ACP-ACTAE Project
Agroecological Crop Protection

Minutes of the ACP Workshop

My Tho, SOFRI (Southern Horticultural Research Institute), Vietnam, 29-31 August 2017

Acknowledgments

Many thanks to VAAS and SOFRI (especially Dr Nguyen Van Hoa, Dr Nguyen Thi Ngoc Truc and Dr Tran Thi My Hanh and all their colleagues who contributed) that locally organized and hosted the Workshop in My Tho, SOFRI (Southern Horticultural Research Institute), Vietnam,

Thanks to ACTAE project and AFD (French Agency for Development) for having funded local charges during the Workshop and travel costs and accommodation of non-Southern Vietnamese participants.

Thanks also to CIRAD (UMR PVBMT) that contributed to the organization and funding of this Workshop.

Dr Jean-Philippe Deguine (Cirad), coordinator of the ACP-ACTAE Project

1 Background

In South-East Asia in general and especially in Vietnam, Laos, Cambodia and Myanmar, agriculture faces a wide range of constraints, including the rapidly changing demand for agricultural production (quantity, quality and safety), the impacts of climate change, the impacts of inputs on health and the environment. Crop Protection has relied for a long time on agrochemicals but is now at a defining moment. Although pesticides have been condemned for many years, the problems encountered with this type of Crop Protection are becoming more frequent and acute: inefficiency in many situations; resistance to pesticides; soil, water, and air pollution; hazards to human health; and loss in biodiversity.

In this context, the challenge of agronomic research is: ii) now to move from this chemical-based approach to that of pest prevention with more balanced and sustainable agroecosystems; ii) to answer both the current questions (in particular to improve the socio-economic viability of the stakeholders) and those of tomorrow (in particular to design and implement ecologically sustainable agroecosystems). Agroecology appears to be an appropriate and relevant way to respond to this challenge.

2 Agroecological Crop Protection

Agroecological Crop Protection (ACP) is the declension of Agroecology to Crop Protection and it is at the crossroad of Agroecology and Crop Protection. It aims at "replacing" chemicals, which have negative effects on the environment and on human health, by the services offered by functional biodiversity above and below soil surface. By focusing on preventive measures, it aims at establishing a bioecological balance between plant and animal communities within an agroecosystem in order to prevent or reduce the risk of infections or outbreaks of pests' outbreaks. ACP is based on 2 axis: i) enhance biodiversity (vegetal/animal) and ii) soil health. It is therefore very consistent and complementary to Conservation Agriculture, devoted to agroecosystem soil management. ACP is another field of agroecosystem field study and management, devoted to prevention and management of pests. It is now well documented.

The three pillars of implementation of ACP are sanitation, habitat management and biological control. New scales of intervention are considered, both in terms of space and time in accordance with participatory, global and systemic approaches. The implementation of the ACP principles to the field reality have shown good results in different parts of the world and some success stories have been described, for example in horticultural crops or fruit crops. Keys of agroecological transition are now available and can be adapted to different contexts, for example SEA context.

3 ACP-ACTAE project and My Tho Workshop

ACTAE is a regional project, funded by AFD (French Agency for Development) and Cirad, aimed at promoting agro-ecological principles and practices in Cambodia, Lao PDR, Myanmar and Vietnam. The overall objective of ACTAE project is to build sustainable and effective mechanisms to facilitate synergies among initiatives contributing to an agroecological transition in South East Asia between Research, Extension and Farmers.

The overall object of the "Agroecological Crop Protection (ACP) ACTAE project is, by starting and promoting activities in a new field of Agroecology, to contribute to the global development of Agroecology in SEA through 3 specific purposes: i) Making a state of the art of Crop Protection in the zone and identifying the priority issues of Crop Protection that must be taken into account; ii) Training and information exchanging on ACP for stakeholders (including training sessions and the organization of a regional Summer Scientist School); iii) Building

the foundation of a ACP medium term project, integrating research, training, education and extension support (including already identified deliverables) with CANSEA partners.

