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Regional Integrated Pest Management Programme in the Near East (GTFS/REM/070/ITA)

External Evaluation Mission Report

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ABBREVIATIONS

AARINENA	Association of Agricultural Research Institutions in Near East and North Africa
AES	Agro-Ecosystem Analysis
AGP	Division of Agricultural Production and Protection of the FAO
CSO	Civil Society Organizations
FAO	Food and Agricultural Organization of the United Nations
FAO HQ	Food and Agricultural Organization Headquarters
FAO RNE	FAO Regional Office for Near East
FAO-RO	FAO Representation Office
FFS	Farmers' Field Schools
FYM	Farm Yard Manure
GAP	Good Agricultural Practices
GDP	Gross Domestic Product
Global GAP	Global Good Agricultural Practices
ICARDA	International Centre for Agricultural Research in the Dry Areas
IP	IPM Practice
IPM	Integrated Pest Management
IPMC	Integrated Pest Management Council (in Iran)
KAOO	Kermanshah Agricultural Organization Office
LO	Letter of Agreement
LP	Local Practice
MARA	Ministry of Agriculture and Rural Affairs
MAWR	Ministry of Agriculture and Water Resources
MoA	Ministry of Agriculture
MAAR	Ministry of Agriculture and Agrarian Reforms
NPCs	National Programme Coordinators
NCARE	National Centre for Agriculture Research and Extension
NTE	Not To Extend
NWGs	National Working Groups
NE	Near East
NGO	Non-Governmental Organization
ONSSA	Office National de Securite Sanitaire des Produits Alimentaires
PCU	Program Coordinating Unit
PMU	Programme Management Unit
PPB	Participatory Plant Breeding
PPRI	Plant Protection Research Institute (Egypt)
RPC	Regional Programme Coordinator
RSC	Regional Steering Committee
SPFS	Special Programme for Food Security
RITSU	Regional IPM Technical Support Unit
UNDP	United Nations Development Programme

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EXECUTIVE SUMMARY

An independent External Evaluation (EE) Mission composed of three technical experts (Dr. Surendra Beniwal, Dr. Na'im Sharaf, and Dr. Salvatore Ceccarelli), visited the project sites in Syria, Jordan, Iran, Morocco, and Lebanon. The IPM/FFS sites visited were of different crops (plastichouse and open-field tomato, apple and mint) and organized at weekly intervals with the participation of 15-25 farmers in each school. The Mission was repeatedly convinced of the usefulness and effectiveness of the IPM/FFS learning process through participatory approach in all the five countries visited. The Mission concludes that the programme has been very successful in drastically reducing (60-70%) the use of pesticides in areas targeted by the programme, and in some cases beyond, in a region known for its culture for the heavy use of pesticides. Also important was the information from Jordan where the quantity of methyl bromide used for soil fumigation in water melon was reduced from 70 tonnes in 2009 to 3 tonnes in 2010; 95% reduction according to the Montreal Protocol on Substances that Deplete the Ozone Layer; Together with the reduced use of fertilizers, the IPM has thus reduced the cost of production and hence improved the net returns and the livelihood of the participating farmers. In addition, it has also succeeded in creating effective awareness among farmers on the harmful effects of pesticides on human health and the environment.

The programme has also succeeded in capacity building among farmers and the personnel of the Ministry of Agriculture (MoA) of the project-participating countries. This includes training of large numbers of farmers and MoA personnel through IPM/FFS approach, and training of farmers in special techniques for the management of insects and disease pests, important in IPM and successful cultivation of crops. The farmers highlighted a number of advantages which include: (i) Improved net returns through reduction in the cost of production by reduced use of pesticides, (ii) Significant changes in the perception of farmers about managing their crops through IPM with the least use of pesticides/fungicides, and new ways of crop cultivation, (iii) Confidence-building by successfully growing the crops through the use of IPM/FFS approach, (iv) Greater awareness on the beneficial effects of the IPM/FFS with respect to protection of environment and production of cleaner and quality products and their impact on human health, (v) Improving their decision-making capacity, (vi) Changes in their attitudes for the use of safer pesticides and creating awakening about the harmful effects of pesticides on human health and environment, (vii) Created awareness among them about the use of new crops and varieties in their areas, and (viii) created awareness for the need to organize themselves in groups or associations as in Jordan and Syria. The successful stories of two tomato growers, Ms. Lema Noem a female farmer from Ghor Safi in Jordan and Mr. Mahmoud Mansour, a male farmer from Lattakia province in Syria, are highlighted in the boxes in the report.

