

APPPC Regional Workshop on Empowering Farmers through FFS-IPM Training in Support of Sustainable Intensification of Crop Production

Workshop Report

Summary

The workshop took place in Kathmandu, Nepal from 27 February to 2 March 2017 and was attended by 30 participants (including 7 women) from 13 Asian countries. It was organized by the Standing Committee on IPM of the Asia and Pacific Plant Protection Commission (APPPC) and FAO of the United Nations in cooperation with the Plant Protection Directorate in Kathmandu.

Delegates from participating countries reviewed up-to-date developments of farmer empowerment approaches with Farmer Field Schools (FFS) in the region. Participants shared experiences and lessons-learned from various country practices of FFS. It was noted that FFS has become the mainstream approach for developing capacities of farmers and communities in discovery-based learning and has been included in various programmes such as food and nutrition security, health (plant, soil, human or environment) management, livestock, water management, climate adaptation, etc. Notable progress of institutionalization and networking of FFS has been made in Bangladesh, Cambodia, China, Indonesia, Nepal, Philippines, Thailand and Viet Nam. More and more local communities, CSOs and GOs are closely collaborating in the promotion of ecological approaches through empowerment of farmers by using the participatory approach of FFS, which contributes to the implementation of the *Save and Grow* strategy.

Participants were briefed on the FAO FFS Guidance Document which provides a framework of FFS and operational guidelines to FFS facilitators, trainers, supporters, policy makers and various stakeholders for promoting quality FFS. The workshop also included a field visit to successful IPM FFS groups in Kavre District of Nepal. During the field visit, participants observed a number of farmer-led experimental trials on soil and plant health associated with using composts, botanical pesticides, entomophthogenic nematodes, balanced fertilization, various cultivations, etc. FFS facilitators played a key role at community level in implementing “field research” under the supervision of agriculture and plant protection officers.

Finally, the workshop finished with plenary discussions on key issues such as how to define follow-up strategies to continue IPM FFS development and innovation in support of *Save and Grow* for sustainable intensification of crop production.

Workshop goals and objectives

The purpose of this workshop was to strengthen IPM FFS management capacities and to assist countries to achieve sustainable intensification of crop production.

More specifically, the objectives of the workshop were to:

- (1) share experiences and lessons learned on the empowerment of farmers through FFS IPM training;
- (2) share experiences on IPM FFS programme implementation in terms of innovation, sustainability, institutionalization, local relevance, effectiveness and ownership;
- (3) identify follow-up strategies to support IPM continuation for SICP under the *Save and Grow* policy; and to;
- (4) document successful cases of IPM for SICP under the FAO's *Save and Grow* policy for the technology extension.

These workshop objectives were in line with FAO's Strategic Objective 2 insofar they support pesticide reduction, sustainable intensification and the implementation of international guidelines. The workshop built capacity to implement these objectives.

The outputs of the workshop were :

- (1) country reports on the updated status of IPM for SICP under *Save and Grow* in the APPPC member countries. (Country reports were asked to cover the modality of FFS, coverage of IPM in area and cropwise, marketing system of IPM products, success stories, development and use of biological control methods, follow-up programmes, institutionalization and ownership of the IPM programme, and future strategy).
- (2) strategies for follow-up: how to continue support for IPM development and application for SICP under the *Save and Grow* policy in APPPC member countries.
- (3) documentation of successful cases of empowerment through FFS IPM training for SICP under the FAO's *Save and Grow* policy.