We have to consider this project as a framework to start basic activities (survey, exchange of information, training) and as a leverage to build a medium term ACP research project for CANSEA (2020-2024), with current and new technical and financial partners.

Meetings and seminars planned in this proposal are targeted to all ACTAE countries (Vietnam, Myanmar, Laos, Cambodia), such as workshops and Summer School (see below). But, taking into account the limited amount of the requested budget, this ACP proposal will particularly focus on developing partnership with two countries: Vietnam and Myanmar.

After the two previous ACP-ACTAE Workshops held in Hanoï (Vietnam, 25-26 April, 2017) and in Nay Pyi Taw (Myanmar, 3-5 May, 2017), this Workshop was the third one, and it hold in My Tho (Vietnam, 29-31, August 2017). It was co-organized by SOFRI/Vaas and Cirad, and it had an international level, including the participation of colleagues from Cambodia, Laos and Myanmar.

4 Program, ACP Workshop (My Tho, August, 29-31, 2017)

Day 1. Tuesday 29th August 2017. State of the art. Current situation

Opening Session
Opening remarks and welcome (Dr HOA NGUYEN VAN, SOFRI)
Opening Session (Dr Philippe CAO VAN, CIRAD-ACTAE)
Some words on the program and the ACP-ACTAE project (Dr J.-P. Deguine, CIRAD, Dr Nguyen Thi Ngoc Truc & Dr Tran Thi My Hanh, SOFRI)
Group Photography

Coffee break

Presentations on specific topics
1. Agroecological Crop Protection: concepts and experiences (Cirad, J.-P. Deguine)
2. An agroecological experience from a farmer in Reunion Island (J.-C. de Cambiaire)
3. Researches and application of insect semiochemicals for crop protection in the Mekong delta of Vietnam. Pr Le Van Vang (Can Tho University)

Collective Lunch

Presentations on Crop Protection (15'presentation + 5' discussion)
Each presentation wil try to propose a review of Crop Protection in the country (main problems per crop and/or thematic; status, evolution, and perspectives) and to present the main activities in Biological Control (mainly biological control using arthropods and bioproducts)

Presentations per country: Status of Crop Protection
- Myanmar. Status of Crop Protection in Myanmar (Dr Nwe Nwe Yin, DAR, MOALI)
- Cambodia. Status of Crop Protection in Cambodia (Mr Sereyboth Soth, Royal University of Cambodia)
- Laos. Status of Crop Protection in Laos (Dr Pheophanh Soysouvanh, MoA, PPC)
- Vietnam. Status of Crop Protection in Vietnam (Nguyen Nam Hai, PPRI)

Presentations on specific topic in Vietnam
- Main Research on Biological Control (Dr Hang Thi Dao, PPRI)
- Prospects and challenges of applying IPM in fruit production in the South of Vietnam (Mr. Nguyen Thanh Hieu, SOFRI)
- Research on Biological control and on bioproducts (Dr Nguyen Thi Ngoc Truc, SOFRI)
- Fruit Flies and their control in Vietnam (Dr. Le Quoc Dien, SOFRI)
- Occurence of Tomato spotted wilt virus in DaLat city in Vietnam (Dr Pham Thi Hoa, Lam Dong Plant Prot Dept)

Day 2. Wednesday 30th August, 2017. Field trip

(8:00-17:00)

- Visit the rambutan orchards (GlobalG.A.P standard+limited using chemical) (35 km from My Tho city)

- Field trip to pomelo orchards (VietGAP standard+Green ant rearing) in Chau Thanh dist, Ben Tre province (20 km from My Tho city)

An all-day field trip in the area of Mekong Delta (organisation: Dr Nguyen Thi Ngoc Truc & Dr Tran Thi My Hanh, SOFRI)

Convivial diner (18:00)

