# Report of the Workshop on Farmer and Consumer Awareness on Pest Management and Reduction of Near-Market Pesticide Use with Respect to Food Safety and Quality in Cambodia

**7-8 September 2006, Phnom Penh, Cambodia**

## I. Introduction

This PF project in Cambodia is focused on farmer and local market consumer awareness of IPM and the reduction of near-market pesticide application. Activities will be based around knowledge exchange and farmer participatory technology development towards good agricultural practice (GAP). To help formulate appropriate work activities for the project, a wide range of opinions and perspectives on IPM-related issues from various national stakeholders were gathered through a 2-day "Workshop on Farmer and Consumer Awareness of Pest Management and Reduction of Near-Market Pesticide Use with Respect to Food Safety and Quality in Cambodia" held on 7-8 September, 2006 at the Sunway Hotel, Phnom Penh, Cambodia in collaboration with the Department of Agronomy and Agricultural Land Improvement (DAALI). Details of the workshop program are as given in *Appendix 1*. Thirty-two people participated, including three resource persons from CAB *International* and 28 national stakeholders comprising farmers, government extension and research personnel, representatives of the Cambodian plant protection association and other NGOs, as well as the pesticide industry (see *Appendix 2*).

The workshop began with opening remarks by Mr. Buntuon Simona (Deputy Director, Plant Protection and Phytosanitary Inspection Office (PPPIO), DAALI and Dr. Loke Wai Hong (Centre Director, CABI-SEARC). This was followed by four presentations representing various stakeholder groups in Cambodia. Following the presentations, participants separated into two working groups to discuss and identify the key issues/problems pertaining to pre-harvest and on-farm concerns that relate to near-market pesticide use by farmers, as well as post-harvest concerns with pesticide residues and food quality in market produce. Suggestions on needed follow-up activities to address the concerns were also made. Included in the program was also a half-day field visit to vegetable and citrus farms to learn about pesticide use by farmers.

## II. Opening Remarks

### 1. Mr. Buntoun Simona (Deputy Director, PPPIO)

On behalf of PPPIO and DAALI, I would like to extend our warm welcome to all of you participants of the workshop on "Farmer and consumer awareness of pest management and reduction of near-market pesticide use with respect to food safety and quality in Vietnam". In particular, I like to thank all of you for making efforts to attend and contribute to the workshop despite your busy schedules, especially the CABI's experts from Malaysia.

It is indeed timely that this workshop is organized in Cambodia as the first CABI activity here. I would like to thank CABI, specifically the South East Asia Regional Centre, for organizing this workshop in collaboration with PPPIO.

Cambodia has requested CABI to help in strengthening the capacity of its national institutions relating to agriculture in knowledge management for human development. This workshop is especially pertinent, considering that its primary objective is to improve the understanding on current pesticide reduction by farmers and how to solve the problems of pesticide residues in market produce. It also has the added objective of working towards sustainable agriculture development and environmental protection, which Cambodia has accorded high priority. Through this activity, CABI is demonstrating its commitment to help Cambodia participate more fully in international trade through better management of sanitary and phytosanitary risks, thereby helping resource-poor producers to better access to global commodity markets. The vast experience of CABI in pesticide management and safe food production worldwide would prove most valuable to help Cambodia achieve this important goal.

Currently, the health hazard caused by pesticides are very important topics for Cambodia as the Government is trying to promote a good health for its people, who have frequently encountered problems caused by pesticide consumption. This is one of the main reasons that have resulted in farmer's loosing money for disease treatment, loosing their precocious time for livings, loosing their ability and labor force and far beyond this can lost their lives. Therefore, to minimize the negative risk caused by pesticides, the workshop is organized with the following objectives:

- To discuss the issues and problems of pesticide residues and their application "near market" (about 2 weeks to 1 month before harvest, depending on the crop)
- To identify several activities (short-term and long term) to reduce such near market pesticide usage (e.g. policy/regulation, farmer training, public campaign, research, etc.)

Department of Agronomy and Agricultural Land Improvement (DAALI) has played a vital important role in reducing the negative effect of indiscriminate use of pesticides, and to ensure a high yield and quality of the agricultural production. Several regulations and decrees pertaining to pesticides have been established and implemented.

In this workshop, I am confident that we will have excellent opportunity to share experiences between participants and CABI's experts. The workshop outputs, not only would be very important for Cambodia, but also for DAALI, to strengthen the implementation of IPM and safer use of pesticides, as well as in generating new ideas/concepts for preparing future project proposals.

I wish the workshop every success and that all participants would do their best to contribute to the workshop.

Thank you.

**2. Dr. Loke Wai Hong (Centre Director, CABI-SEARC)**

On behalf of my colleagues from CABI, Dr Soetikno Sastroutomo and Dr Lim Guan Soon, I wish you all a very good morning. I am very delighted to be in Phnom Penh for the first time and to have this opportunity to work with PPPIO to organize this two-day workshop on pest management and pesticide reduction of near market pesticide use.

The use of pesticides in Cambodia continues to be an issue of broad concern as the amount of pesticides (in terms of volume, formulations and range of active ingredients) used in Cambodian agriculture has increased rapidly in the last decade despite various efforts to manage it. This has come about as a result of expansion of agricultural production and the continuing war against pests and diseases. For high value cash crops, such as vegetables, it is not uncommon for farmers to apply pesticides excessively and indiscriminately, often using 'cocktails' of pesticides. Also, application is made right up to harvest because of farmers' risk-adverse behaviour.

The indiscriminate and overuse of pesticides by farmers have resulted in many undesirable problems. At the farm level, these include environmental contamination, farmer health hazards, and disruption of the agro-ecosystems. Off-farm, the main concern is contaminated produce by pesticide residues, which has negative implications to both consumer health and the export market trade.

In Cambodia, efforts to address the pesticide problems associated with the process of on-farm vegetable production have received much attention and strong support from both the national Government and foreign aid agencies. For more than a decade, such efforts have focused on educating farmers in IPM

through Farmer Field Schools (FFS), to avoid or minimize the adverse effects of pesticide abuse. There has been significant success and farmers have benefited from using less pesticides and obtaining higher profits. However, in the case of reducing near market pesticide use or preventing contamination by pesticide residues in market produce, efforts have been limited. In general, little or no guidance was provided to farmers in this aspect.