OPENING SESSION

The opening session was chaired by Dr. Suroj Pokharel, Secretary, Ministry of Agricultural Development. A welcome address to the delegates and guests was delivered by the Director of the Plant Protection Directorate, Dr. Dilli Ram Sharma, who recognized the expertise and experience of participants and expressed hope that they would benefit from exchange of experiences especially about IPM, FFS, *Save and Grow* in the face of challenges brought about by climate change. To introduce the workshop, the Secretary of the Asia-Pacific Plant Protection Commission (APPPC) and FAO Senior Plant Protection Officer, Dr. Piao Yongfan, reminded the participants that after more than 20 years of FFS in IPM, the challenge is how to empower farmers to sustainably engaging in managing a number of new issues in collaboration with various partners at community level. FFS capacities are available throughout the region to address emerging issues such as sustainable intensification of crop production and climate change adaptation and move forward with innovative solutions. The countries of the region can learn from each other and APPPC serves as a platform for such exchanges. Following this introduction, the FAO Country Representative, Dr. Somsak Pipoppinyo, stressed the relevance of the workshop for Nepal where FFS has been institutionalized by the Government and is now being used to address agricultural, health and environmental issues. The Director General of the Department of Agriculture, Dr. Dila Ram Bhandari, then emphasized the high importance of agriculture for the economic and social development of Nepal, and the role of integrated pest and pesticide management for achieving sustainable food and nutrition security without harming the environment and compromising people's health. The keynote speech was delivered by the Chief Guest, the State Minister for Agricultural Development. In her speech, she highlighted Nepal's achievements of the National IPM Programme and implementation of international pesticide management

conventions. Finally, the session was closed by the chairperson, Dr. Suroj Pokharel, Secretary, Ministry of Agricultural Development, who thanked the organizers and participants and wished them fruitful deliberations. In conclusion, a group photo with all delegates and guests was taken.

COUNTRY REPORTS

The situation in their respective countries were described in twelve country reports by delegates from Bangladesh, Cambodia, China P.R., Lao PDR, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Thailand and Viet Nam. These presentations generally described the country's agricultural system, the history of IPM, past and ongoing FFS, and the use of IPM technologies for pest and pesticide management. They reported on the increase in farmer's knowledge and skills, the reduction of chemical and highly toxic pesticides, new developments in organic and bio-pesticides and their impact on farm income and more diverse environments. While most countries have practiced FFS for more than 10-20 years, this approach has only recently been re-vitalized in Indonesia, Malaysia and Thailand to address new challenges in sustainable crop production intensification (SCPI) and diversification, etc. In several countries, IPM-FFS is already well institutionalized and practiced country-wide with funding from local and national budgets, while others are still at the stage of localized and specific projects. Most FFS have been implemented in rice, vegetables and fruit, but here were also examples for tea, livestock, health issues, food security and climate change. In Pakistan, the FFS model has been modified into Women Open School, Children Ecological Club, Farm Family and Farmer Business Schools. Farmer empowerment was a major issue in Nepal and Viet Nam. In China and Thailand, FFS are used to support a transition to larger-scale farming. Particular Climate Fields Schools were implemented in Bangladesh in flood, flash-flood, saline and drought affected areas. In Malaysia, rice, oil palm and cocoa varieties were being screened for heat and water-efficient qualities.

Discussions

Use of abamectin. Nepal does not use of abamectin as a biopesticide in FFS due to side effect of secondary pest resurgence. However, in some countries, such as Bangladesh, it is registered as a biopesticide as an alternative to highly toxic chemicals.

“Technology transfer” and FFS. FFS are not about “technology transfer”. FFS is about technology verification and adaptation.

Establishment of IPM Section. The IPM Section in the Bangladesh Department of Agriculture Extension was established in 2002 to coordinate IPM activities at field level. The establishment of the IPM section did not require new personnel but uses the existing extension staff at district level for carrying out FFS and monitoring activities – including technology and IPM.

Climate forecasting. In Bangladesh, climate forecasting is done at unit level or national level, if needed. For climate change mitigation, inputs come from projects, e.g. remote sensing, and the information is used to design project activities. In Cambodia, IRRI remote sensing information is shared with the National IPM Programme for action. Mobile phones are used for informing community and IPM trainers about the information. In the Philippines, there is a 2-year IRRI remote sensing project with two groups of people involved in data collection: one group on the physical area and one group on plant health. As of now, there is no clear

footprint that pest or disease can be seen using remote sensing. Also there is no forecasting but only early warning on pests. Information from remote sensing is used after a pest incidence for policy making on where to put resources.