Day 3. Thursday 31st August 2017

Presentations on Soil health (15'presentation + 5' discussion)
- Myanmar. Research on improvement of the health of the soil (Dr Khin Myat Soe, MOALI, DOA-LUD)
- Cambodia. Research on improvement of the health of the soil (Mr Vira Leng, CASC).
- Laos. Research on improvement of the health of the soil (Dr Olot Sengtaheuanhung, DA-LaM)
- Vietnam. Research on improvement of the health of the soil (Dr Nguyen Duy Phuong, Dr Vu Manh Quyet, SFRI & Mr Do Trong Hieu, Nomafsi)

Presentations from Universities (15'presentation + 5' discussion)
Each presentation will try to propose 1. The status and the main activities of Teaching and Research in Crop Protection; 2. Main Research activities on Biological Control and Bioproducts
- Nong Lam Univ (Dr Le Khac Hoang)
- Can Tho Univ (Prof. Le Van Vang)
- Tay Bac Univ (Ms Bui Thi Suu)
- Royal University of Agronomy, Cambodia (Mr Sereyboth Soth)

Rotating Workshops

Through rotating workshops (12-15 participants per group): discussions on 2 pillars of ACP; for each RW: presentations from partners of different countries and organizations, discussion and synthesis.

1. Soil management (Meeting room): How to get a healthy soil to improve pest management? Facilitators: Dr Khin Myat Soe (MOALI, LUD, Myanmar) & Dr Nguyen Duy Phuong (SFRI, VN)

2. Biological control (Conference room): Functional Biodiversity & Bioproducts in an ACP context. Facilitators: Dr Nguyen Van Hoa (SOFRI, VN) & Dr Arnaud Costa (CABI, Malaysia)

Collective Lunch

Presentations from other partners (15'presentation + 5' discussion)

Each presentation will be structured in 2 parts: 1. Main activities and Research in Crop Protection. 2. Activities relevant with Agroecological Crop Protection

- CABI (Dr Arnaud Costa)
- IFAM (Ms Tram Duong, Nu Hoang Institute for Fruit Trees and Macadamia)
- BIO PHAP (Mrs Huynh Dinh Ha Giang)
- HAGL (Mrs Bich Lieu Au)

Restitution of the 2 rotating workshops

Outputs and deliverables (ACP-ACTAE project and others)

Closing session

All the presentations have been given to each participant on a USB key and they also are given at the end of the minutes (annex).

5 Participation and support ACP Workshop (My Tho, August, 29-31, 2017)

Financial support
The ACP-ACTAE project supports:
- logistical charges of the Workshop;
- lunch (29, 30, 31 August) and convivial diner on the 30th August;
- travel and accomodation of the participants coming from North VN, from other places than My Tho and from Laos, Cambodia and Myanmar

6 Organization Committee, ACP Workshop (My Tho, August, 29-31, 2017)

Dr Nguyen Van Hoa / SOFRI Director
Dr Jean-Philippe Deguine / CIRAD-UMR PVBMT
Dr Nguyen Thi Ngoc Truc / SOFRI
Dr Tran Thi My Hanh / SOFRI
Dr Philippe Cao-Van / CIRAD – CTA ACTAE regional project

7 Participants and institutions, ACP Workshop (My Tho, August, 29-31, 2017)

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Dr Philippe Cao Van	Cirad	philippe.cao_van@cirad.fr
Dr Jean-Philippe Deguine	Cirad	jean-philippe.deguine@cirad.fr

8 List of institutions (ACP-ACTAE Workshop, My Tho, 29-31 August 2017)

1. Vietnam

Research Institutes: SFRI (Soils and Fertilizers Research Institute), NOMAFSI (Northern Mountainous Agriculture and Forestry Science Institute), SOFRI (Southern Horticultural Research Institute), PPRI (Plant Protection Research Institute)

Universities: Nong Lam University (VN), Can Tho University (VN), Tay Bac University (VN)

Others: IFAM (Nu Hoang Institute for Fruit Trees and Macadamia), Lam Dong Sub Plant Protection Department (Dalat), BIO PHAP, Viet Tay Do company, HAGL.