Even though FFS farmers have been trained to become 'experts' in IPM and can make sound pest management decisions during the crop growing stages, they however have inadequate awareness and understanding of pesticide residues in harvested products, their negative impacts, and how to overcome them. This is because the discovery-based curriculum of FFS tends to focus on reducing or avoiding the use of chemical pesticides at the earlier and main crop stages of production (emphasizing mainly on agro-ecosystem analysis, natural enemies and the effects of pesticides on these natural enemies, etc.). It however fails to adequately address farmer education relating to near-market pesticide use, such as, pesticide needs and choice during this time, withholding time of spraying before harvest in relation to pesticide residual period (including pesticide contamination of the harvested products), use of proper pesticide application techniques, etc. It is crucial that all these aspects are incorporated into the FFS curriculum so that farmers will have the necessary understanding and practical know-how on how to use pesticides rationally at the near-market crop stage (should this be needed), thereby enabling them to produce safe vegetables for public consumption. Also, in parallel, there should be efforts to generate awareness and understanding of pesticide residues and the related issues among the public, consumers, regulatory bodies, traders and exporters, i.e. the wider stakeholder community, to help influence policy change towards safe food production.

In terms of trade, the capability to produce safety and quality agricultural produce for public consumption in Cambodia is very important and crucial in view of Cambodia's expanding agricultural trade. This is especially so since trade success is now often dictated by market-driven demand for assurance of food quality and safety. In this regard, CABI's experience and resources can play key roles in helping Cambodia to develop the capacities required in quality assurance for local and export market. A specific sub-theme would include the reduction of pesticide contamination in market produce through greater use of local innovation and participatory learning to empower the farming community to achieve change through better knowledge and understanding, resulting in farmers implementing good agricultural practices throughout the entire crop cycle and supply chain. Through another sub-theme of creating general public/consumer awareness on hazards from pesticide residues, local traders, exporters and regulatory bodies will better understand and respond to market requirements, while local consumers will become aware of health risks associated with poor practices and can take measures to avoid them. CABI's support to Cambodia in both these sub-themes through future collaborative

projects is envisaged to help Cambodia improve community health and promote international trade by identifying, understanding and addressing the knowledge needs relating to food safety and quality.

In essence, this workshop and the potential projects that follow would adopt the strategy to create awareness among farmers, consumers, regulatory bodies, local traders and exporters on IPM and near-market pesticide use with respect to food safety and quality by:

- Educating farmers on pesticide needs and use at near-market crop stage, specifically relating to pre-harvest interval and implications pertaining to pesticide residues in market produce
- Creating general public/consumer awareness in IPM and related issues on pesticide residues to change consumer preference towards safe and quality vegetables instead of high 'cosmetic' value produce, and to influence policy change towards safe food production through well-informed local traders, exporters and regulatory bodies.

The workshop program over the next two days presents many avenues for us to share experiences and views. We hope that we will have a productive workshop that will come up with key elements to help us jointly develop useful activities which will assist Cambodia in its strive towards better agricultural production and safer produce for all. My colleagues will be very pleased to interact with all of you to make this meeting a success.

### 3. Closing Remarks by Mr. Pen Vuth (Director of DAALI)

Although the duration of the workshop is only two days, however, we managed to come up with good recommendations and proposed activities to increase farmer and consumer awareness of pest management and to reduce near-market usage of pesticides. I strongly support all recommendations of this workshop and will make sure that the Department of Agronomy and Agricultural Land Improvement (DAALI) implement these with the support from all participating institutions and CABI. We will try hard to promote the implementation of proper pest management practices by the use of less toxic pesticides, and to increase the staff and farmer capabilities in pesticide application technology and judicial use of pesticides. We will work together with CABI to prepare a joint proposal on several important recommendations for submission to donor funding.

On behalf of DAALI and on my own behalf, I would like to express my gratitude to CAB International especially to Dr. Loke Wai Hong, Dr. Lim Guan Soon and Dr. Soetikno who has been very supportive (technically and financially) in the preparation of the workshop and making the workshop successful.

## III. Institutional Presentations

A total of four presentations were made by the following resource persons:

- Some research activities related to IPM and minimizing pesticide residue in agro -products in Cambodia (Ms. Pan Sodavy, National IPM Program)
- Pesticide Policy Issues, Regulation and Management and its Problems (Mr. Chea Chan Veasna, Chief of the Bureau of Agricultural Material Standards-BAMS)
- Pesticide and their dangers in Cambodia (Mr. Keam Makarady, Centre d'Etude Agricole Cambodgien-CEDAC)
- Technical solutions for reduction of pesticides use toward clean agriculture production (Mr. Buntoun Simona, PPPIO)

### 1. National IPM Program

**Some research activities related to IPM and minimizing pesticide residue in agro -products in Cambodia (By *Ms. Pan Sodavy*)**

The IPM Program in Cambodia was initiated in 1993 by the Ministry of Agriculture, Forestry and Fisheries with the overall objective to improve food security through the promotion on integrated pest and crop management skills at the farm level. The National IPM Program is now working in 14 provinces with major agricultural production with the major supports from FAO (since 1996), DANIDA (from 2000) and loan from the WB.

