.

Mechanical weeding in SRI plot, Northern Rakhine State, Myanmar

THAILAND

In **Thailand**, as in Laos, the *initial SRI trials conducted in 2001 by the Multiple Cropping Centre (MCC) at Chiang Mai University were not successful.* However, continued evaluations by MCC and others led to a *national SRI network*, which was formalised at a national SRI workshop held in Chiang Mai in May 2003 (http://sri.ciifad.cornell.edu). Since 2005, researchers at the *Asian Institute of Technology* engaged with the CGIAR Challenge Programme on Water and Food to support participatory action research with farmer field school groups to evaluate SRI. SRI was introduced to villages in northeast Thailand through action-research. Successive SRI projects were then conducted by AIT in Thailand and in the Lower Mekong Basin and have been institutionalised in 2013 with the creation of the *Asian Centre of Innovation for Sustainable Agriculture Intensification* (ACISAI) at AIT. Despite all these research efforts, *SRI is expanding quite slowly in Thailand as intensive mechanised rice cultivation systems dominate, with most of the rice paddies being directly seeded*. SRI potential can be found in subsistence based households such as the ones targeted by the New Theory farming as mentioned above.

Alternate Wetting and Drying (AWD) practice for paddy cultivation, Vietnam

VIETNAM

In **Vietnam**, SRI was initially *tested in 2005* in 14 provinces across the country, with promising results (e.g. reduction of seed quantities by 70-90%, nitrogen applications by 20-25%, and yield increase by 9-15%). Healthier crops led to better resistance to pests and diseases, and to a significant reduction of pesticides use in the field. SRI techniques rapidly became popular among farming communities. In 2007, the Science Council of MARD recognised SRI as a scientific advance. MARD issued an official request to DARDs in Northern regions to support SRI expansion. In 2008, 95,000 farmers were using SRI on 33,000 hectares of paddy in Ha Tay Province. *The Plant Protection Division of MARD* worked with Oxfam America in Hanoi, Thai Nguyen, Bac Kan, Phu Tho, Ha Tinh, and Nghe An Provinces. SNV engaged with 13,000 beneficiaries on 500 ha in Quang Binh and Binh Dinh Provinces. A study by the Centre for Agrarian Systems Research and Development (CASRAD) (Dao the Anh et al., 2012 Assessment of policies and public service impact rice cultivation technique based on SRI principles applied on large scale) investigated the potential of SRI for inclusion in the policy actions of the Action Plan for Climate Change of the Ministry of Agriculture and Rural Development. They found that IPM, ICM and SRI are compatible with the government policies to reduce input use in rice production and could also help reducing emissions of greenhouse gases. The '3 reductions - 3 increases' (3G-3T) policy consists in reducing the use of seeds, chemical fertilisers and pesticides while increasing productivity, quality and economic efficiency. The '1 must - 5 reductions' (1P-5G) policy consists of (1 must) using certified seeds while (1) reducing quantity of rice seeds, (2) nitrogen fertilisation, use of (3) pesticides and (4) water, (5) reduction of post-harvest losses.

COMPARATIVE ANALYSIS

SRI expanded rapidly in Cambodia, Laos, Myanmar and Vietnam where there was a real "agro-ecological potential" (size of the paddies, water control, manual practices relying on family labour force, etc.), strong support from government agencies from national to local levels, Farmers Field School (FFS) used as an extension approach, good potential for production cost reduction in terms of fertilisers and seeds, etc. In these countries the actual impact is localised in high potential areas and SRI does not reach all rice farming households because of constraints related to available labour force, quality of the irrigation-drainage systems, etc. Assessments conducted in Cambodia have pointed out the constraints to SRI adoption: (i) SRI increases labour requirement for weeding, transplanting and water management (Deichert and Koma, 2002), (ii) its implementation is difficult on big rice paddy areas, (ii) few farmers practice the whole set of the 12 principles (some of them are not able to use compost, drain water or transplant young seedling as most of agricultural production system relies on natural rainfall), (iv) it takes several years for farmers before they become skilful in applying SRI practices (Koma and Siny, 2004), and (v) SRI requires intensive training with a high demand for human and financial resources (Anthofer, 2004). Similar constraints have been pointed out in Laos, Myanmar and Vietnam that explain the heterogeneous diffusion patterns of this practice.

As a consequence, the Ministries of Agriculture are supporting a dual rice system, focusing on technology-based production (e.g. hybrid rice, direct seeding, mechanised practices) in large irrigated paddies managed by better-off farmers and, on the other hand, supporting poor smallholders in applying ecological knowledge-intensive SRI on their small paddies. The priority given by Thai and Chinese farmers to technology-based, mechanised agriculture explains why SRI has still a very limited impact in these countries. Its adoption is limited to small farmers who have tested the system by conviction (i.e. ecological awareness) or because they do not have access to other technical options to intensify their production.

SRI in a nutshell

SRI dissemination requires real "agro-ecological potential", strong support from government agencies on national and local levels, as well as the Farmers Field School (FFS) extension approach.

It has good potential to reduce production costs in terms of such inputs as fertilisers and seeds, but faces important constraints related to high labour force requirements and the quality of the irrigation-drainage systems.

The dual rice system supported by the government, focuses on technology-based production in large irrigated paddies managed by better-off farmers while, on the other hand, supporting poor smallholders by applying ecological knowledge-intensive SRI on their small paddies.

5 CONSERVATION AGRICULTURE

INTRODUCTION

Conservation Agriculture (CA) is an agro-ecosystems management approach aimed at improving and sustaining agricultural productivity, increasing profits and food security while preserving and enhancing the resource base and the environment. CA is characterised by three interrelated principles.

Conservation Agriculture principles (http://www.fao.org/ag/ca/index.html)

1. Continuous minimum mechanical soil disturbance (direct planting of crop seeds)
2. Permanent organic soil cover (crop residues and cover crops)
3. Diversification of crop species grown in sequences and/or associations.

While the FAO definition is provided above, CA may have different meanings for different people and should therefore be clearly defined. The term *conservation was initially used in relation to agriculture for the purpose of soil and water conservation*. A large array of soil and water conservation techniques were researched and tested with Asian upland farmers in the 1980s and 1990s. They usually consist in installing hedgerows or vegetative strips (e.g. vetiver) along contour lines. For example, the *Sloping Agricultural Land Technology* (SALT) consists in using tree and shrub legumes for improving the fertility and stability of agricultural soils. It was initially developed in the southern part of the Philippines and then rapidly spread all over the world. SALT can easily evolve towards improved fallow or agro-forestry systems depending on the management types. These erosion control practices have been systematically documented and promoted by global *soil and water conservation networks such as the World Overview of Conservation Approaches and Technologies* (WOCAT - www.wocat.net) or the *World Association of Soil and Water Conservation* (WASWAC - waswac.soil.gd.cn).

CA practices, consisting of no tillage or minimum tillage combined with permanent soil cover through mulching or cover crops and systems of crop association or rotations have been tested by different soil and water conservation projects in the region, including for example the Land Development Department of the Thai Ministry of Agriculture and Cooperatives (www.ldd.go.th), agricultural universities (e.g. Kasetsart, Khon Kaen, Chiang Mai, Maejo) and Royal Projects. In the Philippines, these practices promoted by the *Landcare movement* with the support of ICRAF somehow mixed soil conservation approaches with no tillage and agro-forestry systems in such a way that it becomes difficult to precisely name the agricultural systems practiced by upland farmers. Also, as for organic farming, SRI and other practices, farmers engaged in CA often do not adopt the complete set of principles, which is often a source of confusion over measurements of what is actually adopted by farmers and to

what extent.
Since the early 2000s, the three principles of CA are:

- Soil is permanently covered (mulch or living cover)
- Soil is neither ploughed nor even superficially tilled (sowing is done directly through soil cover, mechanically or chemically controlled beforehand)
- Biodiversity is enhanced by implementing rotations, successions and associations with cover plants

These have been popularised by *CIRAD* through its action-research projects in Vietnam, Laos, Cambodia and Thailand. During the stakeholder workshops and consultations organised as part of this feasibility study, the scope of CA was somehow reduced to CIRAD's activities in the region and supported by the *CA Network for South East Asia* (CANSEA).

Conservation agriculture system consisting in relay cropping of cowpea in maize, Sayabouri Province, Lao PDR

A REVIEW BY COUNTRY

CAMBODIA

In **Cambodia**, CA started in *2004* with experiments on crop diversification and the *direct sowing mulch cropping system* (DMC) implemented by CIRAD as part of a rubber development project (2004/2008). From 2008 to 2012, the PADAC - project for the development of agriculture in Cambodia - followed on this previous phase with DMC experimentations. PADAC is a research-development project, implemented by the *Ministry of Forest and Fisheries of Cambodia* (MAFF) with the scientific and technical assistance of CIRAD and funded by AFD. A partnership and complementary financing has been provided by USAID.

PADAC designed CA production systems based on maize, cassava, soybean and upland rice in three pilot zones, first in two districts in Kampong Cham Province and then in Battambang. According to the CIRAD impact assessment conducted in 2011, the area of DMC systems has significantly increased, from 180 ha in 2009 to 370 ha in 2011. CA covered *600 ha in 2012 and involved 700 households* in the target districts. CA requires *investments and use of complex technology that appear to limit its adoption by smallholder farmers*. PADAC has developed a contract farming system between farmers and agro-industry processors to ensure the sustainability and extension of CA.