2. Other countries

Myanmar: MOALI (Ministry of Agriculture, Livestock and Irrigation), DOA-LUD (Department of Agriculture, Land Use Division) and DAR (Department of Agricultural Research).

Laos: DALaM; PPC (Ministry of Agriculture).

Cambodia: Royal University of Agronomy; CASC (Conservation Agriculture Service Center) under the GDA (General Directorate of Agriculture).

France (Reunion): a farmer/scientist.

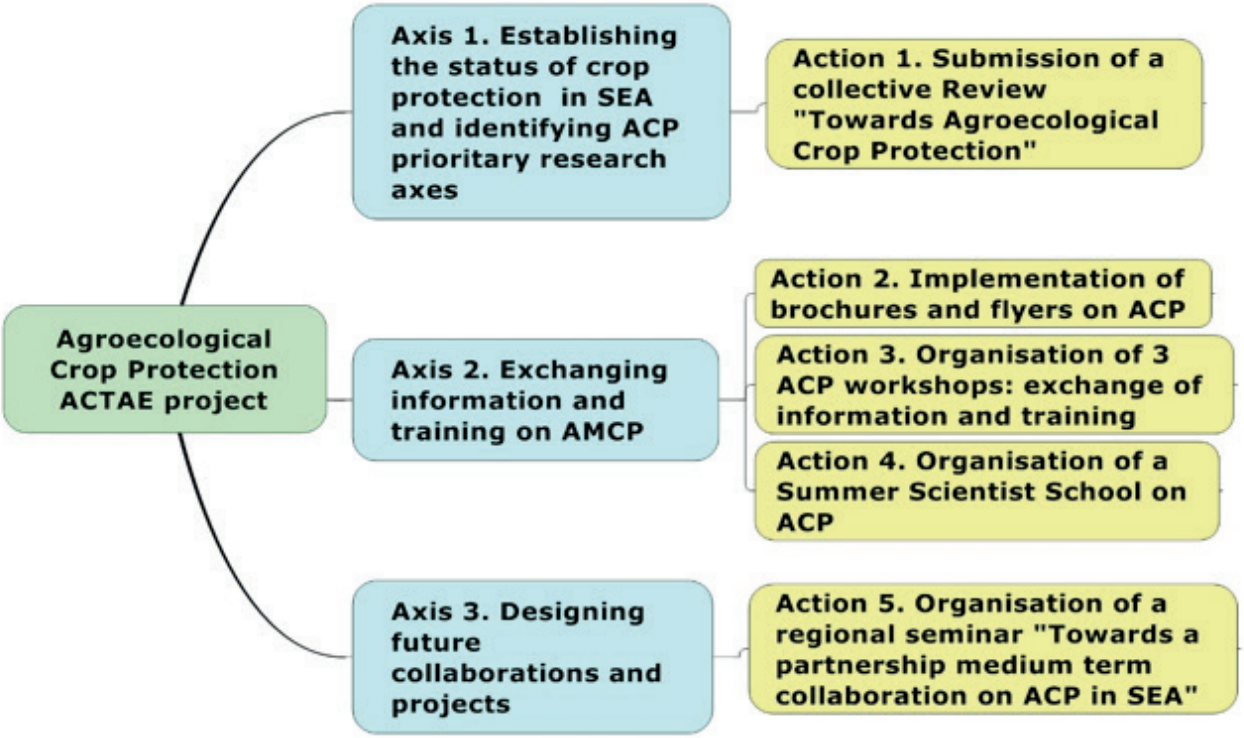
3. International Organizations

CIRAD (International Center of Agronomic Research for Development);

CABI (Centre for Agriculture and Biosciences International).

