

## Pest management (2007-2010)

Period	Pest management: Australia
2007-June 2009	PaDIL was developed by Museum Victoria with support provided by DAFF and Plant Health Australia. PaDIL contains high quality images showing primarily exotic targeted organisms of plant health concern to Australia. It provides information on pests and diseases that assist in helping to protect against invasive threats to Australia's plant health by allowing rapid recognition of emergency plant pests to ensure appropriate response strategies are implemented. Guarding against pest and disease invasion is a key component of Australia's National Plant Health Strategy.

Period	Pest management: Australia (Based on the country report presented at APPPC 25 <sup>th</sup> session in August 2007)
Up to 2007	<p><b>Biosecurity</b> Australian industries continue to develop industry specific biosecurity plans to significantly reduce the risk and spread of pest incursions.</p> <p>A Cooperative Research Centre of National Plant Biosecurity has been established to coordinate and undertake national plant biosecurity research.</p> <p>The Australian Biosecurity System for Primary Production and the Environment (AusBIOSEC) has been established as a whole-of-government project to improve Australia's biosecurity status. Its aim is to improve outcomes from Australia's biosecurity system for primary production and the environment, through greater national coordination on biosecurity policy, regulation, funding and delivery across jurisdictions and sectors. The scope of AusBIOSEC is along the entire biosecurity continuum from pre-border, border to post-border management of biosecurity risk.</p>

Period	Pest management: Bangladesh
2009-June 2010	The Plant Protection Wing (NPPO) plays a vital role in implementing the National Pest Management Policy through the activities of Integrated Pest Management (IPM) and Integrated Crop Management (ICM) projects. Beside these , PPW also forecast pest outbreaks, their control measures and instructions were issued among the farmers by distributing different handbills,

	<p>leaflets and booklets. This organization also conduct nationwide special program to control vertebrate pests.</p> <p>The IPM and ICM projects strengthen IPM activities through establishing and introducing Farmers Field School (FFS), IPM Clubs (Farmers Association), Organic Farming Pilot Program, Biological Pest Control, Farmers Training and organization of workshops/seminars throughout the country. They help farmers become aware of healthy crop production. IPM club also helps to promote IPM activities among the neighboring farmers. Pesticide-free crop production has now become popular among the farmers.</p>
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<b>Period</b>	<b>Pest management: Cambodia (Based on the country report presented at APPPC 25<sup>th</sup> session in August 2007)</b>
<b>Up to 2007</b>	<p>The IPM programme was established in 1993 and now operates in 15 major agriculture production provinces, including the Phnom Penh municipality, with the aim of promoting food security and safety. The main tasks were to reduce the dependence of farmers on agricultural chemicals, to develop the capacity of agriculture trainers and extension workers to educate farmers on agriculture technologies by developing skills in environmentally friendly crop management. The programme had trained more than 600 district trainers, 2,000 farmer facilitators and 100,000 farmers. IPM training had led to an increase in yield, sustainable and cost-effective production, reduction of ecology disruption and environmental contamination, reduction of public health and toxic residues in food, and improvement of the livelihood of farmers, biodiversity and marketability of produce.</p>

Period	Pest management: Dem People's Rep of Korea
2009-2010	<p>The National Plant Protection Organization (NPPO) of the Democratic People's Republic of Korea (DPRK) has developed an efficient system and integrated measures for managing pest risks and controlling pests. The Central Plant Protection Station (CPPS), the Ministry of Agriculture (MoA), is in charge of the plant protection. The CPPS has branches in each province and county which is responsible for managing pests in the area under the direct control of the Ministry of Agriculture.</p> <p>During the farming season, when pests occur and caused damage to crops, MoA will form a pest management group to give advice on pest management, based on the pest surveillance information collected from every province and county.</p> <p>The NPPO holds two periodical workshops every year. At the workshops, participants share their successful experience on pest management and receive necessary training on it.</p> <p>In 2009 and 2010, there appeared soil born pests such as grubs and cut worm and immigrated pests such as army worm and plant hoppers which was caused serious damage to crops. The MoA managed them by applying the Integrated Pest Management (IPM) methods, especially the use of biological control agents such as Bt and Trichogramma.</p> <p>The MoA also thoroughly eradicated newly occurred pests such as Trionymus agrestis, Cephalosporium sp and Autogrpha sp in some areas.</p>