LAOS

In **Laos**, the development of CA by the MAF-CIRAD over the last decade was supported by AFD. CA-based interventions find their origins in the *PRODESSA* when a specific research component on CA was integrated to that rural development project in 2001 in Kenthao District (Sayaburi Province). Building on the results of that first initiative on CA, the PRONAE was launched (preparatory phase from 2001 to 2003 and implementing phase from 2004 to 2009) in 3 districts of Sayaburi Province and 3 districts of Xieng Khouang Province. In addition, the PASS project (2005 to 2009) was dedicated to CA extension and agricultural diversification in maize mono-cropping systems with legumes crops in association or rotation in four Southern districts of Sayaburi Province. Finally the PROSA started in 2007 with the following objectives: i) providing an institutional support to the MAF in expanding CA to the whole country, ii) promoting Agro-ecology and CA in the curriculum of Faculties and Colleges of Agriculture, iii) supporting research and experimentation on development and dissemination of CA, and iv) developing a regional network for CA in South East Asia. The project which ended in 2012 also implemented farm-level activities related to CA in Savannakhet Province. All of these interventions were funded by the AFD, managed by the MAF and implemented by CIRAD in collaboration with Provincial and District Offices of Agriculture and Forestry (PAFOs and DAFOs).

The results in terms of farmers' adoption of innovative practices were very good in the target areas of the projects and as long as the projects were active. However, most farmers did not adopt the three principles of CA as they limited the adoption to no-tillage and residue management in maize monocropping systems in the absence of legume association and crop rotation and many discontinued after the end of the projects (Coudray, 2013).

MYANMAR

In **Myanmar**, the traditional method of conserving soil moisture by mulching or intercropping in the dry land farming is an age-old practice. Environmentally sustainable food security and micro income opportunities in critical watershed project in Southern Shan State was carried out during the period from 1996 to 2002. Based on promising results obtained in Mindanao Island in the Philippines, a similar project was carried out in the dry zone and CA was systematically and widely undertaken by UNDP/FAO project personnel. The *Ecosystem Conservation and Community Development Initiative* (ECCDI), the *GRET-CORAD project and Welthungerhilfe* (GAA) have brought about conservation and management on the ecosystem of natural resources with the aim of enhancing the socio-economic development of communities. *CA and sloping agriculture land technology* (SALT) have been incorporated in many projects after initial experience of the IRRI-Myanmar hilly regions farming systems development project in Shan State between 1992 and 1994 with hedgerow planting and alley cropping.

The main government agencies involved are the *Ministry of Environmental Conservation and Forestry, Ministry of Agriculture and Irrigation* and the respective State and Regional government bodies. At the watershed level, integrated watershed management programmes as in the case of Inlay Lake rehabilitation are implemented by a large organised body comprising all the union and regional level government agencies, UN systems agencies, INGOs, local NGOs, individual researchers and development workers. The centre piece of all these activities is CA.

Terraces farming systems, Northen Chin State, Myanmar

No-tillage system has been introduced by Welthungerhilfe (or German Agro Action), a German INGO, and was adopted by 2500 households in northern Shan State. Maize plots are covered with previous crop residues and planted with no soil disturbances in the next crop season. Different tillage practices are adopted such as minimum tillage, zero tillage, in-row tillage, in-line tillage, etc. in different agro-ecological zones in Myanmar. Cover crops can reduce surface crusting and run-off. Farmers find it difficult to practice cover crops if they are not edible plants. Mulching with crop residues may be subject to fire hazards in Myanmar dry land conditions. In the private sector sugar industry, sugarcane crop residues are covered in-between rows to conserve soil fertility and moisture. This method, termed as trash blanketing is applied by the Australian sugar industry and this method was transferred to sugar industry in Thailand then Myanmar in 2005. In Myanmar four sugar companies are applying it over 1000 acres. It enhances soil fertility, suppresses weed growth, conserves moisture and prolongs the rationing crop cycle.

THAILAND

In **Thailand** CA practices consisting of no tillage or minimum tillage combined with permanent soil cover through mulching or cover crops and systems of crop association or rotations have been tested by *different soil and water conservation projects, including Land Development Department* (LDD) of the Ministry of Agriculture and Cooperatives, agricultural universities (e.g. Kasetsart, Khon Kaen, Chiang Mai, Maejo) and Royal Projects. The LDD has developed a national network of applied research and extension stations to support the diffusion of soil and water conservation practices. Since 1995, *soil doctors have been trained in all villages as intermediaries between LDD extension staff and farming communities*. Volunteer farmers are trained in soil and water conservation practices to help their fellow villagers and can request support from LDD extension agents when necessary. This participatory approach responds to the need to develop alternatives to the traditional 'technology transfer' extension approaches and also responds to the problem of decreasing numbers of LDD staff available on the ground. At present, there are approximately 60,000 volunteer soil doctors representing the LDD at the village level.

Since 2007, *CIRAD has been collaborating with Kasetsart University* to study the impact of agricultural practices on the soil's biological characteristics and functioning. A *laboratory of soil biology installed in the campus of Sakon Nakhon* (northeast of Thailand, Sakon Nakhon Province) is organised around three main activities: applied research in the field of soil biology, training and expertise. *Field experiments* have been conducted in the Kasetsart University campus to evaluate the effect of various no-till systems with cover crops on soil quality: e.g. study of the quality of the fresh organic matter brought back to the soil, impacts on soil macro-fauna abundance and diversity, impacts on soil microbial abundance and activity.

VIETNAM

In **Vietnam**, the introduction and development of CA is mainly thanks to a long-term partnership between Vietnamese and French agricultural research centres: *Vietnamese Institute of Agronomic Sciences* (VASI), *Northern Mountainous Agriculture and Forestry Science Institute* (Nomafsi), *CIRAD since 1996 and IRD since 1999*. More recently the *University of Queensland* and *Think Soils* (Consultancy Company) have conducted CA research in Son La Province in partnership with Nomafsi and Tay Bac University and with financial support from ACIAR and AUSAID.

The *ADAM project* (2009-2013) followed the SAM project - Mountainous Agrarian Systems (1999/2005) with the objective of extending CA in Phu Tho, Son La and Yen Bai Provinces. The project had two components: (1) promotion of direct seeding mulch-based cropping systems (DMC); and (2) design and testing of innovations for *sustainable tea production* on slopping lands and three main activities: adaptive research, training, and communication.

The *Vietnam Soil and Fertilisers Research Institute* (SFRI) in cooperation with IRD, has been carrying out experimentations and measurements on Dong Cao Watershed, in Hoa Binh Province since 2001. Different DMC techniques (e.g. rice straw mulching, cover crops) have been experimented, in comparison with farmer-control plots also in Thailand and Laos. This research is part of the *Managing Soil Erosion Consortium* (MSEC - 1999-2010) that was initially funded by ADB, then the IWMI, IRD, AFD and French MFA. The current phase MSEC3 (*Multiscale Environmental Changes*), from 2011 to 2015, is implemented by IRD in partnership and with the support of the ALLENVI alliance with the French Ministry of Research and Higher Education.

Soybean on rice mulch, Lao PDR

COMPARATIVE ANALYSIS

More than a decade of CA experimentation and monitoring field *results are quite convincing*: increased soil moisture, soil biodiversity (earth worms), decreased soil erosion (from 75 T/ha to 1.5 T/ha) and in parallel, reduced losses of nutrients and increased yield. Cultivation labour has been reduced resulting in many sites in a rapid expansion of CA areas.

However, *farmers face a number of constraints in the adoption of DMC systems* and many stopped practicing CA after the end of the projects in all countries. The main reasons advanced to explain this situation are: (i) a high level of initial investment, (ii) technical problems and (iii) conversion to perennial crops.

Other reasons were identified, depending on local contexts:

- No or limited access to the market, in particular for legumes (resulting in limited association or rotation corn with legumes);
- Lack of supply chains for direct sowing , cover crop seeds equipment;
- Limited access to credit (for developing improved animal production systems) or high level of dependency on traders for credit access (in corn cropping systems);
- Lack of long-term technical support, training and support policies;
- No short term gain in adoption of soil conservation practices; long transition period before visible economic impact, especially on degraded soils that require a longer recovery period.

The *CANSEA* (Conservation Agriculture Network in South-East Asia) network was created in 2009 in an attempt to tackle these issues from a regional perspective. The main stakeholders involved in CA development in South-East Asia use the network to exchange knowledge, experiences and technical expertise in the fields of research, development and capacity building on CA. The CANSEA has provided support to CA research conducted by its members in Laos within the framework of the European *ORCATAD* project (Open Resources for Conservation Agriculture and Trade and Development, 2006-2008), in Cambodia in collaboration with the PADAC project (Projet d'Appui au Développement Agricole du Cambodge), in Vietnam in collaboration with Nomafsi – ADAM project. CANSEA communicates its results to its members and provides training to its partners so as to learn from each other and to overcome the issues pointed out above.

CA in a nutshell

CA implementation results in increased soil moisture, soil biodiversity, decreased soil erosion, reduced losses of nutrients and increased yield.

Farmers face a number of constraints in the adoption of DMC systems such as a high level of initial investment and technical problems for conversion to perennial crops.

Other difficulties are limited access to the market for legume cover crops, lack of supply chains for direct sowing mechanisation and limited access to credit.

CANSEA (Conservation Agriculture Network in South-East Asia) was created in 2009 in an attempt to tackle these issues from a regional perspective.