Over the last decade, intensive cultivation (mostly with high fertilizer and pesticide inputs) was noted to increase in a number of crops in Cambodia. As a result, the hazards from pesticides have become a serious concern. These have included health hazards to farmers (from direct spraying exposures) and unacceptable pesticide residues in market produce. In general, studies by the National IPM Program and other national institutions have found the following:

- Most vegetable farmers mixed 2-4 different pesticides and sprayed 15-20 times per crop cycle
- All vegetable farmers used pesticides and most of them are using Class I-A and I-B pesticides
- Most of rice farmers sprayed 1-2 times/season in wet season and 2-3 times in dry season
- Sixty-six of rice farmers used pesticides and most of them are using Class I-A and I-B pesticides

Guided by the above findings, the National IPM Program has conducted several activities to encourage the use of biological control and using pesticides as the last option through farmers field school (FFS) on rice, vegetables, integrated production system (rice-fish-vegetable), and on other crops (mungbean, maize and watermelon). So far the program has achieved on the following:

- More than 630 provincial/district trainers
- More than 2,160 farmer trainers
- About 100,000 farmers through season-long FFS
- About 150,000 farmers has been exposed to IPM field days
- More than 5,500 school teachers and students
- About 719 farmers participated in farmer life schools
- About 1000 farmer clubs have been established involving 17,066

In addition the program has also achieved its objective by increasing the yields and incomes (in vegetables and rice), reducing the use of pesticides (in term of amount/ volume, frequency of application, and shifting from using toxic pesticides to non-toxic pesticides), increasing the knowledge of farmers (technical and social skills), conserving biodiversity, and improving farmer's health.

## 2. Bureau of Agricultural Material Standards (BAMS)

### Pesticide Policy Issues, Regulation and Management (by *Mr. Chea Chan Veasna*)

Before 1998 the Royal Cambodian Government held no official stance on pesticide use in Cambodia. In this period, there were 3 ministries, i.e. MAFF, Ministry of Economy and Finance (MEF) and Ministry of Commerce (MOC) responsible for importation, licensing and quality control of agrochemicals in Cambodia. In October 1998, Sub-Decree No. 69 on Standards and Management of Agricultural Materials was issued as the first legal instrument specifically for pesticides. It contained specific regulations on registration, production, packaging and repackaging, import, sales, labeling, quality control, storage, disposal, advertisement and marketing of pesticides. The objectives and key components of the 1998 Sub-Decree related to pesticides are:

- No pesticide shall be imported, manufactured, formulated, repackaged, distributed, sold or offered for sale, unless it has been registered or given provisional clearance by MAFF
- Any physical or judicial person who did, does and wishes to do business in pesticides shall register their product and obtain the permit from MAFF
- Every container or package of pesticide offered for sale, storage and use shall bear a label printed in Khmer language that is easily understand. The format and characteristics of the label should comply with the labeling standards prescribed by MAFF

- Pesticide containers and regulated outer packaging should comply with the standards and regulation prescribed by MAFF
- The repackaging of a pesticide is prohibited, unless it has been permitted by MAFF. Decanting or dispensing of any pesticide in food and beverage containers is prohibited
- Importation, production and sale of adultered pesticide, damaged pesticide or pesticide which does not contain the quality and type of active ingredient declared on the label, or pesticide listed in conditional registration, is prohibited.
- Procedures and conditions for storage of pesticides shall be regulated by MAFF. The location of warehouses for pesticides shall be permitted by MAFF with agreement from the Ministry of Environment
- The disposal of waste and unwanted pesticides and empty containers should be permitted by MAFF with agreement of the Ministry of Environment
- The advertising of pesticide shall be regulated by the MAFF. Only pesticides that are fully registered may be advertised.

Subsequent to the 1998 Sub-Decree, Circular No. 345 on the implementation of the 1998 Sub-Decree was issued by MAFF in October 2002. The circular detailed out all procedures on application for licence to trade, registration of products, import and export permit, packaging-labeling-advertising, and inspection-control procedures and penalties. In December 2002, MAFF released a circular detailing the Ministry's intention to ban 64 pesticides and restrict use of over 100 pesticides. The Bureau of Agricultural Material Standards (BAMS) subsequently visited Cambodia's provinces between January and March 2003 to disseminate the circular, together with the 1998 Sub-Decree, to provincial officials and pesticide traders. In December 2003 a list of 116 banned pesticides and 40 restricted pesticides has been approved by the Minister of MAFF.

One of the major reasons for the current problem with pesticide residues found in market produce is due to limited understanding by farmers on proper pesticide use (particularly at near-market stage) and the risks associated with their use. It is proposed that training programs on the proper and safe use of pesticides should continuously be carried out in all major crops. Also, the central government should help provincial governments to implement the rules and regulations concerning the safe use of pesticides.

## 3. CEDAC
## Pesticides and their dangers in Cambodia (By *Mr. Keam Makarady*)

There are 110 pesticides, as identified by their common names (a.i) found in the Cambodian market with 423 trade names. The most dominant pesticides was insecticides. Of these pesticides, based on the MAFF Circular released in December 2003, 101 trade names (13 common names) are banned and 46 trade

names (8 common names) are restricted. In addition, 39 trade names (23 common names) were not listed in the circular. Based on the WHO classification available pesticides in Cambodia (based on common names) were categorized as extremely hazardous (class I-A: 5.5%), highly hazardous (I-B: 12.7%), moderately hazardous (II: 34.5%), slightly hazardous (III: 46.4%) and not listed (1%).

In the labeling of pesticides the most common language used are Vietnamese (48.2%), Thai (37.6%), English (7.6%), Khmer (4.8%), Chinese (1.6%) and Malay (0.2%).

In general Cambodian farmers used pesticides in hazardous manners and intensively, especially on vegetable, mung bean and watermelon production areas. Most farmers did not use adequate protective clothing and applied pesticides as “chemical cocktails”. The most popular pesticides used in Cambodian agriculture are methyl parathion, mevinphos, methamidophos, dichloevos and monocrotophos; all are amongst the most toxic pesticides to human health and are banned in many countries. There was lack of knowledge and understanding in pesticide application techniques and its rational use by most of the traders/sellers and farmers. Most of the farmers were observed to stop using pesticides around 2-3 days before harvest. Only a few farmers adhered to the “safe intervals” of 1-2 weeks before harvest. In vegetable production, farmers applied pesticides until less than one day before harvest

Most of farmers have experienced signs or symptoms of acute poisoning during or shortly after spraying pesticides.

Pesticide companies or manufacturers and importing companies are not implementing sufficient stewardship program of their products.

The enforcement of the existing regulations/decree on pesticides has not been implemented effectively. Many illegal pesticides are still available in the open markets.