9 Structure and progress of the ACP-ACTAE project

The three axis of the ACP-ACTAE project result from the three specific objectives listed above and give 5 actions.



An International Summer School on Agroecological Crop Protection (ACP) will take place from 12 to 16 March 2018 in South-East Asia. Pr Le Van Vang proposed that Can Tho University hosts this event and the participants agreed with this proposal. The general objectives of the summer school are to know about and jointly exchange the principles of ACP and to understand the concepts, methods and tools for their implementation. Specific sub-objectives are to:
- Acquire the scientific principles of agroecology and ACP;
- Share practical experiences of ACP implementations and identify subsequent generic recommendations adaptable to different crops under various production situations;
- Adapt and prepare for the necessary changes in the profession of researcher: areas of knowledge to invest or to deepen; have a good command of tools (notably modelling); multidisciplinary approaches to adopt
- Engage in a collective dynamic of ACP and develop collaborations and research projects, with eventual deliverables - videos, articles, and training resources - consistent with this dynamic.

In addition, a regional final seminar will be organized just after the **ACP-SEA-SS18' on the Sa 17th March, 2017 in Can Tho**. 2 to 3 representatives per country and representatives from other organizations will share about perspectives of collaborations in the future.

Annex 2. Group photography, field trip pictures

Annex 2. Opening session, by Dr Hoa Nguyen Van (SOFRI)

Distinguished participants, Ladies and Gentlemen,

It is my great pleasure and honour to welcome you to this regional workshopon Agroecological Crop Protection at Southern Horticultural Research Institute. As we know, with a fast growing population, increased pressure on its natural resources and climate change impacts everyday more present, South East
Asia is at a crossroads regarding its agriculture development, calling for an important shift toward an agroecological transition.

ACTAE project has a regional focus (Cambodia, Laos, Myanmar and Vietnam) and aims at enhancing and building durable and effective networking mechanisms to facilitate synergies among agroecology initiatives. It's clearly that there is a global need for alternatives to the current agri food system which is now showing its limits.

Agroecology seeks to produce diversified and high quality food, reproduce or improve the ecosystem's fertility, limit the use of non _renewable resources, avoid
contaminating the environment and people, contribute to the fight against global
warming. Agroecology is considered as both a scientific discipline, a set of practices and a social movement.

In Mekong region, the six main approachs of agroecology are already implemented: system of rice intensification (SRI), Intergrated pest management (IPM), Organic agriculture (OA), Intergrated farming system (VAC), Conservation agriculture (CA), Agroforestry (AF). Regarding local situations, it appears a urge need to reduce chemical fertilizers and pesticides and the need to change the behavior of actors at the different steps of the value chain. For all these reasons, there is now an opportunity to better emphasize the importance and the specificities of the adaptation of agroecology in agriculture.

I would like to take this opportunity to thank you for your contribution to this workshop. I wish you have a successful discussion.

Thank you!

Annex 3. Biological Control Rotating Workshop Minutes

Moderators: Dr Nguyen Van Hoa (SOFRI) & Dr Arnaud Costa (CABI-SEA)

I- Main conclusions:
During this rotating workshop, we have had opportunity to exchange the importance of agroecological practices and we came to several main conclusions, summarized by Dr Deguine:

1. Difficulty to move forward with:
- long habit of using of pesticides
- farmers' reluctance to adopt new methods
- Need to be sure of the relevance of the work
- Accept the idea that it will be long and difficult
- Pilot farms to convince of successful economic and technical models

2. The ESR approach:
- Efficiency (Optimize the use of pesticides)
- Substitution (ex: Augmentative BC)
- Redesign (ex: Conservation BC)

3. Approaches in time and phase
To have farmers involved at the beginning for successful adoption, we need to have:
- Co-design the AE approach
- Implement practically
- Surveys of results

4. Developing a strategy in the field is a key point.
This encompasses:
- Prevention
- Habitat manipulation
- Conservation BC with:
  - reduction insecticides levels
  - insertion of vegetal communities
  - development of safe practices for beneficial insects

5. Transition from pesticides use to agroecology
- Research
- Teaching
- Training
- Extension
- Policies

We highlighted the importance to connect research questions to markets and policies. Farmers lack of markets for selling their commodities at higher values. Further work should aim at implementing policies guidance to ensure increased food standards (ex: Organic Farming). These policies can include research outcomes that aim at developing safe practices for beneficial insects.