Soil and water conservation infrastructure, Monywa Region, Myanmar

6 AGRO-FORESTRY

INTRODUCTION

Agro-forestry is a collective name for land-use systems and technologies where woody perennials (trees, shrubs, palms, bamboos, etc.) are deliberately used on the same land-management units as agricultural crops and/or animals, in some form of spatial arrangement or temporal sequence. Agro-forestry is a dynamic, ecologically-based, natural resource management practice that, through the integration of trees on farmland in the agricultural landscape, diversifies and sustains production for increased social, economic and environmental benefits.

A combination of trees and non-tree crops or animals on the same land management unit is considered more as an approach than as a single technology. Agro-forestry systems have long been developed in South-east Asia, especially by ethnic minorities, before the emergence of export-led mono-cropping (e.g. fruit trees in home gardens). Similar to other agro-ecological practices, 'modern agro-forestry' has been promoted in reaction to deforestation and resource depletion to protect natural resources while increasing agricultural productivity and diversifying sources of income. More recently, the potential of complex agro-forests to reduce atmospheric concentration of CO2 and mitigate climate change has been valorised as part of climate smart agricultural strategies.

Agro-forestry principles (http://www.worldagroforestry.org/)

1. Intentional: Combinations of trees, crops, and/or livestock are intentionally designed, established, and/or managed to work together and yield multiple products and benefits, rather than as individual elements which may occur together but are managed separately. Agroforestry is neither monoculture farming nor is it a mixture of monocultures.

2. Intensive: Agroforestry practices are created and intensively managed to maintain their productive and protective functions, and often involve cultural operations such as cultivation, fertilisation, irrigation, pruning and thinning.

3. Integrated: Components are structurally and functionally combined into a single, integrated management unit tailored to meet the objectives of the landowner. Integration may be horizontal or vertical, above or below ground, simultaneous or sequential. Integration of multiple crops utilises more of the productive capacity of the land and helps to balance economic production with resource conservation.

4. Interactive: Agroforestry actively manipulates and utilises the interactions among components to yield multiple harvestable products, while concurrently providing numerous conservation and ecological benefits.

A REVIEW BY COUNTRY

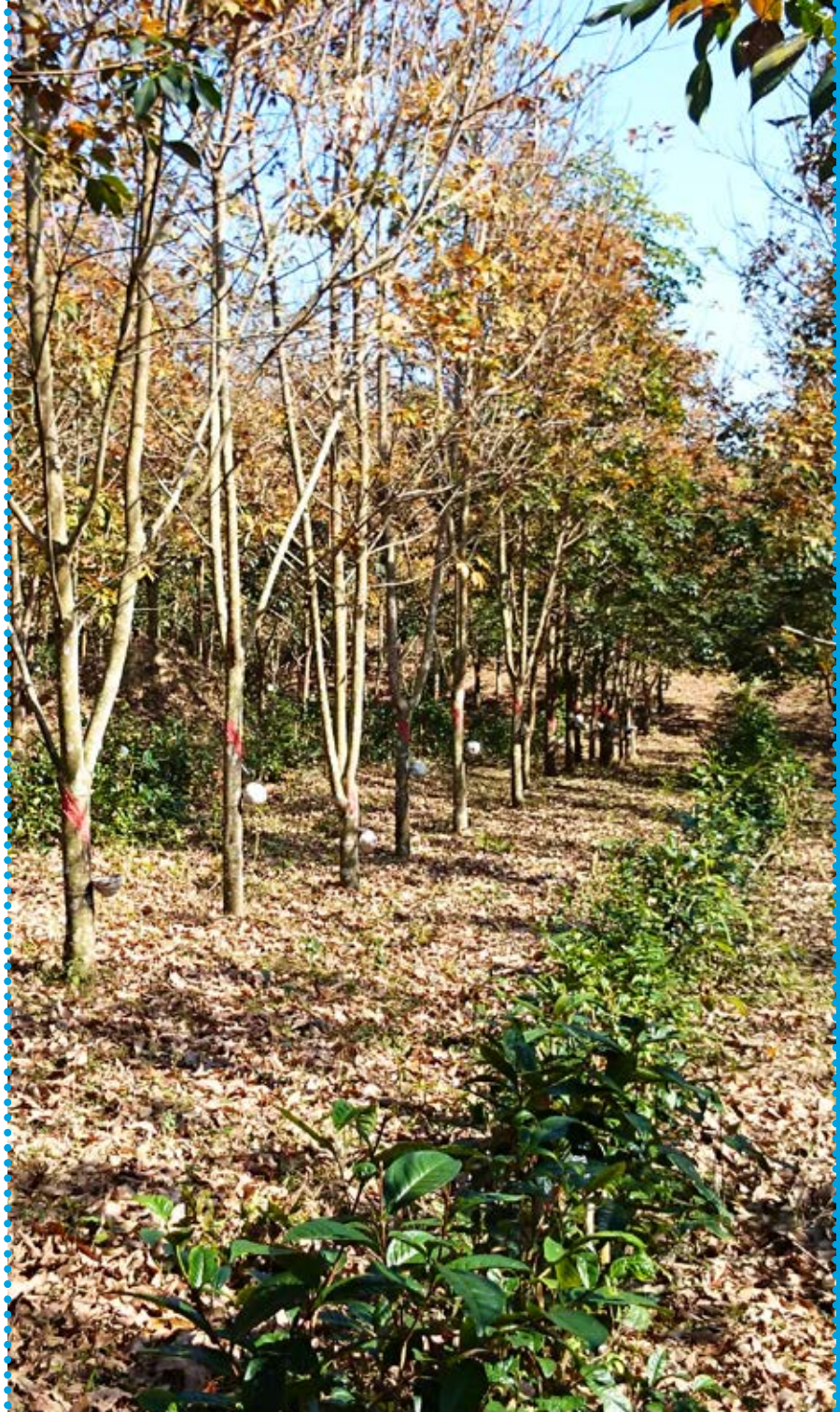
LAOS

In **Laos** agro-forestry practices and non-timber forest products (NTFP) management practices are distributed into three main sloping agriculture land technology fields of activities:

- *Production of forestry systems with regeneration and protection forests* (PADETC and SDC with the collaboration of the Forest Science Research Centre (FSRC) of the National Agriculture and Forestry Research Institute (NAFRI),

- *Promotion of agro-forestry systems with plantations based on wood/ commercial trees* (such as rubber, candlenut, Jatropha, palm oil trees) in association with rice, corn or galangal/ginger cropping systems (SIDA project in collaboration with NARC and FSRC in Sayaburi, Luang Prabang, Oudomxay, Luang Namtha and Bokeo Provinces, 2004-2010);

- *Development of NTFPs production through sustainable management* (SDC/NAFRI/FSRC project, *GRET project* in three districts of Houaphan Province since 2010 on bamboo), and domestication (plantation of NTFPs, possibly associated with traditional crops) as in the SIDA/ NARC/FSRC project, AgroForex company in Phongsaly and Houaphan Provinces on benzoin and German Agro Action (GAA) in Oudomxay Province (Namo District) on cardamom.



Rubber trees intercropped with tea trees, Louang Prabang Province, Lao PDR

In spite of encouraging results (such as NTFPs domestication with Agro-Forex company and GAA), *several constraints limit the adoption of agro-forestry practices* such as: (i) pressure from foreign investors to develop mono-cropping systems for rubber, maize or cassava, (ii) high variability of fruit tree production and prices and (iii) substantial labour force requirements that limit the adoption of those systems to the "middle class" as the poor lack labour and the rich lack interest in mixed systems. *In the absence of a national network on agro-forestry*, related initiatives are mainly project-based.

THAILAND

In **Thailand**, the *World Agro-forestry Centre* (ICRAF) has spearheaded agro-forestry research since the early 1990s, as part of the Alternative to *Slash and Burn Initiative* (ASB - www.asb.cgiar.org). Implementation responsibility was delegated to the *Ministry of Agriculture and Cooperatives*, and the Royal Forest Department (RFD) was assigned to serve as the responsible counterpart agency. The Mae Chaem watershed in Chiang Mai Province was selected as the benchmark research site in association with the *multi-institutional ASB-Thailand consortium*. Many publications have been produced over the years based on experiments conducted in this benchmark site. In addition, many Thai universities have been involved in agro-forestry related research over the years with *relatively limited impact in term of adoption of innovative practices* as compared to the large and sustained research investments on agro-forestry.