Period	Pest management: Dem People's Rep of Korea
2007-June 2009	<p>The "Juche-based Farming Method" established in the Democratic People's Republic of Korea includes all parts of the farming method as well as the management of pests in crops. The method is updated every year by the Ministry of Agriculture (MOA) for dissemination to cooperative farms across the country.</p> <p>Pest management by protecting, producing and applying natural enemies such as Trichogramma and biopesticides, while using few chemical pesticides in the fields, is included recently in the method to increase yields of crops.</p> <p>The Central Plant Protection Station (CPPS), the Ministry of Agriculture, is responsible for carrying out surveillance and managing significant pests in crops in the fields, while the Ministry of Land and Environment Protection is responsible for pest management in the forest.</p>

	<p>From 2007 to 2008, Swiss Development Cooperation (SDC) offered assistance such as training on vegetable IPM and provision of 4 sets of Trichogramma rearing facilities to 4 respective counties and Bt facility to AAS.</p> <p>During the period from 2009 to 2010, DPRK plans to increase the investment in pest management, such as pest control in the fields, production of biopesticides as well as phytosanitary measures and regulations.</p> <p>From 2009 to 2011 the European Union plans to support CPPS, MOA, the Plant Protection Institute and AAS through a project entitled the “Integrated Pest Management Application to Maize Production for Food Security in DPRK” which will provide 24 counties with Trichogramma Rearing Facilities and train personnel for the quality control of production.</p>
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Period	Pest management: China
<b>2009-2010</b>	<p>During the period of 2009-2010, outbreaks of some pests on major crops occurred in responses to global warming, significant changes in cropping systems, climate conditions, and crop varieties. Among them, the locusts, rice brown plant hopper (<i>Nilaparavata lugans</i>), rice leaf folders (<i>Chaphalocrocis medinalis</i>), meadow moth (<i>Loxostege sticticalis L.</i>), rice borers, and cabbage diamond back moths (<i>Plutella xylostella</i>) were the most severe and destructive ones.</p> <p>The locusts hit about 1.7 million hectares both in 2009 and 2010. Meadow moth hit about 5.4 million hectares of farm lands pastures and woodlands in 2009. The outbreaks of rice stem borers have been occurring with more serious damage over the past ten years. The outbreaks spread 18.3 million hectares in 2009 and 17.7 million hectares in 2010 respectively. In the case of BPH, the infested area grew to 10.4 million hectares in 2009 and 12.0 million hectares in 2010 respectively. The total area infested by major vegetable pests amounted to 29.8 million hectares in 2009 and 30.6 million hectares in 2010 respectively.</p> <p>Regional actions were coordinated by the National Agro-technical Extension and Service Center (NATESC) of the Ministry of Agriculture for controlling migratory pests- locusts, meadow moth, rice brown hopper, rice leaf roller and regionally epidemical diseases- wheat stripe rust, rice blast and rice sheath blight, etc.</p> <p>The annual control acreages of major crop pests reached 560.7 million hectares in 2009 and 532.7 million hectares in 2010 respectively.</p> <p>National IPM programs coordinated by NATESC have been supporting the implementation of key IPM technologies in major crops and major pests. Biological and ecological control measures such as using microorganisms and reclaiming locust habitats were extensively promoted in recent years.</p>

Period	Pest management: China
	<p>The IPM technologies on rice were well developed and widely applied in China. Seed treatments with fungicides and insecticide were commonly used by farmers to prevent the infestations of rice seedling diseases and insects. Bio-diversity strategies were implemented in about 6.67 million hectares annually for rice blast management in 2009 and 2010. Light trips were extended to 1.2 million hectares of rice fields to kill moths of rice borers and leaf folders.</p> <p>During the period of 2009-2010, wheat IPM strategies focused on prevention and ecological approaches. In the regions where the pathogens of wheat stripe rust can over-winter and over-summer, the percentage of seed coating or treatment with fungicides was increased to over 90 % in 2010.</p> <p>In corn, biological technologies such as the use of <i>Beauveria bassiana</i> for killing over-winter larvae of corn borer, artificial release of <i>Trichogramma</i> spp in fields have been extended to above 3 million hectares since 2009.</p> <p>In cotton, the transgenic Bt cotton has been continually applied over 3.4 million hectares in China.</p>

