

The Conservation Agriculture Network for South East Asia (CANSEA) an Initiative to Develop and disseminate CA in South East Asia

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Introduction

Different contexts explain the development and the dissemination of conservation agriculture in South-East Asia and consequently the emergence of a sub-regional network for the development and the coordination of Conservation Agriculture activities.

Under the influence of rapid changes related to population growth, conditions of market integration, private or national initiatives (corn, rubber crop, jatropha, etc.), some agrarian systems of Southeast Asia are undergoing a true mutation. Although this change allows immediate socio-economic benefits, it has medium-term negative environmental impacts with long-term repercussions on natural resources, conditions of production and people's health. The simultaneous processes of deforestation, new lands extension (slash & burn) and agricultural intensification have led to critical soil erosion and gradual soil exhaustion. Yields have been continuously decreasing. Conservation Agriculture brings a global answer to these fertility problems, and makes it possible to gradually restore the soil production potential. No tillage, direct seeding into cover crops and permanent cover crops that play the role of fallow, allow a return to the physical and chemical fertility of these soils. The introduction of fodder crops into farming rotations allows, in addition to improvement of soil nitrogen, a better integration agriculture-livestock

In view of these issues, several Research for Development (R4D) projects in the sub-region have developed and disseminated systems of Conservation Agriculture based on direct seeding mulch-based crop systems (DMC-SCV) which contribute to ecological intensification and a sustainable diversification. These projects have produced a significant set of results and data on CA farming systems in Southeast Asia. The Conservation Agriculture Network for South-East Asia (CANSEA) was created in September 2009 to address various regional problems of research and development, which cannot be solved at the national level. CANSEA is a structured regional organisation aimed at implementing projects of regional interest with regional comparable research designs, harmonized environmental and economic assessment methods and comparable impact indicators.

Organization of the CANSEA Network

This regional network of research for development is made up of 8 institutional partners from 6 Southeast Asian countries.

The 8 founding members of the network are:

- Cambodia: the Ministry of agriculture, forestry and fisheries (MAFF);
- China: the Yunnan Academy of Agricultural Sciences (YAAS);
- Indonesia: the Indonesian Agency for Agriculture Research and Development (IAARD);
- Laos: the National Agriculture and Forestry Research Institute (NAFRI);
- Thailand: the University of Kasetsart;
- Vietnam: the Northern Mountainous Agriculture and Forestry Science Institute (NOMAFSI) and the Soils and Fertilizers Research Institute (SFRI);

- Le Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD), which cooperates with all the partners of South East Asia. According to comparative advantage, each network member is leading a theme of action having both national importance and regional interest (see table 1). The network is managed by a Steering Committee and a Regional coordination unit.

CANSEA Objective and Activities

The overall objective of the CANSEA network is to optimize the similarities and the complementarities among countries and institutions in the Mekong region to: i) improve the efficiency of research carried out by the various programmes; ii) go beyond the “pilot” diffusion of CA systems in Southeast Asia; and iii) optimize resources and means.

As a newly structured organisation the CANSEA’s Regional Coordination (CR) gives priority to: i) generic set of actions; and ii) preparing regional specific R-D projects on common thematic of regional interest.

The generic actions are those conventional activities aimed at: i) facilitating exchanges of results and experiences between members; ii) proposing mechanisms of cooperation; and iii) developing common regional projects. The network plays the role of catalyst. This is all the more important in South East Asia since national institutions of R4D have historically had very few exchanges between them and had not really developed strong cooperation. CANSEA is contributing to improving the situation.

The generic types of action include:

- **Supporting exchange between partners** to define, prepare and jointly submit R4D projects. These are meant to seek new funding for new regionally-based projects consolidating previous national achievements.
- **Updating the database on Conservation Agriculture** linked to the CANSEA web site www.cansea.org.la for dissemination of results. Generic activities of the network will initiate exchanges to prepare projects on issues of regional interest.

The projects of regional interest are the following:

- **Regional Component 1: *To develop CA systems at watershed scale (uplands & lowlands) to improve agricultural production and control soils and environment degradation.***

The objective is to develop farming systems that are more productive in the uplands while preserving natural resources and the environment. Slash & Burn systems based on two years rice cropping following by fallow period can be replaced by a CA based on no tillage, direct seeding, cover plants and crops rotation. In uplands leguminous cover crops contribute to restoring soil fertility and animal production. In low lands direct seeding and integration of rice within a crop rotation which includes leguminous cover crops make it possible to reduce production costs, control weeding, improve water balance, improve soil fertility and provide fodder biomass to intensify livestock production.