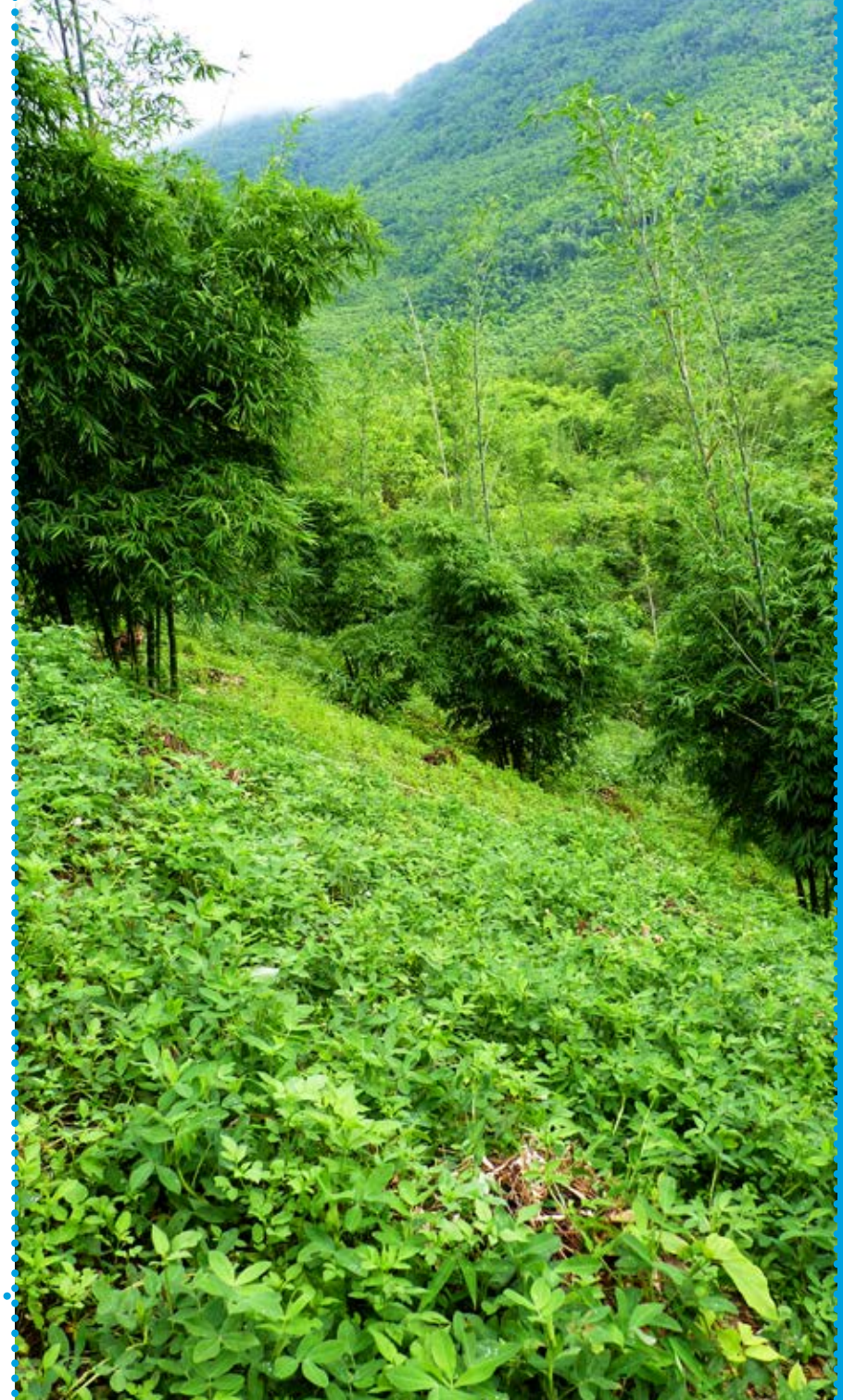
VIETNAM

In **Vietnam**, the government included agro-forestry in rural development policies for the mountainous regions of Vietnam *about 20 years ago*. The *Extension and Training Support Project for Forestry and Agriculture in the Uplands* (ETSP, 2003/2007) was a follow-up project of the Social Forestry Support Programme (SFSP, 1994/2002) implemented by Helvetas Vietnam funded by the Swiss Agency for Development and Cooperation (SDC). Historically, Finland and Denmark governments were also an important partner on forestry and agro-forestry. *ICRAF started its operations in 2007 in Vietnam* as a not-for-profit, international non-government organisation; it is based in Hanoi with 20 scientific and support staff and students. National partners are *NOMAFSI* with its project on 'Agro-forestry for Livelihoods of Small-holder Farmers in North-West Vietnam', the *Centre for Agricultural Research and Ecological Studies* (CARES) at the *Hanoi University of Agriculture* and other research centres and universities members of the Vietnam *Network for Agro-Forestry Education*.

YUNNAN

In **Yunnan**, modern agro-forestry as defined by the World Agroforestry Centre is promoted by the *Centre for Mountain Ecosystem Studies* (CMES). CMES was established in 2002 as an applied research & development institution jointly managed by ICRAF and the *Kunming Institute of Botany* (KIB), Chinese Academy of Sciences. It is working on environmental research and development in the Southwest of China, which is characterised by diverse mountain terrain and climate, a large population of ethnic minorities coupled with rich biodiversity and increasing pressure on natural resources. CMES cooperates with various government institutions and NGO partners to strengthen community capacities by introducing farmers, government agencies, and NGO staff to new approaches and methods adapted to diverse upland situations. By diversifying the agro-forestry model, certifying organic farming, promoting fair trade, sustainable use of NTFPs, use and research on bioenergy, setting up mechanisms for Payment for Environmental Services, and addressing global climate change, CMES is committed to the long term goal of sustainable development in the Southwest of China.

Since 2004, poor upland households have participated in research and development for integrating medicinal plants into agro-forestry systems. Some medicinal plants such as *Dipsacus daliensis, Foeniculi fructus* and *Pinellia ternata* have a high potential for domestication but the lack of farmers' technical knowledge is a constraint. A commodity chain analysis of major local NTFPs – mushrooms, walnuts and pine nuts – was initiated in 2005 to provide an essential base for strategic development inputs at the local level. A focus of this research is on commodification and sustainable management of the NTFP products in agro-forestry systems.



Agroforestry practice (bamboo x groundnut), Houaphan Province, Lao PDR

Under pressure from both national and provincial governments to address problems caused by rapid rubber expansion, in 2009 the Xishuangbanna prefectural government and the rubber industry established the "*Leadership Group for Environmentally Friendly Rubber*" (LGEFR). The group links government, research, and industry stakeholders, and thus provides a forum for discussing and implementing policy instruments for restoring ecosystem services and alleviating poverty. As part of this initiative, CMES is designing a Green Rubber landscape that balances income from rubber with restoration of ecosystem services for sustainable poverty alleviation.

Agroforestry practice (niger x prunus spp), Shan State, Myanmar

COMPARATIVE ANALYSIS

Like FAO in the case of IPM or CIRAD for CA, ICRAF plays a leading role in the promotion of modern agro-forestry in the Mekong region. ICRAF has offices in Hanoi (Vietnam), Chiang Mai (Thailand) and Kun-ming (Yunnan-Vietnam), which have been managing national, regional and global programmes related to agro-forestry for the past two decades.

At the regional level, ICRAF has hosted the South-East Asia Network for Agro-Forestry Education (SEANAFE), a network of 85 member institutions of five country networks in Indonesia, Laos, Philippines, Thailand and Vietnam. From 1999 to 2010, SEANAFE worked closely with established networks, government agencies, and regional and international development organisations in building capacities in agro-forestry and natural resources education. It also collaborated with civil society and other non-government organisations involved in promoting the practice and science of agro-forestry through either formal or non-formal education.

Agroforestry in a nutshell

Agroforestry is a combination of trees and non-tree crops or animals on the same land management unit and is considered more as an approach than as a single technology.
ICRAF has played a leading role in the promo-tion of modern agro-forestry in the Mekong Region.

'Modern agro-forestry' has been promoted in reaction to deforestation and resource depletion in order to protect natural resources while increasing agricultural productivity and diversifying sources of income.

7 BEYOND AGRICULTURAL PRACTICES

OTHER DIMENSIONS OF AGRO-ECOLOGY: VALUE CHAINS AND FOOD SOVEREIGNTY

Agro-ecology has multiple dimensions from production to consumption including marketing. Beyond production, smallholder agriculture should get organised all along the **market chain** to respond to its future challenges, e.g. adaptation to climate change, food security and safety. Agro-ecology also aims at improving farmers' livelihoods by promoting better equity and food sovereignty.

Food sovereignty also means production and distribution of **certified seeds** to all farmers at reasonable prices, avoiding a monopoly position for hybrid or GMO seed production companies. The promotion of agro-ecology practices starts with avoiding losses of native crop species and quality seeds. **Land tenure security** also plays an important role in food sovereignty. It is an important condition of the long term investment of farming households in soil preservation and improvement practices as promoted by agro-ecology movements. **Economic benefit** is a key driver of farmers' adoption of innovative practices. Policies and regulations that will increase direct economic benefit by farmers in adopting agro-ecology practices should therefore be given priority.

Another issue discussed during the second consultation meeting with regional agro-ecology stakeholders (December 6, 2013) is related to the prospective analysis of the needs and aspirations of the **next generation of family farmers** in the GMS. In northeast Thailand for example, most rice growers are older than 60. The young men are working elsewhere, off-farm. Who will take over rice production? How to adapt agro-ecology practices and support policies to the future farmers in the GMS? These questions are burning issues that need to be addressed in the near future.

VALORISING AGRO-ECOLOGICAL PRACTICES THROUGH CERTIFICATION

Many agro-ecology initiatives aim at the promotion of local products through certification (organic products standard, participatory guarantee systems - PGS) and the development of local farmer markets.

By doing so, agro-ecology represents an alternative economic model whereby producers and consumers jointly define the quality of the product by taking into account other innovative components such as farmers' employment, food sovereignty, and biodiversity (Stassart and al., 2012).