Funding for FFS. In China, funding for FFS and support to the IPM programme was mainly from the central government. However, more and more local governments are now providing funding to the FFS approach and expand its application to broad areas beyond IPM. Also, the national programme on zero pesticide by 2020 and provincial plant protection stations support FFS to extend technologies for achieving the national goal. Self-financed FFS are funded by farmers' cooperatives from their profits from higher yields from vegetables and fruits. In the Philippines, FFS funding comes from both national government (for new pests) and local governments, NGOs, etc. Farmers demand FFS from local governments. In Indonesia, there are strong involvements of farmers, trainers and local governments in the programme. However, there is also a conflict between conventional extension (e.g. distribution of seeds, fertilizers, etc.) and FFS approaches; until now, it is difficult to secure funding through the regular budgets of the government extension system.

Save and Grow FFS. S&G FFS takes off from existing IPM FFS by integrating aquatic biodiversity or fish, trees outside forests, crops other than rice, etc. The aim is for farmers to produce more with less input.

Rice and “zero hunger”. In the Philippines, rice is the staple and main source of income for Filipino farmers. The *Save and Grow* FFS on sustainable intensification of rice production integrates fish, vegetables, etc. to improve nutrition and allows farmers to have additional income for other needs.

Conclusion

The examples in the country reports showed the rich experience with IPM FFS in the region and the different courses which this approach has taken in the various countries. Generally, its importance for supporting agricultural development has grown over the years, and it has demonstrated a high adaptability and relevance, even for other sectors that aim to empower farmers to improve their livelihoods in the face of challenges such as climate change.

SUSTAINABLE INTENSIFICATION OF CROP PRODUCTION

Pesticide risk reduction: Results of a long-term impact assessment – Gerd Walter-Echols

In 2015, the long-term impact of IPM-FFS was determined in Cambodia and Viet Nam on groups of farmers that were first surveyed in 2008 (baseline) and then again in 2010, one year after FFS training on pesticide risk reduction. While the short-term impacts in 2010 were largely the result of a single intervention – the FFS -, the long-term impacts were additionally affected by a variety of post-FFS activities such as various community actions, GAP and organic production training, local regulations and national legislation. While the final impact cannot be pinpointed to a single cause, results showed that in 2015 there was a lasting increase in knowledge among community officials of farmers, pesticide shops have improved their safety measures, pesticide use was roughly cut in half in both countries - though more among FFS participants than control farmers -, and highly toxic pesticides were no longer being used. This has resulted in fewer reported poisoning cases and richer ecosystems. It can

be concluded that pesticide risks to individual farmers and their communities have been fundamentally reduced since 2008 in both study countries.

FFS institutionalization and networking for up-scaling agroecology in Asia – Alma Linda Abubakar

Since current global food systems are not sustainable, a transformation is needed which requires changes in field practices, farm management and mobilizing farmer knowledge and learning systems. To discuss the institutionalization of FFS, a regional workshop was organized in Bangkok, Thailand in May 2016. The objectives of the workshop were to (1) share and learn from country experience and lessons learned on institutionalization, (2) develop action plans for operationalization of FAO's FFS Guidance Document; and (3) assess needs and interests for a regional FFS network in Asia. The workshop concluded to make use of the existing Asian regional FFS networking platforms such as the Field Alliance or the FAO Regional IPM Programme, as well as informal networks such as Line or Facebook. The workshop adopted a resolution to urge FAO to take the lead in institutionalizing the FFS learning system and to set up FFS support centres. It called on governments to ask FAO for support in the institutionalization, and it urged all other stakeholders to join hands in institutionalizing FFS.

FAO Farmer Field Schools Guidance Document: An Outline – Alma Linda Abubakar

In April 2016, FAO published an FFS Guidance Document (<http://www.fao.org/3/a-i5296e.pdf>) for planning of quality programmes. It addresses concerns over the quality of FFS programmes while maintaining its uniqueness and flexibility. The chapters of the document cover key elements of FFS approach, designing a programme, developing human capacities, defining the content, monitoring, evaluation, impact assessment, budgeting and building on the basic FFS learning cycle. It is hoped that the Guidance Document would be the start of a constructive collaboration among FFS experts and programmes around the world, and that it would assist producers and their communities in achieving sustainable food production and improved livelihoods for their families and children.