The status of IPM/FFS approach differs in the different countries visited based on the duration of their participation in the programme and on the commitment of the local scientific and extension personnel and policy makers. However, the very evident during the field visits was that: (i) there were dramatic increases in the number of IPM/FFSs from the beginning of the program in 2004 to 2011, (ii) the quality of tomatoes harvested from the IPM/FFSs was enhanced due to the reduction in use of hazardous pesticides and the use of bumble bees as pollinators, (iii) the women IPM/FFS farmers expressed desire to have new crops added to their plots to diversify their crop production and household income.

Among problems faced by the IPM/FFS farmers the most highlighted was the problem of marketing of their products. The farmers highlighted that (i) their products were cleaner and of better quality, (ii) they needed recognition of their products and higher prices, and (iii) they were not receiving any support from their governments for marketing. The Mission feels a strong need for creating awareness among the traders as well as the consumers on the availability of cleaner and quality vegetables and fruits from the IPM/FFSs for marketing and consumption. One possible solution for this may lie in the organization of IPM/FFS farmers' into groups or associations, wherever possible, to help them get better access to markets and better prices for their better quality products. Although such a path is restricted by law or social pressure all over the region except in a few countries, but the example of

Iran, where the PMU provided technical support to help farmers market their produce, could be replicated at the regional level.

The programme activities in different countries are coordinated by the Department of Plant Protection of the MoA except in Jordan, where it is coordinated by the National Centre for Agricultural Research and Extension (NCARE). The project has been able to train personnel of different departments of MoA and other institutions. Also, the MoA has started the use of the IPM/FFS approach to other crops/production systems/disciplines. However, the Mission strongly feels that much is left to be desired for better inter-institutional collaboration and linkages of programme with other departments of the MoA, agricultural institutions, NGOs and private sector. It would be better if there is much greater involvement of the departments of extension in the programme where it needs improvement. The Mission recommends the creation of a National Cell (Unit) in the MoA in each country to coordinate the IPM/FFS and other participatory extension activities in each country; such a unit has already been established in Jordan.

Sustaining the project activities beyond the project duration is important for harvesting the fruits of the project and to expand its activities to other crops/production systems/disciplines in other areas of a country. Based on Mission's discussions with different stakeholders of the programme in different countries visited, it concluded that the participating countries were very satisfied and happy with the programme activities and results, and thus would like to sustain the programme activities beyond the project duration. Three new projects have been suggested to address important issues related to the programme.

The programme through its regional activities has successfully: (a) strengthened the scientific expertise at the regional level, (b) strengthened capacity building among farmers through exchange of visits among countries, and special training programmes for farmers, (c) established linkages among the participating countries through establishing effective linkages with National Programme Coordinators (NPCs), publications of regional nature, communication system among regional IPM networks, and conducting training and information systems and continued monitoring on health and environment issues, and (d) developed an IPM database information system, and an excellent and dynamic programme website (www.IPM-Near East.com).

It has also produced a number of attractive, easy to understand and useful publications in Arabic in each country including leaflets on problems in cultivation of different crops and also the results of the IPM/FFS in different crops. The Mission also feels the need to produce some technical bulletins on different aspects of cultivation of different crops with which the IPM/FFS are associated.

Backstopping and support to the program and RPC from FAO HQ, FAO Regional Office (RNE) and the FAO Representation Office (FAO-RO) in Damascus were considered timely, adequate and of high quality. In view of the considerable achievements of the programme, the Mission strongly feels and strongly recommends that an extension of the programme is justified, at least for an additional period of 3 years. Apart from taking advantage of a well functioning and very productive programme set-up, the Mission sees a need for continuing the programme work to further harness its advantages and popularize its use to different crops/production systems/disciplines. The four countries which joined the programme in 2009 (Algeria, Morocco, Tunisia, and Iraq) will continue the work but utilizing the technical know-how and experiences of the other six countries which have participated in the programme since the very beginning in 2004.

The Mission has made a number of recommendations on the up-and out-scaling of the IPM/FFS approach, capacity building of programme personnel and officials of the MoA and others, strengthening of institutional collaboration and linkages, information on the use of fungicides for farmers, production of bioagents and biopesticides at the country level, marketing and product certification of IPM products, sustainability of the programme, use of genetic materials and varieties, crop diversification and conservation agriculture, etc., need for monitoring, evaluation and impact assessment and regional activities.

The Mission also suggests a number of different aspects that need be included in the extended phase of the programme which among others include policy interventions by governments to replicate the successful marketing support results obtained by the programme at the regional level, support to NPCs and the programme through staff and logistic support, strengthening of inter-institutional collaboration, exposure of the policy makers of different countries to the IPM/FFS approach through study visits, expand the use of IPM/FFS approach to other crops, production systems and areas ,ensuring sustainability of the programme by at the country levels by providing the needed financial and administrative support, and by creating a National Cell in the MoA of their countries for coordinating the IPM/FFS and other participatory programmes in agriculture, on the lines similar to what is planned in Iran.