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2007-June 2009	<p>Regional actions were coordinated by the National Agro-technical Extension and Service Center (NATESC) of the Ministry of Agriculture for controlling migratory pests- locusts, lawn moth, rice brown hopper, rice leaf roller and regionally epidemical diseases- wheat stripe rust, rice blast and rice sheath blight, etc.</p> <p>The annual control acreages of major crop pests reached 543.5 million hectares in 2007 and 532.7 million hectares in 2008 respectively.</p> <p>National IPM programs coordinated by NATESC have been supporting the implementation of key IPM technologies in major crops and major pests. Biological and ecological control measures such as using microorganisms and reclaiming locust habitats were extensively promoted in recent years.</p> <p>The IPM technologies on rice were well developed and widely applied in China. Seed treatments with fungicides and insecticide were commonly used by farmers to prevent the infestations of rice seedling diseases and insects. Bio-diversity strategies were implemented in about 6.67 million hectares annually for rice blast management in 2007 and 2008. Light trips were extended to 0.7 million hectares of rice fields to kill moths of rice borers and leaf folders.</p>

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	<p>During the period from 2007-2008, wheat IPM strategies focused on prevention and ecological approaches. In the regions where the pathogens of wheat stripe rust can over-winter and over-summer, the percentage of seed coating or treatment with fungicides was increased to over 80% in 2007.</p> <p>In corn, biological technologies such as the use of <i>Beauveria bassiana</i> for killing over-winter larvae of corn borer, artificial release of <i>Trichogramma</i> spp in fields have been extended to above 2.5 million hectares since 2007.</p> <p>In cotton, the transgenic Bt cotton has been expanded to over 2.4 million hectares in China.</p>

Period	Pest management: China (Based on the country report presented at APPPC 25 <sup>th</sup> session in August 2007)
Up to 2007	<p>The quarantine pest list was updated. Two alien invasive pests, i.e., the red imported fire ant and the cucumber green mottle mosaic virus, were discovered and emergency quarantine eradication programmes were undertaken. Integrated measures were strengthened for the plant quarantine pests. Crop pests of national importance, particularly migratory locusts, rice borers, rice plant hoppers and rodent were successfully managed and controlled. Using an ecology approach such as improving biodiversity in its over-summer places to reduce inoculum, the national programme on the management of wheat stripe rust was implemented. Demonstrations of “green protection technologies” such as light-trapping, pheromone mating-disruption and biological control were carried out on a large scale, and these activities attained impressive economic, environmental and social benefits.</p> <p><b>International Cooperation</b> IPM experts from China initiated exchange programmes with Viet Nam and Thailand, to explore the possibilities of cooperation on the management of rice plant hoppers.</p>

Period	Pest management: India
2007-June 2009	<p>Plant Protection plays a vital role in achieving targets of crops production. The major thrust areas of plant protection are promotion of Integrated Pest management, ensuring availability of safe and quality pesticides for sustaining crop production from the ravages of pests and diseases, streamlining the</p>

	<p>quarantine measures for accelerating the introduction of new high yielding crop varieties, besides eliminating the chances of entry of exotic pests and for human resource development including empowerment of women in plant protection skills.</p> <p>Keeping in view the ill effects associated with the use of pesticides, Integrated Pest Management (IPM) approach has been adopted as a cardinal principle and main plank of plant protection in the overall crop production programmes in the country. Further IPM is also an important component in the National Agriculture Policy adopted by the Government of India. The objectives of IPM approach are to increase crop production with minimum input costs, minimize environmental pollution and maintain ecological equilibrium. 31 Central Integrated Pest Management Centers have been set up for the purpose.</p>
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Period	Pest management: Japan
2007-June 2009	<p>The training course on disinfestation technique using thermal treatment on fruit fly has been organized since 1988 with trainees being invited from countries which are affected by fruit fly. As a multilateral contribution, Japan financially supported through a trust fund a field project on phytosanitary capacity-building, targeting 10 countries. The project was implemented by the FAO.</p>