The following recommendations are proposed:

- A broad-based campaign should be initiated to increase public awareness of pesticide issues amongst Cambodia’s farming population and consumers.
- Intensive training programs should be initiated to raise the skill and knowledge of Cambodian farmers toward reduction of pesticide usage especially near harvest
- The Cambodian Government should strengthened and enforced their pesticide regulation, especially to reduce and eliminate the presence of banned and illegal pesticides

- Pesticide manufacturers and importing companies should take their responsibilities in product stewardship very seriously.
- Research to find alternative control methods which are environmental friendly and safer to human should be promoted and supported

## 4. PPPIO

### Technical solutions for reduction of pesticides use toward clean agriculture production (By *Mr. Buntoun Simona*)

PPPIO has been appointed by the Cambodian Government as the NPPO (National Plant Protection Organization) which is the only recognized organization in the country as the focal point for IPPC and has obligation to organize activities in compliance with IPPC. Based on the activities, PPPIO has been divided into three sections, i.e. related to phytosanitary, plant protection and regulatory & administrative sections. The activities related to pesticide residues in the agricultural produces and its field monitoring/evaluation were implemented under pest surveillance subsection of plant protection section.

The activity conducted by pest surveillance sub-section includes the following:

- To determine the present or absent of endemic and quarantine pests in the country
- To do pest forecasting and its control measure
- To harmonize the national pests list as well as the ASEAN List
- To established and update the national phytosanitary database
- To organize pest control intervention and eradication based on the surveillance results
- To implement integrated pest control measures and pest eradication for quarantine pests or invasive alien species
- To establish pest risk analysis
- To do research based on field trials for alternative pest control and on the effectiveness of new pesticides on target pests and its impact on natural enemies and organize field demonstration

The most important activity under pest monitoring and evaluation section which is relevant with the workshop's theme is conducting annual pesticide survey in the market as well as recording the importation and distribution of pesticides. There were only 101 different trade names of pesticides available in the market in 2000, but this was increased to 158 (in 2001), 358 (in 2002), and 419 (in 2003/04).

In the survey conducted in 2004 it was found that 22% of the pesticides available in the market are of the banned list, 9% of the restricted, and 55% of the permitted lists. Two percent of the pesticides available in the market are belongs to POP.

In 2005 there were 466 different trade names of pesticides available in the market with 126 common names. Out of this 21% are of the banned list, 9% from the restricted and 62% from the permitted list.The most common languages used in the labels are Vietnamese (43%), Thai (37%), Khmer (14%) and Chinese (1%).

From the survey it was also found that most of the farmers have a very little knowledge on the safe and proper use of pesticides, this limited information/knowledge were mostly obtained from the pesticide retailers. All farmers are using pesticides and sometimes they mixed 3-5 different pesticides (insecticides and fungicides) to control tolerant/resistant pests. Farmers also regularly sprayed pesticides 2 to 3 times per week until close to harvest (1-3 days) to get a good appearance of the produce before marketing. On average farmers sprayed 15-25 times per crop cycle in crucifers. They understand about the problems with pesticide residues but have no choice.

It is recognized that in the foreseeable future, chemical pesticides will still be needed for controlling insect pests and diseases. As such, PPPIO has developed "Strategic Plan" for reducing the use of pesticides by farmers and to move the currect agronomic practices from heavily pesticides dependent to clean agriculture production system with the following actions:

- To raise awareness of the farmers, stakeholders and public in general on: a) safe or judicious use of pesticides (rational pesticide use), b) the negative effects of pesticides on human health and environment, c) GAP with focus on food safety and quality, d) pre and post-harvest technologies related to pesticide residues and quality management, and e) the use of alternative pest control to replace the use of pesticides
- To strengthen the PPPIO capacity in pesticide analysis and diagnostics (HRD and lab facilities)
- To continue organize annual survey of pesticides in the market, monitor farmer's mis-use of pesticides, records cases of pesticide poisoning and pesticide's negative impact on animals and environment
- To publish public awareness materials, e.g. posters, flyers, leaflets, radio/TV scripts on safe use of pesticides, GAP, negative effects of pesticides, new technologies for pre and post-harvests, and alternative use of pests control.

## IV. Field Visit

Interviews with farmers during the field visit to Kien Svay District (Kandal Province) on 8$^{th}$ September revealed that a large variety of pesticides are commonly applied on their vegetables, often with 'cocktails' and very near to harvest, including some spraying in the evening and harvesting the next morning.

## V. Working Group Discussions and Findings

Following the institutional presentations, the CABI team formulated working group guidelines to enable focused discussions during the working group sessions. This proved very successful in helping each working group to discuss and identify the key issues/problems pertaining to pre-harvest and on-farm concerns that relate to near-market pesticide use by farmers, as well as post-harvest concerns with pesticide residues and food quality in market produce. Suggestions on needed follow-up activities to address the concerns were also made. Working Group 1 was led and moderated by Mr. Buntoun Simona and Working Group 2 by Mr. Ly Sereivuth

Based on the institutional presentations, outputs of the two working groups, and the final overview plenary discussions, various key issues and proposed follow-up actions were identified concerning farmer and consumer awareness on pest management and reduction of near-market pesticide use with respect to food safety and quality in Cambodia. The key issues and proposed follow-up actions are summarized as follows:

**General problems faced by farmers during the pre-harvest period**

- Serious problems caused by insect pests, diseases and weeds . The most common pests found are diamond back moth (DBM), flea beetle, armyworm, cutworm, white fly, pod borer, aphid, stem borer, diseases cause by bacteria and viruses, and grassy weeds
- Farmers has limited knowledge on the safe and judicial use of pesticide (e.g. most of the pesticide labels are in foreign languages, pesticide sprayers are leacking and using the same nozzle for different crops and persticides, etc.)
- Some pesticides available in the market are fake with no effect in controlling pests
- In some areas there is a shortage of water and therefore the crop growths are badly affected
  Most common pesticides used are methamidophos, azodrin, methyl parathion, fenvalerate, mancozeb, mevinphos, Hopsan 75, Cabaryl, Decis, Pegassus, Tricard, and Carbofuran.
- Some farmers are spraying pesticides indiscriminately, e.g. spraying in the morning and harvesting in the afternoon or daily spraying until harvesting time in the case of fruit-vegetables
- For leafy vegetables farmers mostly spray 3 - 4 times per week and they mixed 2-5 different types of pesticide in one spray. In serious situation, farmers are mixing 8-15 different pesticide.