6. Importance of a regional approach

Overall we concluded on the importance of developing a regional approach. This can be addressed by targeting key pests on key crops and avoiding to focus on one technique but fostering a combination of techniques. Researchers from different countries and different regions in South East Asia would greatly benefit if efforts can be combined, which should help the upscaling of initiatives and projects. Successful experiences can be demonstrated through pilot farms that include state of the art research, which can be more convincing to engage farmers' practical adoption of agroecological practices. Dr Jean Philippe Deguine concluded the session by proposing the development of a regional program on fruit fly management.

II. Workshop Minutes:

Dr. Le Khac Hoang (Nong Lam University) discussed the future of mass rearing biological agents and how we can suggest farmer to reduce the use of pesticides. Changing agricultural practices to support natural enemies (NE) is important for conservation biological control. The main focus can be on invasive species. Farmer can produce entomopathogenic fungi themselves

Dr. Vang Le Vang (Can Tho University) highlighted the main issue in South Vietnam is Brown Plant Hopper outbreaks. In the Mekong delta it is important to open farmers' mind to accept new techniques, yet it may be difficult for us to succeed. In some provinces, large areas of rice (e.g. 200 ha) could be treated through mass production of Metharizium fungi.

Ms. Bui Thi Suu (Tay Bac University, Vietnam) mentioned the importance of coffee crops, the possibility to develop biological control against scale insects or IPM research on Coffee Berry Borer. She agreed about the difficulty to convince farmers to adopt a reduction of pesticides or use biological control. Training to farmers and between farmers can be useful for future success.

Ms. Tram Duong (IFAM, Vietnam) agrees we should build demonstration farm for farmers visit then they follow the B.C. In future, IFAM will develop the rearing of yellow ants. Increasing the cooperation between farmers can be helpful. She questioned whether we should apply entomopathogenic fungi with predator in same field?

Ms. Pham Thi Hoa (Lam Dong PPD, Vietnam) proposed we should select farmers who can share the knowledge. It is important to obtain good results and demonstrate them efficiently in pilot sites to convince the farmers. Because it is known that farmers apply chemical two weeks/time, they should reduce their use of pesticides.

Dr. Hang Thi Dao (PPRI): We should focus on the most important natural enemies (NE) and promote a safe environment for NE, with less pesticide use. There is a need for BC products for farmer easy to buy and easy to use. The product costs should be minimized so that farmers adopt it readily. Training for farmer about BC on how it works, how to apply is necessary. Focus can be on invasive species.

Mr. Nguyen Nam Hai (PPRI) agrees with Dr Hang Thi Dao, the farmers need the "know how". The farmers need technique for using BC product. However not many companies currently produce BC products. Some large companies such as Hoang Anh Gia Lai, Vingroup start to make safe fruits and vegetables - can we make the pesticide company realize the benefit of developing BC products?

Mrs Au Bich Lieu (HAGL): Mite is a very serious pest in Vietnam. New methods to control the mites are necessary because mites have become resistant to pesticides. Many farmers need or want to buy BC products - they wish to apply new methods for their farm. Researchers should promote their BC products to farmer and need to think about how to help farmer apply the products, and help farmer to change their mind. How can we make the transition from pesticides use to agroecological methods is a key question.

Mr. Vira Leng (Royal University of Cambodia) explained that we should train the farmers and emphasize the benefits of Biological Control. Field demonstration can show the results to farmers. We should also think about the low price for BC product so that farmers will use them. One recurrent issue is the difficulty to set targets on a long term due to short-term projects finishing, and no further continuation of developed outcomes.