Climate change adaptation in agriculture through FFS: An experience sharing from Nepal – Madhu Sudan Paudyal, Binod Saha, and Krishna Prasad Pant

Nepal is experiencing more prolonged and frequent droughts, as well as erratic onsets and cessation of the rainy season. Combined with the degradation of land and forest cover, this has increased the vulnerability of the rural population. Working in four districts, the project "Climate Change Adaptation in Agriculture through Farmer Field Schools" established 120 FFS for community sensitization, and testing and validation of adaptation technologies. In the wheat/goat based FFS, farmers experiment with drought resistant varieties, minimum tillage, soil/water conservation measures, use of organic matter, balanced fertilization, mulching and drip irrigation. The agroecosystem analysis included the use of agro-meteorological data collected with mini-weather stations. It was concluded that FFS is a suitable approach to involve communities in climate change adaptation.

Innovations in IPM FFS and adaptation to climate change – Cahyana Widyastama

The FIELD Foundation has applied the FFS approach to a variety of innovative applications such as ecological vegetables and sweet potatoes; estate crops; family food security; nutrition

and health; plant breeding; watershed management; eco rice and rice-fish; multi-purpose trees; living food bank; biogas; water and sanitation; and understanding climate and its impact on the village. Save & Grow FFS included anticipation for abnormal climates such as too much or too little water, and how to “read” the climate and wrong onsets of the rainy season. Farmers screened for drought and salinity tolerant varieties, and learned to improve the water holding capacities of their soils. Furthermore, they developed technologies to mitigate the impact of climate conditions by transplanting older rice seedlings to adapt for water salinity or growing appropriate crops and varieties adaptive to new climate conditions.

IPM development in support of Save & Grow in Thailand – Paveena Konyong

Because Thai farmers are traditionally small-scale and vulnerable to natural disasters, the Government has launched a new policy of encouraging large-scale farming in order to enhance farmers’ knowledge, increase their bargaining power and reduce production costs. This transition will be supported by 882 Agricultural Learning Centres to assist communities in the new integrated approach. These centres apply participatory learning curricula according to FFS practice for IPM, GAP, soil and fertilizer management and marketing. In 2016, six hundred (600) active large-scale farms participated in the programme for rice, dry crops, orchards, vegetables, mulberries, livestock and fish farms. The Department of Agricultural Extension is using IPM-FFS as a tool to disseminate knowledge to the member farmers of the Agricultural Learning Centres. The expected outcomes are a 20% cost reduction, increased marketing efficiency, a 20% higher income for the farmers, and a sustainable production based on the needs of the community.

Linkage of IPM FFS with plant clinics in Nepal – Dilli Ram Sharma and Vinod Pandit

CABI is promoting the Plantwise programme for improving plant health systems within developing countries by establishing a network of plant health clinics that deliver advice to farmers. In Nepal, Plantwise was launched in 2012 and now operates 38 clinics in four regions of the country. It promotes locally based IPM strategies, gives technical backstopping and diagnostic support with access to a global knowledge base. Synergies between FFS and Plantwise are utilized and FFS farmer facilitators were trained as plant doctors who can deliver quality services even in remote areas. However, some participants - including the APPPC Secretariat – expressed concerns of potential risks when the role of FFS facilitators shifts from capacity development of farmers’ abilities for discovering, analysis and decision making to providing solutions and prescriptions.

A success story of rapid bioassay pesticide residue analysis in Nepal – Dilli Ram Sharma and Man Bhadaur Thapa

Misuse of pesticides leads to excessive residues on agricultural products, particularly on vegetables. As a way to reduce pesticide residues and to monitor the situation, the Nepal Government has decided to establish a rapid bioassay pesticide residue laboratory in Kathmandu in 2014. In the meantime, six more laboratories were established in the country. The bioassay method measures the amounts of AChE in the sample via an enzymatic reaction with the help of a spectrophotometer. Samples that show an inhibition of more than 45% are considered unsuitable for human consumption. So far, a total of 4,588 samples were analysed, of which 61 were found above 45%. Almost half of these excessive samples were found in the first month after laboratory establishment; after that, farmers became more careful since they were afraid that their shipment would be confiscated. It was found that off-season vegetables,

and particularly tomatoes and cauliflower, were prone to excessive residues. Due to the extensive media coverage and public concern, the laboratory has had a positive impact on the pesticide residue situation even though its detection range is quite limited and the enforcement procedures are difficult to carry through.