**Proposed activities to be implemented during pre-harvest period**

- To train farmers on the safe and proper use of pesticides during pre and post-harvests and its negative effects on the produce
- To train farmers on harvesting, handling, storage and transportation technologies
- To prepare technical bulletins, posters, leaflets, and pamphlet etc. on the safe use of pesticides and its impact on human health and environment
- To train farmers on the use of proper pesticides for specific inset pests
- To produce a very effective pesticide to control pests with a very low of pesticide residues
- To promote the use of alternative control methods of pests using biopesticides
- To train the farmers on good agriculture practice (GAP) focussing on managing food safety and post-harvest quality of fruits and vegetables
- To train farmers on pests and control measures on vegetable production
- To organize public campaigns in collaboration with farmers and consumers
- To promote the implementation of law, sub-decree and legislation on pesticide management
- To promote agricultural products that are fee from pesticides

**General problems faced by farmers during the post-harvest period**

- No proper harvesting, packaging and storage technologies are available in the country and therefore will
    a. reduce the quality of the produce
    b. promote insect and disease infestation
    c. reduce the price
- Availability of transportation is limited
- Farmers spray pesticides indiscriminately, e.g. spraying in the morning and harvesting in the afternoon (for leafy vegetables)
- Safe and environmentally-friendly pesticides are very limited
- No proper chemicals that can be used to prolong the life span, difficult in separating the rotten produce from the good quality produce which scould destroy the whole produces
- Profit margin is very low

**Proposed activities to be implemented during pos-harvest period**

- To train farmers on the safe use of pesticides in the post harvest period
- To train farmers in the harvesting, storage and transportation technologies
- To prepare technical bulletins, leaflets, posters, flyers, etc. related to post harvest period of crops
- To monitor pesticide poisoning cases and its effect on the environment

- To train farmers and sellers/retailers on managing food safety and post-harvest quality of fruit and vegetables
- To increase public awareness on pesticide effects in pre-harvest and post-harvest
- To promote other alternative measures of pest control which are safer
- To train farmers on good agriculture practices (GAP) with focus on managing food safety and post-harvest quality of fruit and vegetables
- To train farmers on pest and control measure on vegetable production
- To promote the implementation of rules and legislations on pesticide management
- To promote agriculture produce with no pesticide residues
- The technical officer should train to the farmer directly in village level on pesticide safe use and method take care of crop technique
- To translate all pesticides with labels using foreign languages into Cambodian language

## VI. WORKSHOP RECOMENDATIONS

**General recommendation:**

The new sub-decree $N^0$. 105 issued on 22 August 2005 by Prime Minister has specifically mentioned that Ministry of Agriculture Forestry and Fisheries have obligation and responsibilities for promoting food safety on agriculture products from the field until primary processing.

As a result of this sub-decree several legislations will be developed by PPIO including MRLs of pesticides in the agricultural products. This workshop on the reduction of pesticide use near market recommends that to protect the human health, environmental protection and to promote better qualities of agricultural product for exports; the first priority for the PPPIO is to organize and publish public campaigns to raise awareness of producers (farmers) and consumers on the important of food safety, especially based on **Pesticide Management in pre and post harvest of agricultural products.**

**Specific recommendation:**

1. **Preharvest activities that has to be done:**
    - To train to the farmers on safe use of pesticide.
    - To train to the technical staff in province extension workers IPM trainers and others organization or institution whom which concern with pesticide on safe use of pesticide.
    - To publish campaign to people on impact of pesticide to the human and environment through many way such as training, TV broadcasting, radio, posters, pamphlet, flip chart with picture, leaflet….etc.

- To train farmers on pesticide residues in fruits and vegetables crop and pre harvest interval of pesticide application
- To promote others control measure to replace or reduce of toxic pesticide applications
- To train farmers on managing food safety and post harvest quality of fruits and vegetables.
- To promote Good Agriculture Practice (GAP) nationwide
- To organize annual survey on pesticide available in market and cases of miss used by farmers and pesticide poisoning.

2. **Postharvest activities that has to be done:**
    - To train farmers, pesticide sellers, fruit and vegetable collectors and wholeseller on pesticide or others chemicals on proper pesticide application techniques and safe use of pesticides
    - To train farmers on post harvest technology
    - To publish public campaign materials on food safety, post harvest and quality management of fruits and vegetables through proper training, TV broadcasting, radio, pamphlets/flyers, posters, hand-out, etc.
    - To produce quick test kits for detecting pesticide residues in the agricultural products (relevant to MRLs)

Guided by the above findings and suggestions on follow-up actions, work plans for the project would be developed for consultations and agreement with relevant national counterparts. Where necessary, further refinements would be made to ensure the activities meet with local needs. The consultations would also identify all implementation arrangements needed to execute the proposed activities.

## VI. Acknowledgements

Special thanks are due to PPPIO, in particular Mr Buntoun Simona to ensure that all the necessary arrangements are in place for organizing a successful workshop. Thanks are also accorded to all participants who have made invaluable comments and contributions to the workshop.