- **Regional Component 2: *CA development for diversification of rice-based cropping system in uplands areas.***

In the mountainous area rainfed rice is the staple food. Traditional practices are no longer compatible with the demographic pressure and the reduction in land availability. Without interim protective measures, erosion becomes important and the soils on steep slopes quickly become unproductive. In these upland areas CA techniques allow a return to a physical and chemical fertility as well as a better integration agriculture-livestock.

- **Regional Component 3: *Restoration of the fertility of degraded acidic soils with aluminum toxicity.*** Acidic soils are abundant in South-East Asia. There are Acrisols (albic, aluminic or plinthic) issued

from very diverse origins (Sandstone, Claystone and even on fluviogenic soils). They all have a very low pH (4 to 5), with strong deficiencies in nutrients and often an aluminum toxicity. When they come from sandstone, these soils are sandy, very poor, with low water holding capacity, which accentuates the risks of drought. Their weak exchange capacity largely saturated by aluminium exacerbates the risk of aluminum toxicity.

The objective is to restore the fertility of these soils transforming them back to an economically-attractive production level. The NAFRI-CIRAD experience showed that within a few years conservation agriculture techniques (no soil tillage, permanent coverage of the soil and rotation with leguminous plant with strong biomass) can gradually restore the fertility of these soils and make them economically productive.

- **Regional Component 4. *To understand the determining factors of the CA adoption and to identify the socio-economic conditions for its diffusion.***

For multiple reasons (cultural, historical, economic, technical) the adoption of CA technologies is slow, especially when these new methods target subsistence farmers without investment capacity. It is important to understand at farmers' level what the determining factors of this adoption are. At environmental level, it is also important to identify the conditions of diffusion of these new CA technologies.

- **Regional Component 5. *To Support the development of various curricula on CA.***

The overall objective is to contribute to building a regional programme based on a network approach developing synergies and coordinating among Faculties and Colleges of Agriculture within the region. This component is based on:

- A tailored agroecology teaching programme for each Faculty or College according to local requirements, objectives and means.
- Focused faculty programmes on concept and theory and fundamental themes (carbon flows and carbon sequestration, organic matter dynamics in soils, soil biology research and studies) and focused college programmes on practical aspects of Conservation Agriculture and Direct Seeding on plant cover (SCV).
- A specific short term training course in Agroecology and Conservation Agriculture targeted to researchers, teachers and technicians

Key lessons learned from the experience of the CANSEA network

These key lessons are the following:

- The difficulty to mobilize grassroots partners, stakeholders and to make emerging relevant and useful information and results from this basic level with ongoing CA programmes and projects.
- The difficulty to develop and use relevant Participatory Information & Communication Technologies for Development (PICT4D) tools which allow network members to share their information and experiences.
- The necessity to have a lean structure to avoid heavy structural and transaction costs. Multiplying management committees is very costly in terms of meetings (travels, per diem...).
- In defining and implementing regional programmes (transnational) objectives and activities of these programmes are collectively defined. Institutions do together what can't be done alone. Some national institutions are reluctant to be involved in regional programmes since they consider they not have the full control over them.

Figures and Tables

Figure 1. Network Members & selected thematic areas according to both their comparative advantage to lead the theme and the regional interest of the theme for other countries

Founding Institutions	Thematic areas selected by institution according to their comparative advantage to lead the theme & the regional interest of the selected theme for the other countries.
Cambodia GDA-PADAC	Methodological approach to link Research & Extension.
China YAAS	CA development for diversification of rice-based cropping system in uplands areas
Indonesia IAARD	CA development in watershed area (uplands & lowlands) to improve agricultural production and control soil & environment degradation
Laos NAFRI	CA to restore fertility of degraded soils & more specifically of acidic soils
Thailand KU	Curriculum development (Masters) on CA integrating (amongst others) C sequestration & soil Biology
Vietnam NOMAFSI SFRI	Soil conservation & CA-DMC systems in Uplands zones