Period	Pest management: Lao PDR
2009-2010	<p>Pest management is nationwide recognized in Lao PDR through the integrated pest management project (IPM) which has been implemented since 1995 under the technical cooperation programme between FAO and Lao PDR.</p> <p>The national IPM project office which is based in the Plant Protection Center has the central and local networks within the line institutions aiming at promoting and educating farmers in sustainable and environmentally friendly pest management.</p> <p>IPM activities play an important role in implementing the Lao government's current policies on agriculture with emphasis on increasing productivity, market-orientation, exports and household food security. At the same time, the policy also stresses the preservation of agriculture biodiversity and sustainability, equitable development, and the conservation of natural resources. Organic crops and production areas, and production for niche markets have also been advocated.</p>

	<p>The strategy for pest management has focused on vegetables since 2005. The IPM activities in Lao PDR have focused on increasing the capacity of the IPM program and policy support, and on increasing the participative role of stakeholders, especially farmers, in the planning and implementation.</p> <p>The main development during 2007-2008 has focused on promotion of involvement of additional agencies in the program support and implementation, including effective coordination among these agencies and strengthening technical and training capacities among field staff.</p> <p>More than 14 farmer field schools were conducted in the target area with 231 farmers trained in the IPM. As well, 7 officers and local trainers of the IPM program continue upgrading their capability on biological control and good agricultural practice of vegetable production through a series of training activities organized within the country and in the partnership countries (including China, Thailand, Cambodia and Viet Nam).</p> <p>In collaboration with Oxfam-Belgium Project on the use and production of biological control agents, a number of biological control agents have been introduced into the program and investigation is conducted on its potential to control important pests with possible field-level production. The knowledge on biocontrol practice of Diamond backmoth, using its major parasitoids (<i>Diadegma semiclausum</i> and <i>cotesia</i> sp.) and biopesticide (<i>Bacillus thuringiensis</i>), has been transferred to local trainers and farmer field schools in the target area where huge cabbage is produced for export.</p> <p>In October 2007, the status of Coconut hispine beetle in Lao PDR was assessed through a FAO program. The assessment formulated concrete recommendations for containing the spread of the beetle and for strengthening the biological management of beetle. The experiment to study potential of predatory earwigs and mass rearing of <i>Asecodes hispinarum</i> are being investigated under the lab condition of the PPC.</p> <p>Based on the IPM project's activities with its achievement, the Ministry of Agriculture and Forestry as well as the Department of Agriculture have been promoting the Integrated Pest Management (IPM/FAO) as basis for implementation of clean agricultural production which comprises 3 steps including (i) good agricultural practice, (ii) pesticide-free production and (iii) organic agriculture.</p>
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Period	Pest management: Lao PDR
2007-June 2009	<p>With regard to the policy development and legislation, the Government of Lao PDR has defined its new agriculture and forestry strategy for the period 2006-2010 which contains four key objectives, such as food security, commodity production, eradication of shifting cultivation, and sustainable forest management. The policy of commodity production involves increasing the supply of goods for both domestic and foreign market. The Government is launching the promotion of "Clean Agriculture" aiming to produce organic</p>



	<p>agricultural products.</p> <p>IPM program as well as GAP are included in 4 production systems of Clean Agriculture policy i.e. (i) conventional traditional agriculture, (ii) conventional chemical agriculture (GAP and IPM), (iii) pesticide free products (PFP), and (iv) organic agriculture (OA). The main achievements have been the adoption by the Ministry of Agriculture and Forestry of Lao PDR of the Standards for organic farming. They were adapted to the local context from IFOAM (International Forum for Organic Agriculture Movement) Standards. Therefore GAP is currently being in the process of consideration to support by STDF.</p>
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<b>Period</b>	<b>Pest management: Malaysia</b>
<b>2007-June 2009</b>	<p>Integrated Pest Management (IPM) has long been implemented in rice, vegetable and fruit crops in an effort to alleviate the problems caused by excessive use of pesticides. New programmes and activities are being planned to further strengthen and expand IPM implementation in order that the benefits are enjoyed by a large segment of the farming community.</p>