## VII. Appendices

1. Programme of Workshop
2. List of Participants

**Appendix 1**

# Programme

## Workshop on
## Farmer and Consumer Awareness
## of Pest Management and Reduction of Near-Market Pesticide Use
## with Respect to Food Safety and Quality in Cambodia

**Department of Agronomy and Agricultural Land Improvement (DAALI)**
**Sunway Hotel, Phnom Penh, Cambodia,**
**7-8 September 2006**

Day 1

| | |
|---|---|
| 08.00 – 08.30 | **Registration** |
| 08.30 – 09.00 | **Opening session**<br>• Mr. Pen Vuth (Director, DAALI) - Welcome Address<br>• Dr. Loke Wai Hong (Centre Director, CABI-SEARC) - Overview of the Project on IPM Awareness and Reduction of Near Market Pesticide Application |
| 09.00 – 9.30 | TEA |
| 09.30 – 12.30 | **Session I**: **Current issues pertaining to near market pesticide use in Cambodia**<br>**Chaired by:** Mr. Buntuon Simona<br>**Background and Issues**<br>• Some research activities related to IPM especially and minimizing pesticide residue in agro -products in Cambodia: Case Studies (Ms. Pan Sodavy, National IPM Program, Cambodia Office)<br>• Pesticide Policy Issues, Regulation and Problems (Mr. Chea Chan Veasna, Chief of Office)<br>• Pesticide use and its residues on vegetables (Mr. Keam Makarady, CEDAC)<br>• Technical solutions for reduction of pesticides use toward clean agriculture production (Mr. Buntoun Simona) |
| 12.30 – 14.00 | LUNCH |
| 14.00 – 17.10 | **Session II: Development of Work Plans** |

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|---|---|
| | **(by Working Groups 1 and 2)** |
| 14.30- 15.45: | **WG1: Pre-harvest** – on-farm issues relating to near-market pesticide use<br>(The WG would identify key issues/problems and suggest activities to be undertaken to address these problems, including possible institutions/agencies to carry out the activities).<br>(Chairman/chairperson Mr. Buntuon Simona)<br><br>**WG 2**: **Post-harvest** – pesticide residues and food quality in market produce. (The WG would identify key issues/problems and suggest activities to be undertaken to address these problems, including possible institutions/agencies to carry out the activities).<br>(Chairman/chairperson Mr. Ly Sereivuth) |
| 15.45-16.00: | Tea break |
| 16.00-17.15 | **WG 1: Post-harvest** – pesticide residues and food quality in market produce.<br>(The WG would identify key issues/problems and suggest activities to be undertaken to address these problems, including possible institutions/agencies to carry out the activities).<br>Chairperson: Mr. Ly Sereivuth<br>**WG 2: Pre-harvest** – on-farm issues relating to near-market pesticide use<br>(The WG would identify key issues/problems and suggest activities to be undertaken to address these problems, including possible institutions/agencies to carry out the activities).<br>Chairperson: Mr. Buntuon Simona |
| 17.15-17.45 | Report on progress by the Working Groups<br>Briefing on the Field Visit |
| **<u>Day 2</u>** | |
| 08.00 – 12.30 | Field visit and interview with farmer by using questionnaire: at Vegetable farm pre-harvesting in Kien Svay District, Kandal Province |
| 12.30 – 14.00 | LUNCH |
| 14.30 – 16.30 | **Session III**: **Finalisation of work plan**<br>**Chaired** by Mr. Heng Chhun Hy<br>Presentation by Working Group 1 and 2 and discussions |

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| 16.30 - 17.00 | TEA |
| 17.00 – 17.30 | Closing Remarks by Mr. Pen Vuth |

**Appendix 2**

# List of Participants

**Workshop on**
**Farmer and Consumer Awareness on**
**Pest Management and Reduction of Near-Market Pesticide Use with Respect to Food Safety and Quality in Cambodia**

**Department of Agronomy and Agricultural Land Improvement (DAALI)**
**Sunway Hotel, Phnom Penh, Cambodia,**
**7-8 September 2006**

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**Appendix 3**

# Outputs of Working Group 1

**Chairperson:** Dr. Nguyen Truong Thanh, NIPP
**Facilitators:** Dr. Lim Guan Soon and Dr. S.S. Soetikno, CABI-SEARC

Participants of the Working Group (WG) agreed to first identify the issues/problems concerning "safe pesticide use" by farmers, as well as the existing regulations governing it. This is crucial to enable them to determine what the best solutions/actions are for each of the issues/problems faced by farmers. From the discussion, the important issues and follow-up actions identified by the WG are as follows:

| No. | Issues | Solutions/Actions |
|---|---|---|
| 1 | • A number of important pests are still causing damage to the vegetable crops, especially long bean, tomato and the leafy vegetables<br>• Damaged crops have less cash value or are not saleable (e.g. leafy vegetables attacked by DBM, armyworm (*Spodoptera*), and flea beetle (*Phylotreta*); long bean attacked by *Maruca* borer; and tomato attacked by *Helicoverpa* caterpillar)<br>• Affected plants have reduced yields and fetch less profits | • Finding alternatives and relatively safer pesticides is necessary, since practically none are presently available in the market or accessible to farmers in Vietnam<br>• Farmer education is necessary to help them understand how to use pesticides rationally and to overcome their risk-adverse perceptions to pests.<br>• Farmer education should also include pesticide application techniques so that they do not always use the same type of nozzle for all kind of pesticides and crops<br>• Training on the correct use and application of pesticides should be regularly organized, not only for farmers but also for pesticide traders/salesmen. Where possible, agriculture students should also be trained |

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| | | • The farmer training methods used should be simple and the training contents easily understood by farmers |
| 2 | • IPM training is presently not implemented by all farm households<br>• Some IPM technologies are too technical and not farmer-friendly, and so are not suitable for implementation by small farmers | • Policy changes are necessary to ensure that all farmers are given training in IPM and can understand all the related IPM technologies, so that they can implement IPM effectively<br>• More farmer-friendly IPM technologies should be developed and made available to farmers |
| 3 | • Presently, most farmers do not have procedures of good agriculture practice (GAP) to follow when growing their crops.<br>• Vegetables sold in the market are usually collected from many different small farmers (with some following better agricultural practices than others). As such, it is difficult to separate the market vegetables according to their production practices | • Systems of GAP for different crops should be developed so that farmers can adopt them in their crop production practices<br>• For GAP, more factors should be considered (and not only pesticide residues), such as fertilizers, water/soil conditions, bacterial contents, etc.<br>• Cooperatives of farmer groups practicing GAP should be set up to differentiate different production practices adopted by different farmers, so that farmers practising GAP can be given due recognition.<br>• GAP should be implemented and the rules and regulations governing it should be strictly followed. It should be recognized by all concerned that GAP control is more important than good laboratory practice (GLP) control (i.e. tests on pesticide residues) |
| 4 | • Consumers presently do not believe in “safe vegetable produce”<br>• There is no scheme to recognize GAP and to confirm and assure consumers that the GAP vegetables in the market are truly safe. | • Establish a certification scheme for GAP. Also, legally identify suitable institution(s) at central and local levels to certify that the vegetables produced by GAP are really of GAP quality and safe. This would help to differentiate GAP vegetables from those produced under conventional cultivation with heavy use of pesticides. (A good model to follow is the certification for seeds adopted by PQ Department of PPD in some provinces where the seed pack/container is given an official |