Intensification and institutionalisation of IPM FFS in Nepal – Binod Saha

The national IPM Programme in Nepal exists since 1997. From 2008 to 2013 was the consolidation, upscaling and institutionalization phase of the programme that linked the plant protection services with research institutions, educational institutions, public and private support organizations and farmer groups. Within year-long IPM-FFS that covered the farmer group's entire cropping system, the programme established standard procedures for group strengthening, organized production, monitoring product certification and market promotion. The system ensured maintaining a high quality of the services and started placing the IPM-FFS curriculum in the pre-service training of agricultural graduates. It was found that FFS is a good entry point to initiate other development interventions and to promote sustainable agriculture on a large scale.

FFS – an effective approach to address food and nutrition security: a case of Agriculture and Food Security Project in Nepal – Ratna Kumar Jha

The large-scale \$58 million project by the Ministries of Agricultural Development, Livestock Development and Health covers 19 mid- and far-western districts of Nepal where food security is the lowest. A key element of the programme are the 1900 FFS on crop production, 445 on goat, poultry and dairy, and 95 on seed production. Though the FFS methodology was found highly suitable and adaptive to the variety of tasks, it was difficult to adequately qualify the large number of FFS facilitators in the available time and to maintain the quality standards necessary for experiential learning.

Dissemination of cost effective organic farming technology in SAARC region: Use of Jeevatu for safe crop production in Nepal – Khadka Bhakta Paudel

Developed by the Nepalese Farming Institute, Jeevatu is the 15-30 days fermentation product of farmyard manure/compost, cow urine and water. The final product contains a mixture of beneficial microbes which are claimed to control a variety of insect and disease problems in the soil and on plants. Furthermore, it improves the nutrient status of crops. It can be used as a low-cost substitute to agricultural chemicals and is suitable for organic farming.

Developing IPM packages for vegetable crops and its dissemination in FtF districts of Nepal – Lalit Prasad Sha and Dilli Ram Sharma

A USAID-funded collaboration project with a consortium led by Virginia Tech University, a number of IPM technology packages were developed for eggplant, tomato, cauliflower, cucumber and bitter gourd and disseminated in 20 Feed-the-Future (FtF) districts. The packages include seed treatment with *Trichoderma* and *Pseudomonas*, coco-peat seedling trays, nursery soil solarisation, seedling treatment with *Trichoderma*, rouging virus infested plants, grafting for control of bacterial wilt and other diseases, yellow sticky traps, and monitoring traps for determining thresholds and many more. The technologies are disseminated through IPM Learning/Demonstration Centres. The adoption requires a supply chain to assure that the inputs are available in the right quantity, at the right time and in the

right place at a reasonable price. A recent example of an IPM package development was against an outbreak of *Tuta absoluta*, an invasive tomato leafminer, in 2016 which involved trapping and drowning the insect after being attracted by a commercially available lure.

Conclusion

The examples presented at the workshop showed a great diversity of IPM and FFS approaches and demonstrated the adaptability of the FFS approach. With the FFS Guidance Document, a universal standard for FFS has been established that can be used as a reference point for assessing the quality of FFS, something which is crucial for its successful practice. The examples further showed the long and difficult process of changing the top-down technology transfer mindset into a participatory learning one. However, many of the existing and newly emerging challenges show the suitability of the FFS approach to achieve lasting changes. The presentations also demonstrated, that FFS is much more than a tool for providing support to the SCPI in the context of “*Save and Grow*” as well as to the food security and food safety initiatives by incorporating into various programmes.

FIELD TRIP

On 2 March, a field trip was organized. First, the workshop participants visited the Kalimati wholesale market in Kathmandu where in June 2014 a small laboratory for rapid bioassay for pesticide residues was established. Vegetable samples are being analysed for their AChE properties which would indicate a presence of Organophosphate or Carbamate pesticide residues. An enzyme inhibition value of more than 45% would indicate that the sample was unfit for human consumption and based on a Government directive, the shipment would have to be seized and destroyed. In the first month of operation, 14% of the samples taken showed excessive residues. Since then, the number of violations was drastically reduced. Nevertheless, the continuing monitoring created an increased awareness among producers who became more careful with bringing produce to the market for which the waiting period has not been observed.