The networks Ecovida (in southern Brazil) and PGS Vietnam are good examples of PGS certification. They certify producers based on the active participation of stakeholders and are built on a foundation of trust, social networks and knowledge exchange (IFOAM).

http://www.ifoam.org/Policy_Brief_PGS_web.pdf
https://sites.google.com/site/pgsvietnam/Home
http://www.ifoam.org/about_ifoam/standards/pgs_projects/pgs_projects/15649.php

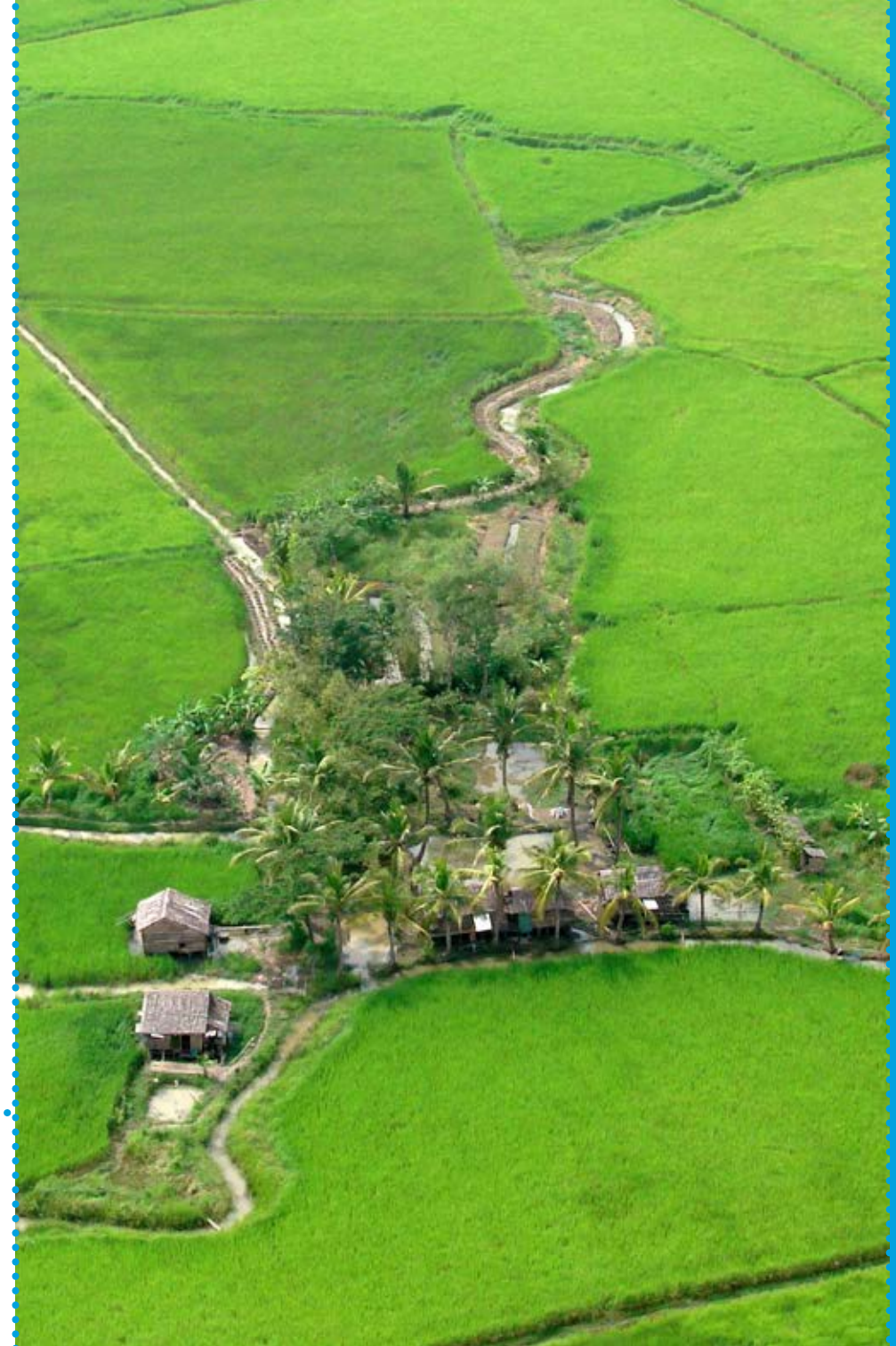
The future of agro-ecology in the Mekong Region may well depend on innovative certification mechanisms that will provide access to dedicated markets, as is the case for organic farming nowadays.

A few key ideas for the future of agroecology in the region:

Economic benefit is a key driver of farmers' adoption of innovative practices.

The future of agro-ecology in the Mekong Region may depend on innovative certification mechanisms that will provide access to dedicated markets.

Related to agroecology development and urgent future issues are the needs and aspirations of the next generation of family farmers in the GMS: how to make farm work attractive to the young generation, i.e to promote the modernity of agroecology practices and support economic development through family farming.



Rice cultivation and home gardening in the Ayeyarwaddy delta, Myanmar

Rice transplanting in deep water areas, Ayeyarwaddy delta, Myanmar

SECTION II.

MEETING THE CHALLENGES OF AN AGROECOLOGICAL TRANSITION IN SOUTHEAST ASIA

1 LESSONS FROM THE COMPARATIVE ANALYSIS OF AGRO-ECOLOGY EXPERIENCES

TRADITIONAL VERSUS MODERN AGRO-ECOLOGY

Several participants to consultation workshops highlighted the concept of "modern agro-ecology" as compared to "traditional agro-ecology".

Traditional agro-ecological practices refer to the farming systems and practices developed by farmers in their different contexts, based on *empirical learning processes and knowledge transfer from generation to generation*. Agro-forestry, crop rotation and association, etc… have been traditionally practiced by farmers all over the Mekong Region. Local, indigenous knowledge is highly relevant and should be mobilised in designing alternative agriculture practices.

The modern agro-ecology concept appeared in reaction to societal and environmental problems generated by the expansion of the so-called modern or conventional agriculture (i.e.: motorised and chemical agriculture). These modern agro-ecological practices build on traditional empirical knowledge and *scientific research for a better understanding and use of ecological processes operating in the farming systems*. They are compatible with the traditional concepts of sustainable agriculture or the more recent promotion of *climate smart agriculture*. Beyond the term 'agroecology' that has been used for many years lies very innovative concept and approaches capable of tackling the most recent issues related for example to food security or sovereignty or mitigation/adaptation to climate change.

The different agro-ecology "schools" presented in the previous section, such as integrated farming / IPM, SRI, CA, agro-forestry, organic agriculture, illustrate the collective effort of the society to re-build a modern "agro-ecology". They aim at rationalising the lessons learned from farmers' daily practices and scientific experiments and supporting their diffusion through adapted policies and development programmes. They also provide increased visibility to gain support from policy makers, consumers and funding agencies.

This finding stresses the importance of **affirming the "modernity" of the "agro-ecology" concept**, based on both empirical knowledge and increased scientific understanding and use of ecological processes for sustainable intensification of agriculture.

Longan-maize-fodder grass strips in Yen Bai, Vietnam

RELATIVE STRENGTH OF EXISTING AGRO-ECOLOGY SCHOOLS: OA, IPM, SRI, CA, AF

Organic agriculture, integrated farming/IPM, SRI, CA and agro-forestry have developed in all six countries in the last 25 years.

Some institutions have played a key role in the expansion and visibility of these approaches in the region such as FAO for integrated pest management, Cornell University for SRI, CIRAD for CA and ICRAF for agro-forestry. These international institutions implement their field activities through government agencies in the different countries and have organised regional networks with the support of international donors. International and local NGOs joined the movements later on to support extension activities with farming communities. Some project teams have also turned into national NGOs when the project ended to maintain the momentum beyond the project period.

The organic movement appears as a bottom-up process with farmers and local activists organising themselves and linking with other groups to support their activities and gain recognition. They ultimately federate by becoming members of national associations and the International Federation of Organic Agriculture Movements (IFOAM) which provide them with technical support and certification services.

A regional **assessment of the technical performances, adoption rate, coverage and impact** of these practices (number of farmers, area, production and economic value) is deemed necessary for a future networking activities.

THE 'FORGOTTEN' AGRO-ECOLOGY PRACTICES

Organic farming, IPM, SRI and agro-forestry are well known international schools related to the agro-ecology movement. The technical recommendations generally apply or aim to apply to farming systems with a high market orientation.

Two lesser known schools have been documented in this study: the VAC system and the "New Theory farming systems", respectively in Vietnam and Thailand. These alternative farming systems aim at optimising ecological processes through optimum "integration" of food gardening, fish rearing and animal husbandry. They generally apply to labour-intensive small-scale farming systems, with a high self-consumption orientation. Both have specific networks carrying out research and extension. The limited time allocated to the feasibility study did not allow us to quantify the respective importance of these schools (number of farmers, area, production and economic product).

Although less known and less market oriented, **these initiatives have and still produce sound field experiences that may be useful for the agro-ecological transition.**

AGRO-ECOLOGY PRACTICES PARTIALLY ADOPTED AND ADAPTED BY FARMERS

The review of the previous section provides various illustrations of how farmers adopt, and also often adapt, agro-ecological techniques to their realities. For example, the practice of SRI is expanding quickly with positive results; however the SRI 12 principles are rarely fully applied by farmers. We made the same observation for CA, whose three principles are not always adopted by farmers.

This should not be seen as a problem, but rather as an illustration of farmers' capacity to innovate and select what seems to be more adapted to their interests and means in the current contexts. There is no readymade recipe for agro-ecological development and farmers are not interested in supporting such or such a "school". They are rather interested in experimenting any innovation potentially useful for solving the actual problems they face in achieving sustainability.

This pleads for an open and flexible mind for the tenants of what we call "agro-ecological schools", who are invited to coordinate their efforts for, and their support to, the agro-ecology movement by **offering complementary production alternatives to smallholder farms** on the one hand, but also by **documenting and harnessing the farmer-led adaptation / innovation processes**.