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| | | stamp to certify the seed quality)<br>• Certification for "safe vegetable produce" should be issued before the produce is marketed<br>• Various criteria may be considered in the certification of GAP. Examples may include the types and how the pesticides are used, PHI, MRL, fertilizer regime, conditions of water applied, etc.)<br>• MARD or Ministry of Health should be responsible for the certification schemes. PPD, under MARD, could be a possible legal agency for this certification<br>• The agency(ies) involved in the certification scheme should be legalized, through a Decree, by the National Assembly |
| 5 | • Although some farmers know about "safe produce" they would not implement this practice because the pricing of such produce is no different from that produced under conventional practices where pesticides are used | • Farmers should be given incentives to adopt GAP by conducting campaigns to consumers to encourage them to know and understand GAP produce and be willing to pay a little higher price for the safer GAP produce |
| 6 | • Presently there is no concerted effort made to develop GAP systematically for practical evaluation of its real benefits and to promote it | • Develop and implement pilot projects on GAP in selected farms or farming communities, including a certification scheme to evaluate the constraints, benefits and potential acceptance by consumers.<br>• For example, as a start Hanoi PPSD could sample quantities of the produce for certification and to obtain the response from consumers |

In brief, the findings and recommendations of WG 1 can be summarized as follows:

***Main problem*:** Most farmers are spraying pesticides close to near-market stage. The main reasons are:

- Farmers lacking in knowledge/understanding of the safe use of pesticides
- Farmers are strongly risk-adverse, even to insignificant presence of pest numbers and damage

***Proposed Actions/Solutions*:**

- Strengthen farmer knowledge on IPM through FFS or short training courses.
- Re-design training curriculum to include better understanding of application techniques (types of sprayers and nozzles, their selection and handling, care and maintenance, etc.). Besides farmers, pesticide traders/salesmen (and if possible agriculture students) should also be given training on these aspects.
- Explore and develop alternative pest management tactics that farmers can use in his/her pest management practices (e.g. using biocontrol agents, bio-pesticides, cultural techniques, chemical pesticides that are less toxic, etc.).
- Organize farmers who practice “safe vegetable production” into groups (e.g. as cooperatives, clubs, or company).
- Establish quality standards for “safe” produce. This should be based on existing standards adopted by international quality control organizations or the international market.
- Identify appropriate institution(s) to develop appropriate policies and guidelines on standards and quality control, including suitable agency to enforce them.

**Appendix 4**

# Outputs of Working Group 2

**Chairperson:** Dr. Nguyen Hong Son, NIPP
**Facilitators:** Dr. Babara Ritchie and Dr. Loke Wai Hong, CABI-SEARC

Pesticide regulations and management have been formulated since 1990 with major revisions done over time toward the safe use of pesticides. Pertaining to registration, many pesticides of high toxicities and short PHI have been phased out, although some short PHI products are still being recommended to farmers at near-market stage. Over time, organo-chlorine and organo-phosphate pesticides commonly used in the 90s have been deregistered in 1995 and replaced by new generation pesticides, such as pyrethroids. Formulations of EC have also been replaced by SC and WDG, while Class I and II pesticides were gradually replaced by Class III and IV pesticides.

Besides the general approved/permitted list of pesticides, there are also others that are recommended for specific crops. Although the list for tea is acceptable, that for vegetables faces difficulties, because of mixed planting and different harvesting time for different vegetable crops. Reducing the number of registered pesticides would mean less choice for farmers and slower development of the pesticide industry in the country.

Although government institutions, international organizations, and NGOs, have made efforts to support and promote the implementation of IPM by farmers towards safe vegetable production, yet the annual quantity of pesticides used in the country has continued to increase. Presently, still about 70% of farmers are using pesticides improperly, mainly because they lack training and enforcement of the existing pesticide regulations inadequate.

Today, the increased demand for pesticides is mainly due to rapid expansion of agricultural production (areas, new varieties/crops, changes from low to high value crops, etc), resulting in their indiscriminate use by farmers. In general, leafy vegetables and tea receive the most pesticides, while fruit-vegetables (e.g. long bean and cucumber) receive less.

Several major problems in pesticide use by farmers include:

- Farmers do not consider the negative effects when using pesticides, whether control is needed for the pest at that particular crop stage, if the pesticides used are effective or safe to beneficial organisms
- Farmers frequently spray on a calendar basis with doses higher than recommended.
- Un-registered/illegal and highly toxic pesticides are still used (e.g. Monitor)
- Farmers' main aim is merely to protect their crops from poor cosmetic appearance not accepted by consumers

In general, farmers trained in IPM are better aware of the dangers of pesticide overuse than their non-IPM counterparts (e.g. poisonings and other health concerns like cancer). Some therefore do not apply pesticides 3-4 days before harvest. Also, some consumers now prefer produce showing slight pest damage (as sign of no/less pesticide use).

Presently, farmers encounter greater problems for some fruits and fruit vegetables (e.g. beans, tomato, cucumber, others) because of staggered ripening and harvesting and because there are no effective pesticides of very short residues (2-3 days) available in the market that farmers can use on these crops. In addition, there are no other non-pesticide alternative control measures available.