Following the visit at the wholesale market, the workshop participants were driven about 50 km to Kavre district where they first visited the Panchakanya IPM FFS in Mahendrajyoti which experimented with fertilization trials on potato. Afterwards the group visited the Sayapatri IPM Resource Centre in Kushadevi that was established in 2013 by the National IPM Programme. This centre was operated by the local IPM farmer cooperative for the production of biopesticides, specifically entomopathogenic nematodes, *Trichoderma viride*, NPV and *Metarhizium*. However, the production of these biopesticides is still hampered by frequent power cuts which required an emergency power supply for some of the crucial instruments. There are plans to produce *Beauveria* and *Acorus calamus* dust in the future. In addition, the cooperative organized the marketing of their IPM products in the nearby city of Banepa. The members continue with jointly testing and validating IPM technologies in the field and providing technical information to the farming community. Before leaving Kavre district, the workshop participants visited the Laligurans IPM FFS in Banepata which experimented to improve cauliflower production.

Conclusion

The field visit demonstrated the importance of enforcement procedures for effective pesticide management. Even small and incomplete measures can have a lasting effect if they

demonstrate a political will to carry through. The cooperative-run IPM Resource Centre at Kushadevi was an enlightening example of institutionalizing IPM at local level and efforts to make IPM economically sustainable.

DISCUSSIONS AND FOLLOW-UP

SWOT analysis of IPM-FFS and follow-up strategy for SICP

Participants were divided into four groups to discuss the strengths, weaknesses, opportunities and threats (SWOT) of IPM-FFS. The main results were:

STRENGTH: Many years of experience with IPM-FFS; availability of trained facilitators and experience resource persons; well accepted by farmers, increasingly supported by government and donor policies; entry point to other applications; entry point to networking with other institutions; starting point for permanent village learning groups and farmer organizations; platform to launch other applications.

WEAKNESSES: Quality difficult to maintain, research not always in line with needs, lack of lead organization, lack of government funds from regular budget, landless and big commercial farmers less interested; parts of the curriculum not clearly understood by farmers and facilitators, trained facilitators disappear to other organizations, no facilitator training at agricultural institutes or universities.

OPPORTUNITIES: Public demand for safe food; more private sector investments into IPM products; certified IPM products; collaboration among different agencies.

THREATS: Powerful lobby of chemical industry; many donors and governments still go for top-down approach; globalization drives industrial farming; support may change with change of ministers; politicians prefer quick fixes and results.

With regard to the question, what changes are needed to achieve sustainable intensification of crop production, the main ideas were: Continue FFS education; embed facilitator training into the regular education system; mainstream coordination, leadership and funding; tap into private sector support.

Conclusion

While many FFS do more of the same and still focus on IPM, there is need to expand and employ new strategies that reflect changing societies and new opportunities.

New pests

Cambodia: Rice: rice blast: new variety, tests with *Trichoderma*; reduce nitrogen, do not spray nitrogen, correct seed rate; seed bed treatment with *Trichoderma*; clean field, water level at 5 cm, balanced fertilizer; wet nursery

Philippines: Mango: mango gall midge: paper bag, *Metarhizium*, *Trichoderma*, pruning tree canopy;

Sri Lanka: Virus diseases in vegetables, also banana (bunchy top); destruction of crop residues, conservation of natural enemies, minimize insecticide spray, sprinkler irrigation in dry season, crop rotation, yellow traps, seed treatments, removal of affected plant in early stages; Jeevatu could be tried; selection of good seed; products come into Nepal from India, Thailand, China, netting in the seedling stage; micronutrient foliar spray may be helpful; rice straw as a mulch.

Thailand: Cassava: after pink mealybug, now cassava, root rot: clean seed cassava system; soil treatment with urea before planting; witches broom: destroy, clean seed system.

Conclusion

The integrated management of pests and diseases continues to be a challenge and provides opportunities for innovations and new approaches. Exchanging country experiences is important to further develop IPM in the region.