HARNESSING COMPLEMENTARITIES BETWEEN SCHOOLS

The adoption of System of Rice Intensification (SRI) practices paves the way for organic agriculture (e.g. Cambodia, Laos) and for the application/expansion of the SRI principles to other crops through the so-called System of Crop Intensification (SCI). The Farmer Field School (FFS) learning process initially promoted by FAO for extending IPM practices is nowadays used for SRI (e.g. Myanmar) and other agro-ecology practices by a large range of stakeholders. Integrated Protection Management (IPM) evolved towards Integrated Crop Management (ICM). Trained individuals and government institutions (e.g. IPM units at provincial and district levels) are often mobilised to manage new practices such as SRI. Building on previous projects which have invested in agro-ecology training over long periods (e.g. training of trainers, FFS), engaging knowledgeable people who already understand the underlying principles of agro-ecology, facilitates the dissemination of new approaches. The role of the private sector in these evolutions is also worth noticing as private companies often accompany the changes in farmers practices, for example through the production and marketing of alternatives to chemical inputs.

These examples illustrate the on-going learning process and the **potential benefits for each school and for agro-ecology as a whole from cross-fertilisation of experiences and knowledge** between schools.

WINDOWS OF OPPORTUNITIES FOR PROMOTING AN AGRO-ECOLOGICAL TRANSITION

Some conditions, periods or stages in agriculture development are more favourable than others for farmers to successfully incorporate agro-ecological practices. This review shows clear examples of differentiated rates of adoption for IPM, SRI, agro-forestry, CA.

For example, CA dissemination experiences show that two kinds of situations are more favourable for the adoption of CA practices: (i) situations where farmers still use traditional shifting cultivation practices and need to adapt to fertility constraints due to restrained access to land, and (ii) situations where the use of conventional methods such as motorised tilling and use of chemical fertilisers and pesticides lead to heavy environmental problems such as erosion of pollution. Obviously, CA will have less echo in contexts where farmers recently engaged in convention agriculture practices (tractors, chemical pesticides and fertilisers…), are receiving short term benefits and still do not face environmental difficulties. Support policies are also essential components of such transitions as exemplified by the situation in Bhutan, where a clear vision of organic agriculture has been developed to support a national policy for agriculture development.

This suggests **identifying windows of opportunities** for more efficient and effective promotion of agro-ecological practices.

Summer rice direct seeding, Ayeyarwaddy delta, Myanmar

THE SUCCESSES OF FARMER FIELD SCHOOLS

Farmer Field Schools (FFS) are unanimously recognised as a powerful extension instrument for agro-ecology principles as it builds farmers' capacities to observe and react to ecological processes. Many organisations have used the FFS for engaging a strong scientific/experiential learning process on issues relevant to agro-ecology (e.g. organic farming, IPM, ISM, SRI).

FFS was easier to promote in countries where official extension systems were weak or had limited ties with the agrochemical lobbies. In Thailand for example, the Training and Visit (T&V) system developed in the 1980s with the support of the World Bank had institutionalised top-down technology transfer mechanisms of agricultural extension, combined with strong ties with agrochemical companies that used the government extension system to reach farmers. These prevailing systems made it more difficult for tenants of agro-ecology practices to promote them through alternative FFS extension approaches as it was clashing with the well-established T&V scheme. This may explain why FFS met great success in Cambodia, Vietnam, Laos and Myanmar but had a lower impact in other countries in the region.

Also, the term FFS has been used for describing any group-based extension activity, regardless of the quality of the training. Some so-called FFS involved a different topic every week: no experimentation, no season-long process of observation and analysis.... just regular sessions with a group of farmers. The number of these pseudo-FFS has risen with the term's success.

This suggests the importance of **promoting and supporting not only alternative farming practices, but also alternative extension approaches**. Members of agro-ecology networks should be invited to revisit the principles of agro-ecology and at the same time get back to the fundamentals of FFS so that a community of practice can be gradually developed at the regional level.

Summer vegetable Farmer Field School, Northern Rakhine State, Myanmar

CERTIFICATION MECHANISM TO REWARD AGRO-ECOLOGY PRACTICES

The multiplicity of initiatives and the required learning process raise the issue of the difficulty to give visibility and to reward this global effort of farmers and stakeholders for building agro-ecological alternatives to conventional food and agriculture systems. Organic farming is seen by some participants as the most accomplished standard of agro-ecological practice, with certification standards and procedures which provides visibility and economic awards. It is also seen as a niche market allowing a price premium on limited production volumes dedicated to specific market segments while "mass production" cannot benefit from such a price premium.

Very few farmers however can strictly respect the organic farming principles, and/or afford the cost of external certifications. This results in the emergence of alternative concepts such as Good Agriculture Practices (GAP), green products certification (e.g. China) or clean vegetables (e.g. Vietnam). In several countries, Participatory Guarantee Systems (PGS) reward farmers on the quality of their products or Payment for Environment Services (PES) reward the quality of the ecosystem farmers preserve by adopting agro-ecology practices (e.g. China).

These observations highlight the importance of addressing the question of valorisation of products, practices and/or landscapes (e.g. certification and PGS, labels, PES). **Economic incentives to farmers who join the "agro-ecology learning process"** should be investigated collectively, tested in real conditions and lessons learnt should be largely disseminated.

2 DEVELOPING SYNERGIES AMONG STAKEHOLDERS IN THE MEKONG COUNTRIES

Participants in the consultation process were asked to express their interest in taking part in the establishment and development of a regional network on agro-ecology. **All participants positively received the proposed initiative and clearly expressed their interest in participating in a future agro-ecological network.**

The Table 3 summarises expectations of participants during the workshop.

We present hereafter some of the expectations based on the discussions that took place during the consultation workshops.

Table 2. Expectations from participants towards a GMS agro-ecology network

Expectations	CA	LA	MY	TH	VN	YU
Building a shared understanding and common vision of agro-ecology	x	x	x	x	x	x
Developing synergies among stakeholders, organisations	x	x	x	x	x	x
Increased skills and expertise of network members through capacity building	x	x	x	x	x	x
Up-scaling project activities and facilitating the dissemination of innovative techniques	x	x	x		x	
Generating funds to strengthen national networks and regional umbrella	x	x	x		x	
Including more stakeholder groups (researchers, farmers, technicians)	x	x				x
Empowering the civil society and facilitating the recognition of NPA organisations	x			x		

BUILDING A SHARED UNDERSTANDING AND UNIFIED VISION OF AGRO-ECOLOGY

Participants expressed their interest and wish to reach a shared understanding and common vision of agro-ecology, for gaining higher visibility and influence.

The concept of "agro-ecology" is sometimes new to them. Some organisations considered the concept of "sustainable agriculture" as the old wording for the concept of "agro-ecology", which is more fashionable. For example, the concept of "sustainable agriculture" is used by GRET/CIRD in Cambodia (APICI) for characterising a learning process approach where farmers are testing, adapting and combining SRI and integrated farming techniques. Others consider that the concept of "agro-ecology" is similar to "Climate Smart Agriculture" as defined by FAO. The four criteria of Climate Smart Agriculture namely sustainability, stability, equitability and productivity would also hold for agro-ecology approaches.

The concept of "agro-ecology" may also not be fully understood due to limited standardisation or *translation issues reflecting the history of the concept in each country*. For example, the term agro-ecology was used in the 2000s for CA, before the latter was more precisely defined among practitioners during the 5th CA World Congress in 2011. Consequently, after 15 years of research on CA supported by CIRAD in Laos, there is still confusion between the concept of 'conservation agriculture' and 'agro-ecology', as 'conservation agriculture' was translated 'ecological agriculture' (niwet kasikam) in Lao language.

During the workshops, a continuum of practices was identified which made it difficult for participants to delineate clear boundaries between their approaches or schools. Many projects combine the different approaches so as to offer local farmers a panel of technical options that they can adapt to their own circumstances, needs and capacities. As a consequence, trying to delineate boundaries between schools is almost impossible as it would widen the gap between the principles of each school and the reality of field implementation. It was also observed that both donor communities and farming communities are opened to all approaches and keen to combine/integrate these in their practices.

As we aim at bridging the different schools instead of dividing them, workshop participants suggested that *networking activities should primarily focus on the principles* underlying the different practices. During the workshops, participants agreed to use the five historical principles of agro-ecology as a starting point in categorising sustainable production systems, whatever school they belong to. Agro-ecology is commonly understood as a sound use and management of agro-ecosystems, or a good balance between all the components of the ecosystems (water, soil, forest, wildlife, human, fauna and flora, etc.). From there, agro-ecology was defined as a *unifying concept which combines various forms of agricultural systems sharing one common goal: to reach environmental, economic and social sustainability.*

A regional agro-ecology initiative would thus have to further **refine the collective understanding of underlying principles and support the development and sharing of a common vision for agro-ecology development in the Mekong Region.**

Beyond the technical and socio-economic dimensions of agro-ecology, the Oxfam Lao country Director also mentioned that this kind of network should also have a wider mission or vision, including a philosophical common objective related to environmental and human well-being issues.

BUILDING SYNERGIES AMONG STAKEHOLDERS TOWARDS A COMMON GOAL

During the workshops, most participants were first interested in *sharing information, ideas and experiences in their own field of expertise*, e.g. "visiting interesting and successful IPM cases in other countries" for the national IPM expert. However, the discussion also raised interest in sharing with other fields of expertise.

The participants also recognised some *tensions between tenants of different schools*. These tensions may be due to different causes. One of them is the institutional competition for access to donor funds. Another one is directly linked to the behaviour of charismatic leaders who try to impose their views on others or are competing for their ideas in an attempt to increase their visibility. Beyond these institutional or personal causes, tensions sometimes reveal *conceptual or political divides* between schools. We highlight two of them as examples.