<b>Period</b>	<b>Pest management: Myanmar</b>
<b>2007-June 2009</b>	<p>Myanmar has a national IPM policy. IPM is one of the main pillars to the development of the Plant Protection Division.</p> <p>The Plant Protection Division was established by a steering committee in 1999. The Division advocates the need for Integrated Pest Management to be adopted as a national crop protection policy. It also makes decision on crop information exchange between Myanmar and other ASEAN countries and international association.</p> <p>Currently, the IPM practices are being adopted to mitigate pest damage. The other aspect of the botanical insecticide such as neem pesticide has been tested against vegetable pests in the field condition.</p> <p>The Farmer's Field School has been established since 2000. However, during the beginning stage, emphasis was placed only on the rice farmers.</p>

Period	Pest management: Nepal
2009-2010	<p>Crop pests are important biotic agents to reduce crop loss accounting with 25-35%. Pesticide dominates major components of pest management in Nepal. However, very poor graded pesticides dominate Nepalese markets. Haphazard use, unnecessary use and their likely effects are common in major rural areas. In order to combat this situation, the Plant Protection Directorate (PPD) in association with line agency programs is active in the country. The PPD has been giving its services by applying effective quarantine and pesticide management approaches in the country. The Integrated Pest Management (IPM) is one of the major programs of the Directorate, which is also technically backstopping by FAO, Nepal.</p>

Period	Pest management: New Zealand
2007-June 2009	<p>Integrated pest management continues to be an integral component of orchard management programmes in New Zealand.</p>

Period	Pest management: Philippines
2009-June 2010	<p>The vision of the Crop Protection Division of the BPI is to strengthen crop protection services in the country. This is done by employing biological and cultural technologies which are effective, safe and environment friendly. To adequately address pest problems and ensure increase in farm productivity, food sufficiency and security, the Crop Protection Division develops and formulates guidelines and policies in the implementation of improved crop protection strategies.</p> <p>The major functions of the Division are the implementation of sustainable biological control technologies, generation of pest management strategies and improvement of crop protection technologies adapted for the local farmers. The Crop Protection Division provides technical assistance, coordination, and where necessary, supervision over regional facilities, e.g. Regional Crop Protection Centers (RCPCs) and surveillance and early warning system (SEWS). IPM-related national, as well as bilateral/multinational program implementations are involved.</p> <p>It provides facilities for plant pests and disease diagnosis, mass production and</p>

	<p>rearing of biological agents for field distribution, training for crop protection staff and extension agents, and proper evaluation of national programs and projects on crop protection. It works in tandem with the Plant Quarantine Service since it supervises and evaluates researches and other development projects on exotic pests of special national considerations and acts as central monitoring arm and repository of regional pest data information.</p> <p>Crop protection is vital to the success of sustainable agriculture. If pests are left unabated, the benefits of crop production will be futile, even if proper fertilization, good water management, and sound cultural practices are followed. Thus, crop protection is a key component of agricultural production.</p>
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Period	Pest management: Republic of Korea
<b>2009-2010</b>	<p>The Rural Development Administration (RDA) conducted the demonstration projects for rice and citrus to promote the IPM practice. Demonstration farms operated in 2008 consisted of 284 sites for rice and 16 sites for citrus and contributed to reduce the chemical spray times by 4 from 12 times to 8 times in average for citrus, and for rice the chemical application reduced to 2 times from 3 times as well.</p> <p>The Ministry for Food, Agriculture, Forestry and Fisheries (MIFAFF) started a supporting program in 2005 for the growers who used natural enemies to control insect pests occurring in 9 greenhouse crops including strawberry. The Government gives a subsidy (about 50% of the cost for purchasing natural enemies) to the growers who satisfy the requirement set by the program with a goal that 50% of horticultural crop area use biological control methods by 2013.</p> <p>The RDA carried out research to determine economic threshold levels for about 13 major pests, 11 major diseases and 7 major weeds in cooperation with 8 provincial research institutes in 2008.</p>