Dr. Nwe Nwe Yin (DAR/ MOALI Myanmar) Rice is a staple food in Myanmar and we can consider the use of Trichogramma to control the yellow stem borer. Often there can be some difference of efficacy between laboratory experiment and field applications due to difference of temperature and other abiotic conditions. Most farmers used chemical control as in other SEA countries. The Diamond Back Moth is a serious issue on cruciferous in Myanmar. One topic is to control the white fly to reduce yellow mosaic virus. Another idea is the use of Trichoderma to control Phytophthora.

Dr. Hanh Thi Tran (SOFRI)
Government is aiming at reducing the use of toxic pesticides and increasing the development of soft pesticides. There we should have change to apply BC approach. One option could be to link phytosanitary companies to scientist and researchers in the field of crop protection to promote BC products. Dr Hanh recommended to choose one main crop and their main pest to find an effective control (by developing the main natural enemies). Group of farmers, cooperative or companies can be trained to the new techniques (they need safe products for exporting). Further the knowledge can be up-scaled to other audiences.

Dr. Arnaud Costa (CABI) highlighted the need of successful training in pilot farms, where both research and demonstrations can be made. Overall, several countries face similar challenge and can unify their research efforts. As in all countries the use of bioproducts has remain low, we need to develop new markets with improved food standards to ensure that farmers can benefit from agroecological approaches with higher values for their commodities. In addition, policies should strengthen the adoption of developed approaches.

Dr. Hoa Nguyen Van (SOFRI, Vietnam) concluded the session. Dr Hoa highlighted that we should choose select a main pest for regional Asia as a study case (like fruit flies). We can choose suitable time for pesticide application. Having demonstration for famers is essential for success.

Annex 4. Titles of the presentations (ACP-ACTAE Workshop, My Tho, 29-31 August, 2017)

A USB key was given to each participant at the end of the Workshop, including all the presentation files. To complete the content of this CD-ROM, the manuscripts of the available presentations are given in Annex 4. Below are the titles of the presentations, with the name of the presenters.

N°	Presentation title	Presenter
1	ACTAE project	Dr Philippe Cao Van
2	ACP: concepts and experiences	Dr Jean-Philippe Deguine
3	ACP Experiences from Reunion Island	Dr J.-C. de Cambiaire
4	Insect semiochemicals : a review	Prof. Le Van Vang
5	Crop protection in Myanmar	Dr Nwe Nwe Yin
6	Crop protection in Cambodia	Mr Sereyboth Soth
7	Crop protection in Laos	Dr Pheophanh Soysouvanh
8	Crop protection in Vietnam	Mr Nguyen Nam Hai
9	Biological control: historical and recent research in Vietnam	Dr Dao Thi Hang
10	Biological control and bioproducts in Vietnam	Dr Nguyen Thi Ngoc Truc
11	Fruit Flies in VN	Dr Le Quoc Dien
12	Agroecology in Lam Dong Province (Vietnam)	Dr Pham Thi Hoa
13	Soil health in Myanmar	Dr Khin Myat Soe
14	Soil health in Cambodia	Mr Vira Leng
15	Soil health in Laos	Dr Oloth Sengtaheuanhoung
16	Soil health in Vietnam	Dr Vu Manh Quyet
17	Nong Lam University activities	Dr Le Khac Hoang
18	Tay Bac University activities	Ms Bui Thi Suu
19	Royal University of Agriculture (Cambodia)	Mr Sereyboth Soth
20	Can Tho University activities	Dr Le Van Vang
21	CABI activities	Dr Arnaud Costa
22	Crop protection in Central Highlands (Vietnam)	Ms Duong Ngo Thi Bich Tram
23	Bio Phap activities	Mrs Huynh Dinh Ha Giang
24	HAGL activities	Mrs Au Bich Lieu