Ex 1: Strict conversion versus gradual transition

Tenants of strict organic agriculture exclude the use of any kind of chemicals. Organic certification opens market and may provide a premium price to the farmers for organic products, but it requires from producers a *complete conversion* to chemical-free practices, strictly excluding synthetic insecticides, herbicides or fertilisers. The conversion process is slowing down the adoption rate, as it may temporarily lower productivity and increase the work load in case of a pest outbreak or when available residue biomass is not sufficient to produce enough compost.

Others schools (e.g.: IPM, Good Agriculture Practices, CA, Integrated Farming) promote a sound and/or reduced use of chemicals and possibly their elimination as a final step of their action, which almost never happened. They promote a *gradual transition from current farming towards a more desirable technical model* adapted to local circumstances as well as the needs and capacities of farming households. More time is given to insure a smooth transition through gradual learning and adaptation of good agricultural practices. The downside of this approach is that certification is more difficult to set up and producers do not benefit from price premiums or dedicated market chains as is the case for organic products.

Ex 2: Family farms versus agribusiness companies

Family farms represent the large majority of agro-ecology farmers while agribusiness companies are relatively new to these practices and markets.

During the last 25 years, most sustainable agriculture projects focused on smallholders, considered by governments, researchers and development partners as key actors of agriculture and rural development. Consequently, agro-ecology techniques (AO, SRI, IPM, etc.) have been developed mainly for them and with them.

In the recent years however, moved by consumer demands for safer food and/or policy of corporate social responsibility, a number of agribusiness companies have invested in organic production and markets, generally the international market. The question is raised whether to include them or not within the agro-ecology movements.

These issues have been discussed during the consultation workshops. All participants reached a consensus that the **future regional agro-ecology network should concentrate efforts on family farms with a gradual transitional approach**. Dealing with agribusiness companies should be done only in relation with their interactions with smallholders or impacts on family farming.

In addition, a consensus has been reached concerning the overall interest of overcoming tensions between schools and learning from each other's work. All schools will get stronger if they can meet the demand from farming communities, governments and donors for a transition to agro-ecological practices. Building synergies among organisations and strengthening the overall network is seen as a prerequisite to increasing work efficiency and visibility of agro-ecology in every country and all throughout the region. All expressed their interest and will to share experiences and build synergies in order to promote the agro-ecological transition in the GMS region.

SCALING UP EXISTING EXPERIENCES

The question of scaling up experiences has been discussed and all participants see it as a key challenge. Some of the issues faced for scaling up local agro-ecological initiatives are given below:

- For farmers already engaged in conventional farming, the switch to alternative agro-ecological farming systems requires time (e.g. for rebuilding soil fertility) and often a transition period of lower production and income before recovering. *Specific incentive and compensation mechanisms* need to be worked out. In addition, bio-fertilisers and bio-pesticides are not available to farmers who want to transition to organic production because they are not developed at a commercial scale by private companies to supply an emerging market.

- The transition from subsistence to commercial agriculture is often supported by local *middlemen or traders* who link remote farmers to the market and smallholders to agribusinesses. They compensate the initial lack of credit system, support farmer organisations, and also the collection and transportation of agricultural product from villages to markets. They are important actors of local development as they support the diffusion of new practices and equipment but can also become predators when farmers become indebted. They should be fully *involved in the multi-stakeholder negotiations* taking place at the different stages of the agro-ecology transition.

- Organic market infrastructures are not yet much developed in the region and certification costs are high, which reduces the opportunities of premium prices paid by consumers for natural products. Specific ad hoc *certification systems* (e.g. PGS) and marketing campaigns to consumers need to be worked out.

- Farmers already engaged in the conventional farming lose empirical knowledge on ecological processes involved in sustainable intensification of agriculture. *Specific training and research / learning mechanisms* are required to engage farmers in adopting alternative farming systems.

The following mechanisms were also considered for scaling-up:

- *Identify windows of opportunity for intervention*: we have explained in a previous section how the different contexts and agrarian evolutions may hinder or favour the adoption of alternative farming systems. The identification of windows of opportunity for intervention and scaling up would help to gain in efficacy.

- *Facilitate communication platforms and consultation mechanisms:* Farmer networks play an important role in the development of sustainable agriculture systems. They support farmers learning and sharing activities during the conversion phase and link them to relevant market outlets. Community-level exchange networks should therefore be promoted as an incentive to the dissemination of agro-ecology practices. Smooth circulation of unbiased information among

network members is crucial for them to reap the benefits of their individual investments in network activities.

- *Valorise good practices through certification and PES systems*: Valorisation of products, practices or landscapes is crucial for gaining visibility, opening market and receiving financial incentives for the agro-ecological transition (e.g. price premium, labels, PES).

STRENGTHENING AND BUILDING ON EXISTING NETWORKS

According to participants, a regional agro-ecological network should definitely build on existing national and regional networks. A non-exhaustive list of such networks is given below based on the results of the national consultations.

In Cambodia

PROLINNOVA, an international multi-stakeholders platform, promotes local innovation, including farmer-led experimentation (Cedac, Srer Khmer and Padek are members);

COrAA committee gathers different stakeholders (farmer federations, private sector, NGOs) and focuses mainly on the organic marketing network;

NGO-Forum is a platform of several NGOs involved in different topics such as the Pesticides Reduction Network (PRN-C). It seems to be strongly managed by the committee; so members gave little information on potential complementarities or overlapping activities.

In Laos

The NGO Working Group on Forest and Agriculture gathers the main international NGOs and local Non for Profit Organisations (NPA).

The Sector Working Group on agriculture coordinated by the Ministry of Agriculture and Forestry is seen as a consultation platform between government agencies and donor communities. It also involves experts from different international institutions, researchers and representatives of the civil society.

In Vietnam

Some networks already exist for Agro-forestry, VAC (Vacvina) and organic agriculture (eco-farming).

There is no structured group at the national level on IPM, SRI and CA. To discuss and exchange agro-ecology ideas and experiences more broadly, the forum of NGO Resource Centre on Sustainable Agriculture and Natural Resource Management (SANRM), could become a relevant platform.

In Myanmar,

As in other Mekong countries, the organic movement is pretty well organised as it depends on certification schemes for product marketing. The Myanmar Organic Agriculture Movement Group (MOAG), which provides an umbrella for organic farming organisations and issues organic certificates, also contributes to the Myanmar Green Network.

In all countries

National and international NGOs link to a large number of regional or global networks that will be important to investigate more systematically in the context of the future project.

Participants to the consultation workshops mentioned practical issues related to the expansion of existing networks for including many more organisations working on a large range of topics. For example, more than 100 organisations have been identified as working on topics related to agro-ecology in the Mekong Region (Table 1). A network with such a large number of members may be too big and too complex to manage efficiently. They suggested **organising and/or to strengthening existing thematic regional networks** for agro-forestry, organic agriculture, IPM, or CA for example. CANSEA already plays a significant role in the promotion of CA in the region and could become an example for other networks. Later on, these thematic networks could be *federated under a unique regional umbrella.*

Weighting and packaging area for organic vegetable, Ha Nam Province, Vietnam

INCREASING THE VISIBILITY OF AGRO-ECOLOGY INITIATIVES AT MULTIPLE SCALES

Beside rice production for domestic market consumption, agriculture in the Mekong Region is dominated by mono-cropping-based, export-led production systems that generate a share of the total agricultural production while occupying most of the agricultural land and rural population. Very large economic interests are vested in conventional agriculture, which may explain why beyond the ideological discourses about sustainable agriculture and self-sufficiency, alternative agricultural practices have not generalised in the recent years. Agrochemical companies have developed very strong lobbies that prevent, or at best slow down, the transition to alternative farming practices.

As a result, conversion processes have been mainly supported by some form of spiritual and/or environmental activism or market opportunities provided by consumer demand for organic products. Many farmers engaged in alternative farming claim that the non-monetary rewards compensate for the lack of premium on the price of organic products. However, an efficient market infrastructure for their products is a prerequisite for the widespread adoption of alternative agriculture. A recognised certification scheme benefits farmers because consumers sometimes doubt the authenticity of a farm product which is simply labelled 'organic' or 'chemical free'. One obstacle to the growth of alternative agriculture is the limitations in the certification scheme. Non-governmental organisations have been very effective at promoting sustainable agriculture as they are working at the grassroots level with the poorest farmers who did not get access to the inputs and innovations of the Green Revolution and are worst affected by the failures of conventional agriculture. However, the *future of agro-ecology practices will depend on its visibility*. Flexible agro-ecology certification schemes should be explored to **support the definition and implementation of widely recognised quality standards.**

The success of organic networks lies in the need to get organised into groups or associations in order to get certified and gain access to dedicated markets. Other schools within the agro-ecology movement should *learn from the experience of the organic movements* to strengthen their networks and develop synergies with higher levels (i.e. from national to regional and global) and with other thematic networks. By increasing their visibility and their recognition as an important component of agriculture, agro-ecology movements will then be able to better defend their positions against agrochemical lobbies and may lose on the way its status of 'alternative' agriculture to become 'mainstream', marking the end of the transition. Accompanying the transition towards agro-ecology requires **developing a number of instruments, standards and procedures to support and monitor changes and impacts.**

Upland farming, Houaphan Province, Lao PDR

Upland landscape,
Houaphan Province,
Lao PDR

CONCLUSION:

TOWARDS AN AGROECOLOGICAL TRANSITION IN SOUTHEAST ASIA

The study shows that there are a **significant number of initiatives and accumulated experiences** in the Mekong Region on practices contributing to an **agro-ecological transition** seen as an alternative to the current agrifood system. Agro-ecology is a **unifying concept** of a wide "agro-ecology movement", to which "schools" such as Organic Farming, CA, System of Rice Intensification (SRI), Integrated Pest Management (IPM), Integrated Farming, Agro-forestry, as well as VAC and new theory farming systems are contributing. All these initiatives represent high capital in terms of scientific knowledge, experience and knowledge.