Currently, strict law enforcement pertaining to smuggling of highly toxic, obsolete or banned pesticides from other countries is lacking because of inadequate enforcement officers to undertake the task and poor coordination and cooperation between the relevant national institutions. Other contributing factors include attractive profit margins and no clear designated agency to oversee the problem.

Impact of IPM farmer training and campaigns on proper pesticide use is presently not very high because of:

- Overlapping in training programmes with focus in central cities/ provinces/districts resulting in highly toxic pesticides still being used in the remote areas
- Training not directed at pesticide users because most husbands participate in training, but their wives do the spraying
- Non-FFS IPM curriculum is too complicated, impractical and not meeting the farmers' needs, and so difficult for farmers to appreciate/absorb and they easily forget
- Because farmers have limited knowledge to detect and predict pest occurrence, as well as in the use of pesticides (what kind, when, how often, what dosage, etc.), they therefore rely mainly on the pesticide sellers/agents for advice on pesticide use

- Pesticide companies only promote their products through agents interested in selling their products for higher profits, sometimes even advising farmers to mix several pesticides in a single application
- Training documents and pesticide flyers/leaflets are not easily understood by farmers

To promote the practice of 'safe vegetables' production, it is important that the economic benefits to farmers are not overlooked. Until farmers can be assured of the benefits when following the guidelines/protocols for GAP, they would continue to depend on cheap, illegal and highly toxic pesticides. A certification scheme to ensure better pricing of GAP produce is thus crucial, so that farmers do not always rely on achieving only good cosmetic products.

Based on the above understanding, Working Group 2 has developed the follow recommendations and follow-up actions:

1. It is crucial to develop a simple, easy to implement and appropriate protocols for GAP of valuable crops where there is intensive use of pesticides.
2. Farmer awareness and campaigns on the safe use of pesticides at near-market stage should be promoted and organized regularly
3. Training on safe use of pesticides should be done not only for farmers but also for pesticide traders/salesmen
4. There should be policies to promote advancement in research and extension with regard to utilization and application of alternative control methods (such as, better cultural practices, bio-based pesticides (bio-pesticides and botanicals), and biological control agents
5. Establish clear policies and regulations concerning the safe use, certification and monitoring of pesticides to govern producers, traders, consumers and the agro-products. Suitable organization(s) should also be designated/established to be responsible for implementing the policies and regulations
6. Strengthen cooperation between producers and traders by forming associations to jointly promote safe and quality standard agro-products for consumption.
7. Establish production zones for producing different crops of high quality.
8. The economic benefits to farmers should always remain the primary objective of all activities

**Appendix 5**

# General Discussion and Comments

**Chairperson:** Dr. Nguyen Hong Son, NIPP

Following separate discussion within each working group and subsequent presentation of their findings by each group in the final plenary session, a general discussion was held. The following are summary comments and conclusions.

1. In general, the main findings of the two working groups are quite similar and should be combined into a common set of recommendations, as follows:

- Training programmes for farmers should be continued. However, focus is needed to improve its contents on safe use of pesticides. This is necessary because pesticide use in Vietnam would continue to grow, despite the implementation of IPM programmes. Farmers will continue to need pesticides due to expanding agriculture development in the country and changes from growing low value to high income crops, using new varieties and practising intensive farming.
- In the short and immediate term, training should focus on improving the knowledge on safe use of pesticides in both farmers and the pesticide traders/salesmen.
- The training should cover aspects on pesticide management, pesticide regulations and prohibited products, imitation and adulterated products, precautionary measures, toxicity, commercial/trade names, labeling, and other pesticide-related issues.
- Pesticide application techniques and sprayer maintenance should be covered as a special module in the training.
- Training manuals/guides should be simple language, easy to understand, and clearly illustrated. The contents should be relevant to the practical needs of farmers and with suggestions that farmers can implement.
- All the activities should have the economic benefits of farmers as the primary objective.

- The central/local governments and international organizations should help identify the quality standard of 'safe agro-products' that can be conveniently monitored and include this information in the curriculum.

2. Issues pertaining to general pesticide reduction by farmers, and at near-market stage in particular, must be evaluated within the overall framework of agriculture development in Vietnam, as the farming systems continue to evolve and become more intensive to meet with global demands.

- It should respect free market mechanism within the whole economic activities, which includes the issues of pesticide use.
- The use of pesticides is targeted not only to increase economic benefits but must also take into consideration human health and the environment. Therefore, there should not be simply phasing out the current toxic pesticides without finding safer alternative products as replacements.
- Generally, the quantity of pesticides used in Vietnam is still relative low compared to many countries in the ASEAN region. As such, the issue of concern should be "*proper use of pesticides*" rather than purely "*reduction of pesticide use*". In practice, the feasibility of pesticide reduction depends on the nature of the crop, the associated environmental and ecological conditions, and the farmer's socio-economic situation.
- Obtaining reliable data on the relationship between pesticide residues and PHI for each crop and its ecological conditions is crucial. Obtaining such information should therefore receive attention.

3. Although alternative measures to chemical pesticide use are still limited, whatever is available should be rapidly transferred through various media to implementing agencies and farmers needing them. In particular, it is crucial to strengthen cooperation among researchers, extension workers and pesticide suppliers to help farmer gain the knowledge to better manage their crops.

4. To help proper pesticide use in vegetables, there is a need to prepare a recommended pesticide list with appropriate guidelines on how to use them on different crops and at different growing stages.

- The guidelines must be in the local language, simple, and are clearly illustrated so that farmers can easily understand them.
- Likewise, pesticide labels should use the local language and have simple and clear instructions.

5. Over time, more farmers have begun to appreciate the dangers of using highly toxic pesticides. Nonetheless, many still do not know and will select highly toxic but cheaper pesticides because of better profit margins. Although many are willing to use new and alternative products, the prices of these must be reasonable and not too expensive.

6. While pesticide companies undertake research to provide wide spectrum but relatively low toxic pesticides, traders/retailers often prefer to continue supplying

farmers with low quality pesticides that they can make more profits. In such cases, Inspection Department should impose strict regulations so that such negative activities can be minimized. Relevant authorities should also develop appropriate regulations on brand name assurance to control imitations.