Climate change challenges

Finally, the workshop participants were asked to apply their experiences in IPM-FFS to the emerging challenge of climate change that is starting to be felt in many countries of the region. The following themes were discussed by the different working groups:

Rising temperatures/ less rainfall: FFS groups need to be encouraged to discuss possible climate change effects for their communities and start experimenting with possible solutions. For example, many areas with irrigated rice may have to shift to dry rice production while in northern areas, rice could be introduced as a new crop. Communities can learn from farmers in areas that have already a hotter and dryer climate. FFS activities could include testing new short duration varieties; adjust sowing time; or looking out for new pests. Furthermore, the basket of options for “climate smart villages” may also include water conservation and sanitation issues.

Rising sea levels: Possible reactions are shifting to seafood production or continue cropping with salt tolerant varieties. Conservation of fresh water reservoirs will be an increasing issue. Certain areas may be protected from the rising sea with a system of dykes through community action. For all these changes, FFS could be the starting point for action and changes.

Longer or shorter cropping seasons: FFS groups may experiment with different varieties, nurseries, tunnel houses, intercropping and multicropping; pest exclusion netting or grafting tomato seedlings. On a regional level, it was recommended to share experiences and collaborate with pest monitoring and surveillance for new pests.

Adaptive measures against extreme weather conditions: The development of a national stakeholder system, early warning systems, community-based surveillance or living food banks may be mitigating measures for FFS groups.

Conclusion

Many countries will be affected by different climate change effects and communities need to find suitable solutions to local conditions, and possible collaborative actions which could be an outcome of FFS groups.

CLOSING SESSION

In his closing remarks, Dr. Piao Yongfan, FAO Senior Plant Protection Officer and Secretary of the Asia-Pacific Plant Protection Commission (APPPC) thanked the organizers and participants for their active participation and contributing their experiences. To move forward, however, we need to explore ways of dealing with new challenges beyond IPM in support of sustainable intensification and diversification of crop production. Rather than increasing the number of IPM-FFS, we need to use our experience and expertise to support colleagues and counterparts with finding solutions to new challenges. The workshop has presented many examples where FFS was used beyond IPM: water management in India; food and nutrition security in Nepal; Climate Field Schools in Bangladesh; community actions in Viet Nam, or innovative practices in the Philippines. It takes a long time until new concepts are widely accepted, but a new generation of dedicated officers entering the FFS movement, new opportunities arise. We need to free ourselves from the concepts of control and technology transfer and move forward to manage our soils, water and health. With this preparedness and road map into the future, we will get new opportunities beyond IPM, create new alliances or share resources. With the support of FAO, APPPC will continue to be a platform for the exchange of experiences and helping the next generation to carry on and further develop the FFS approach to achieve sustainable intensification of agricultural production for a better future.

Some delegates joined the words of thanks and gratitude to the organizers and FAO, and the workshop was then closed by Dr. Dilli Sharma.

Timetable

First Day, 2017/02/27		
Title	Time	Remarks/ Responsible person
Registration	08.30-09.00	PPD Officers
Inauguration Session Welcome Remarks : PD, PPD, Dr. Dilli Ram Sharma Highlights of the Workshop : Dr Piao Yongfan, General Secretary, APPPC Few words : Dr. Somsak Pipoppinyo, FAO-R, Nepal Few words: Mr. Dila Ram Bhandari, Director General, DoA Few words : Chief Guest (Honorable State Minister for Agricultural Development, Mrs. Radhika Tamang) Closing Remarks : Chairperson (Secretary, MoAD, Dr. Suroj Pokharel)	09.00-10.00	
Photo session	10.00-10.15	
Coffee Break	10.15-11.00	
Adoption of Workshop Agenda	11.00-11.05	
Appointment of rapporteur	11.05-11.10	
Country Paper- IPM-FFS in support of sustainable intensification of crop production within context of climate change		
• Bangladesh	11.10-11.25	
• Cambodia	11.25-11.40	
• China	11.40-11.55	
• India	11.55-12.10	
Indonesia	12.10-12.25	
• Lao PDR	12.25-12.40	
• Malaysia	12.40-12.55	
• Lunch	13.00-14.00	
• Myanmar	14.00-14.15	
• Nepal	14.15-14.30	Mr Rajib Das Rajbhandari
• Pakistan	14.30-14.45	
• Philippines	14.45-15.00	
• Sri Lanka	15.00-15.15	
• Thailand	15.15-15.30	
• Viet Nam	15.30-15.45	
• Discussion	15.45-16.00	
Coffee break	16.00-16.15	
Pesticide risk reduction in the Greater Mekong subregion: Results of a longer-term impact assessment	16.15-17.00	Mr Gerd Walter-Echols
Closing for the day	17.00	
Welcome dinner	18.00	Hosted by FAO/RAP