The findings of this study stress the importance of affirming the "modernity" of the "agro-ecology" concept based on both empirical knowledge and increased scientific understanding and use of ecological processes for sustainable intensification of agriculture. Existing agroecology schools (Organic Agriculture, IPM, SRI, CA, Agroforestry) have already gained relative acknowledgment but a regional assessment of the technical performances, adoption rates, coverage and impact of these practices (number of farmers, area, production and economic value) is deemed necessary for future networking activities. In addition, identifying windows of opportunities for more efficient and effective promotion of agro-ecological practices is a prerequisite success factor. The study also points out that it is crucial to promote and support not only alternative farming practices, but alternative extension approaches as well. Members of agro-ecology networks should be invited to revisit the principles of agro-ecology and at the same time get back to the fundamentals of FFS so that a community of practice can be gradually developed at the regional level. Last but not least, the stakeholders involved in the study highlighted the importance of addressing the question of valorisation of products, practices and/or landscapes (e.g. certification and PGS, labels, PES). Economic incentives to farmers who join the "agro-ecology learning process" should be investigated collectively, tested in real conditions and lessons learnt should be largely disseminated.

The consultations of agro-ecology actors confirm a **shared interest for bridging and synergising these initiatives**, in order to exchange and enrich experience, to increase the visibility of the practices and scale up their adoption by farmers and inclusion in public policies, as well as to increase their capacity of fund raising for strengthening the existing networks. A regional agro-ecology learning alliance can emerge from the existing though still dispersed initiatives in the region. It should have a clear mandate and added value in relation to existing networks and initiatives. It can be fostered by "agro-ecology champions" from the different countries, who will actively promote the concept of agro-ecological transition, bridge the gap between existing experiences and facilitate the formulation of new projects by providing funds necessary to sustain the network activities. The learning alliance would strengthen the agro-ecology networks in the countries, and build and bridge between the regional thematic networks. Governance would have a democratic pattern. Finance would be diversified and sustainable.

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NUMBER OF PARTICIPANTS IN CONSULTATION WORKSHOPS AND EXPERT CONSULTATIONS

Country	Consultations dates	Number of participants	Institutions involved in agroecology				
			govt	ingo	cso	priv	**tot**
Cambodia	30/05/2013	15	4	13	4	4	25
Lao PDR	15/05	14	9	5	4	1	19
Myanmar	12/06	20	4	4	5	3	16
Thailand	12/06	-15-	7	5	5	1	18
Vietnam	11/06	27	8	14	3	0	25
China	19/06	-14-	5	4	2	4	15
Total		105	37	45	23	13	118

N.B. The number of institutions involved in agro-ecology in each country is displayed in the last column with breakdown according to the type of institution in the previous columns (govt = government institutions, ingo = international non-governmental organisations, cso = civil society organisations, priv = private sector).

LIST OF ORGANISATIONS INVOLVED IN THE CONSULTATIONS WORKSHOPS

Countries	Governmental Institutions	Non Governmental Institutions (national)	Non Governmental Institutions (international)	Civil Society Organizations Farmer networks	Private Sector	Others
Cambodia	Ministry of Agriculture, Forestry and Fisheries (MAFF)	Centre d'Etude et de Développement Agricole Cambodia (CEDAC)	Agrisud International	Asian Farmers' Association (AFA)	Natural Garden	CIRAD
	Cambodian Agriculture Research and Development Institute (CARDI)	Srer Khmer	Aide au Développement Gembloux (ADG)	Farmers and Nature Network (FNN)	Khmer Harvest	GIZ
	Kbal Koh Station	Cambodian Institute for Research and Rural Development (CIRD)	International Volunteer Center of Yamagata (IVY)	Federation of Farmers Association promoting family Enterprise in Cambodia (FAEC)	PUAC Shop (KFG)	
	Tuk Vil Station Research Center	Carritas Cambodia	Japan International Volunteer Center (JVC)	Peri-Urban Agriculture Center (PUAC)	CEDAC Shop	
		Cambodian Organic Agriculture Association (COrAA)	Gret			
			Oxfam America			
			Wildlife Conservation Society (WCS)			
Laos	Ministry of Agriculture and Forestry (MAF)	Association des Groupements des Producteurs de Café du Plateau des Bolovens (AGPC)	Oxfam Belgium, Netherlands, Australia		AgroAsie	CIRAD
	National Agriculture Research Center (NARC)	Association pour le Soutien au Développement des Socétés Paysannes (ASDSP)	Comité Coopération Laos (CCL)		AgroFex company	FAO
	Nothern Community Management Irrigation Sector Project (NCMI)	Participatory Development Training Centre (PADETC)	SNV			
	National Agriculture and Forestry Research Institute (NAFRI)	Sustainable Agriculture and Environment Development Association (SAEDA)	Agrisud International			
			Welthungerhilfe, German Agro Action			
			Helvetas			

LIST OF ORGANISATIONS INVOLVED IN THE CONSULTATIONS WORKSHOPS

Countries	Governmental Institutions	Non Governmental Institutions (national)	Non Governmental Institutions (international)	Civil Society Organizations Farmer networks	Private Sector	Others
Myanmar	Plant Protection Departement, Departement of Agriculture	Ecosystem Conservation and Community Development Initiative (ECCDI)	Welthungerhilfe		Shan Maw Myae	FAO
	Taungoo University	Metta Development Foundation	Gret		Green Growth Generation Co., LTD	
	Union of Myanmar Federation of Chamber of Commerce and Industry (Myanmar Organic Agriculture Group)	Farmer Business Development Technical Group			Doe Taung Thu Organization	
	Department of Agriculture, Ministry of Agriculture and Irrigation (MoAI)	Natural Resource and Technology Applied Group (NRTAG)				
		Mangrove Service Network (MSN)				
		CORAD				
Thailand	Department of Agriculture Extension - Ministry of Agriculture and Cooperatives			Earth Foundation / Green Net	Thai Organic Trader Association	CIRAD
	Land Development Department (LDD) - Ministry of Agriculture and Cooperatives			Alternative Agriculure Network (AAN) / Sustainable Agriculture Foundation Thailand (SAFT)		IRD
	Universities (Kasetsart, Chiang Mai, Khon Kaen, etc.)			Thai Education Foundation		FAO
	Royal Project Foundation Highland Research and Development Institute (HRDI)					World Agroforestry Centre (ICRAF)
	AIT (Asian Institute of Technology)					

Countries	Governmental Institutions	Non Governmental Institutions (national)	Non Governmental Institutions (international)	Civil Society Organizations Farmer networks	Private Sector	Others
Vietnam	Ministry of Agriculture and Rural Development (MARD)	Sustainable Rural Development (SRD)	Agriculture Development Denmark Asia (ADDA)	Vietnamese Farmers Union (VNFU)		CIRAD
	Nothern Mountainous Agriculture and Forestry Science Institute (NOMAFSI)	Center Community Research Development (CCDR)	Netherlands Development Organization (SNV)			AVRDC
	Centre for Agrarian Systems Research and Development (CASRAD)		Japan International Volunteer Center (JVC)			Danida
			Action Aid Vietnam			ICRAF
Yunnan	Ministry of Agriculture	Pesticide Eco-Alternative Centre (PEAC)	Oxfam Hong Kong	Eco-Planting cooperative of Pingzhai Village	Haobao Organic Farm	
	Ministry of Environmental Protection	Centre for Biodiversity and Indigenous Knowledge		Guangdong Green Farming Social Work Development Center	Manlao River Organic Coffee Plantation	
	State Forestry Administration	PCD-Partnership for Community Development			Sino-Agri Holding company limited	
	Centre for Mountain Ecosystem Studies (CMES)				TianZi Biodiversity Conservation and Development Center	
	Yunnan Institute for Ecological Agriculture					

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ABOUT THE STUDY

Starting from the early 1990s, a multitude of national and regional initiatives have emerged in the Great Mekong Sub-Region for supporting ecological intensification of agriculture or agroecology.

The French Agency for Development (AFD) has been a very active supporter of these initiatives, especially in relation to the promotion of Conservation Agriculture and the establishment of the Conservation Agriculture Network for South East Asia (CANSEA). In addition to its initial focus on Conservation Agriculture and with the objective of widening the scope of agroecology by including all other "schools" such as Organic Agriculture, Agroforestry, Integrated Pest Management, System of Rice Intensification…, the AFD commissioned a study to better understand regional and national agroecology dynamics and initiatives, their strengths and weaknesses as well as the main issues at stake for their large scale dissemination.

The authors conducted this study in 2013 in the six countries of the GMS, through a review of the literature combined with country based consultation workshops in Cambodia, Laos, Myanmar and Vietnam and expert surveys in Thailand and Yunnan-China.

This publication aims at sharing some of the study's key findings, and at providing a broad, yet non-exhaustive, overview of the current situation of agroecology in the Great Mekong Region.

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ABOUT GRET

Gret is a French development NGO which for 38 years has been acting from the field to policy level, to fight against the poverty and the inequalities. Its professionals intervene on a broad range of topics in order to provide sustainable and innovative responses for a fair development.

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