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Period	Pest management: Sri Lanka
2007-June 2009	<p>During the period under review the most significant change in the Pest Management in Sri Lanka, is the appointment of National committee to revise the Plant Protection Act No 35 of 1999, to make the necessary changes to meet the present day requirements and submission of new set of regulations under the Act.</p> <p>The country has embarked on several Pest Management Programmes for control of specific pests. Shortage in resource like funds, trained staff, machinery, and equipments always hindered the progress of the programme. Despite the problems encountered the centre has achieved most of the targets.</p> <p>The Integrated Pest Management (IPM) strategy that was practiced in rice cultivation is now extended to vegetable and other plantation crops by using Farmer Field School (FFS) training approach. After the successful implementation of IPM programme , a new programme was initiated in the country incorporating mosquito vector management into the IPM programme, called Integrated Pest and Vector Management (IPVM) Programme, funded by UNEP.</p> <p>Due to multidisciplinary nature of the programme it required the involvement of several stakeholder Departments, like the Department of Agriculture, Department of Health and Mahaweli Authority of Sri Lanka (MASL) . This itself was a unique experience, integrating Agriculture with Health for the purpose of providing a better service and upgrading the livelihoods of rural communities.</p> <p>In order to sustain the programme IPVM clubs were formed in village where FFS training were conducted so that farmers themselves could continue the activities they learnt at the FFS while disseminating that knowledge to other farmers.</p>

	<p>Another development in the past two years is the preparation of regulations under Plant Protection Act No. 35, 1999, to control of Coconut Leaf Rot Disease and Weligama Cococnut Wilt Disease in southern region of Sri Lanka.</p> <p>Water hyacinth and <i>Salvinia molasta</i>, have been identified as principal invasive weeds that require adoption of biological control methods. Rearing facilities of bio control agent <i>Cytobagous salviniae</i> has been improved and four regional rearing units were also established during the last two years for biological control programme of salvinia.</p> <p>In addition, bio control agent of water hyacinth, <i>Neochatina bruchi</i> was imported from Thailand and introduced into water bodies after completing the necessary host specific test.</p>
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Period	Pest management: Thailand
<b>2007-June 2009</b>	<p>During 2007-2008, MOAC did not change the national policy on IPM programme. The country's key economic crops included rice, okra, asparagus, fruit crops, vegetables, field crops, and orchids.</p> <p>However, the budget constraint had an impact on IPM activities. The Department of Agricultural Extension (DOAE) had to decrease the number of training programs and farmer field schools (FFS). As regards the main IPM programme, DOAE still encouraged the farmers' education and knowledge development, with focus on the change of attitude of farmers using highly toxic pesticides. The education helped them understand the principles and the framework of Good Agricultural Practices (GAPs).</p> <p>The main component of the IPM implementation is to encourage farmers to use biological control. A number of bio-agents are introduced to replace or alternate with chemical pesticides.</p> <p>Since the end of 2007, DOAE has set the project entitled "Using Integrated Pest Management for Decreasing Risk of Plant Pest Infestation" as the main activity of the Community Plant Pest Management Center. The objects of the project are to develop farmers into "Pests Management Professionals in IPM", to reduce damage to farmers crops, to encourage less investment, and to enhance community participation in the project.</p> <p>Technology transfer in the project mainly relies on the adaptation process of FFS. To ensure the product safety for consumers from pesticide residues, products will be tested for chemical residues before being harvested.</p>

	<p>Area-wide IPM of fruit fly control programme using the Sterile Insect Technique (SIT) has been carried out over a large area, and sometimes involves a major facility and a lot of equipment. The required financial resource may also be large. Even though a programme might be economical on a benefit/cost basis, it is not always affordable. Obtaining operating funds can be the most important issue facing a programme. Adequate financial resource affects the programme strategy and operations as well as the duration and reliability of programme support. In the case of Thailand's programme, financial support from the government is essential for the stability and success of the programme. Sometimes the government support is unreliable or not delivered in a timely manner. For a biological programme, this can easily cause delays, uncertainty, unnecessary repetitions of work, and even a programme failure.</p> <p>The basic requirements for scaling up the pilot project to a national level include not only a complex procedure of incorporating new and better technologies but also the support of the government officials who have to be convinced. This often poses a huge challenge.</p>
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<b>Period</b>	<b>Pest management: Viet Nam</b>
<b>2007-June 2009</b>	<p>The National IPM Programme has IPM trainers in all 63 provinces of Viet Nam, IPM FFSs have been conducted in more than 95% of the communes growing rice nationwide involving over 10% of farm households. IPM has been expanded to vegetables, cotton, maize, sweet potato, tea and citrus. FFS have been followed-up with various forms of community activities including establishment of IPM clubs and farmer groups, application of System of Rice Intensification at field level. The National IPM Programme actively supports the National Safe Vegetable Programme by developing IPM aligned to principles of GAP, thereby contributing to improving food safety.</p>