Second Day, 2017/02/28		
FAO Farmer Field Schools institutionalization workshop: Result and follow up	09.00-09.20	FAO, Ms Alma Linda Abubakar
FAO Farmer Field School Guidance Document: An Outline	09.20-09.50	FAO, Ms Alma Linda Abubakar
• Discussion	09.50-10.00	
• IPM Farmers Field School in Nepal; a milestone for climate change adaptation	10.00-10.20	Nepal, Mr Madhusudan Paudel, Climate change Project/FAO.
• Discussion	10.20-10.30	
• Coffee break	10.30-10.45	
• IPM developments in support of <i>Save and Grow</i> (IPM in support of agroecology, safe food production, value chains)	10.45 -11.10	Thailand
• Discussion	11.10-11.20	
• Innovations in IPM Farmer Field Schools and adaptation to climate change	11.20-11.50	Mr Cahyana Widyastama, FIELD Indonesia
Discussion	11.50-12.00	
• Linkage of IPM FFs with plant clinic in Nepal	12.00 -12.25	Nepal, Dr Dilli Ram Sharma(PPD) and Dr Vinod Pandit(CABI)
Discussion	12.25-12.35	
• A success story of rapid bioassay pesticide residue analysis in Nepal	12.35-12.55	Nepal, Dr Dilli Ram Sharma and Mr Man Bhadaur Thapa, PPD
• Discussion	12.55-13.00	
• Lunch	13.00-14.00	
• Intensification and institutionalization of IPM FFS in Nepal: Lesson learnt and way forward	14.00-14.30	Nepal, Dr Binod Saha, FAO/Nepal
• Discussion	14.30-14.40	
• “Farmer Field School – an effective approach to address food and nutrition security: A case of agriculture and food security project in Nepal”.	14.40-15.05	Nepal, Dr Ratna Kumar Jha FAO TA to Agriculture and Food Security Project
• Discussion	15.05-15.15	
Dissemination of cost effective organic farming technology in SAARC region (Use of Jeevatu for safe crop production in Nepal)	15.15-15.45	Nepal, Dr Khadka Bhakta Paudel
Discussion	15.45-15.55	
• Coffee break	15.55-16.15	
• Developing IPM packages for vegetables crops and its dissemination in FtF districts of Nepal	16.15-16.40	Nepal, Mr Lalit Prasad Sha IDE/Nepal and Dr Dilli Ram Sharma (PPD),
Discussion	16.40-16.50	
Closing for the day	17.00	
Third Day, 2017/03/1		
Departure from the hotel	08.00	
Field visit- Whole day field trip to observe • Rapid bioassay pesticide residue analysis laboratory		Nepal

<ul style="list-style-type: none"> • Interaction and visit with the IPM production farmers side at Kavre district. • Visit and observation IPM community resource centre, Kavre district. 		
Lunch	14.00-15.00	
Arrival at hotel	17.30	
Fourth Day, 2017/03/2		
1. Panel Discussion <ul style="list-style-type: none"> • SWOT analysis of IPM FFS • IPM follow up strategy for SCPI (Four Group formulation)	09.00-10.30	FAO
Coffee break	10.30-10.50	
<ul style="list-style-type: none"> • Development and use of possible alternative of chemical pesticides 	10.50-11.25	FAO
Presentation and discussion	11.25-13.00	Group leader
Lunch Break	13.00-14.00	
Plan for the future: How can we support IPM and FFS on <i>Save and Grow</i> for SCPI for farmer empowerment – Facilitated by FAO	14.00-16.00	FAO
Conclusion of workshop	16.00-16.30	

List of Participants

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