The Mission also recommends that the programme now should extend IPM into an integrated crop management (ICM) programme in the extended phase of the programme to further benefit the horticultural farmers of six countries in the Near East. For this, it would be good to establish formal regional networks which could be coordinated by creating a Regional IPM Technical Support Unit (RITSU) in the PMU. Alternatively, an IPM Platform could be developed at the regional level. Exercise for such a new arrangement should be done in consultation with the member countries and FAO RNE Office and FAO Country Representations to prepare specific objectives, structure and operational modalities, institutional linkages and funding mechanisms.

The Mission identifies three new project proposals related to IPM/FFS, as an outcome of its evaluation of the IPM/FFS programme in the Near East, for further perusal and seeking financial support by the PMU. These projects would support the specific needs of the programme.

1. INTRODUCTION

The Regional Integrated Pest Management (IPM) Programme in the Near East (GTFS/REM/070/ITA) started in April 2004, in six countries in the Near East (NE) (Egypt, Iran, Jordan, Lebanon, the Palestinian Territories, and Syria), with funding from the Government of Italy, implemented by the Food and Agriculture Organization (FAO) of the United Nations. The initial duration of the project was two years, with a total funding of US\$ 1,796,700. Following the second Project Tripartite Meeting held in Cairo in June 2007, the Government of Italy as the donor approved additional funds of US\$ 1,185,929, and in late October 2007, and in agreement with FAO and upon request by the participating countries, extended the project till December 2009 with an additional allocation of US\$ 2,100,000, for a total contribution of US\$ 5,082,629.

During the Third Tripartite Meeting of the Regional Integrated Pest Management Programme in the Near East held in June 2009, the Government of Italy endorsed the geographical expansion of the Programme activities to four new member countries: Algeria, Morocco and Tunisia in North Africa (Maghreb), and Iraq in the Middle East. An additional fund of US\$ 1.8 million was made available to the programme, bringing the total budget to US\$ 6,882,629 to cover the original six countries plus the three Maghreb countries. Around the same time, the Government of Italy approved further additional funds of Euro 500,000 (equal to US\$ 726,744) to support the programme activities in Iraq. This brought the overall programme funding to US\$ 7,609,373. The programme duration was extended for two years with the current NTE of December 2011.

2. BACKGROUND AND CONTEXT

2.1 INTRODUCTION

Agriculture in the NE region is important as it contributes to the national Gross Domestic Products (GDPs) and is the main income generating activity for a considerable part of population supporting its livelihoods. Dryland field crops,, orchards, irrigated crops and vegetables are the major cop productions systems in the region. Among them, horticulture (fruits and vegetables) is an important component of the agriculture sector as these are commonly grown in the region. A good potential exists in the region to improve the production of fruits and vegetables in the region and to have access to markets, both local and international. Lately, as a consequence of Green Revolution there is a trend to intensify horticulture production due to developing markets and opportunities for increasing production. Thus, there is a greater emphasis on high-input intensive production systems in which greater and wide-spread use of pesticides has become a norm in the region. This has been made worse by the concentration in few large companies of the seed market and the pesticide market (49% of the seed and 53% of the pesticide markets are controlled by four companies). In such a situation, farmers have been confronted with the adverse effects of intensification and especially due to overuse of pesticides, which have had negative effects on environment and public health.

Considering the above, a stakeholder workshop was organized for the six countries (Egypt, Iran, Jordan, Lebanon, the Palestine Territories, and Syria), which were represented by government agencies, Non-Governmental Organizations (NGOs) and Civil Society Organizations (CSOs). After discussions on different aspects of horticultural production in the region including pests and diseases and the problems of the overuse of pesticides, the workshop developed a strategy for a regional programme on the IPM. The workshop also identified four thematic areas for the programme: IPM and reduced risks for health and environment, IPM and community empowerment, IPM and access to local as well as international markets, and sustainability of agricultural production systems. The workshop also emphasized the role of the MoA in implementing the programme activities in each country emphasizing the importance of collaboration with relevant institutions such as plant protection services,

extension agencies, universities and NGOs at both national and regional levels. It was also considered important to establish links with other relevant units of other ministries for appropriate interaction.

The programme aimed to address the problems associated with (i) unwanted side-effects of the intensive production in horticultural crops, (ii) misuse and overuse of pesticides which can endanger public health, environment and ecological systems, (iii) the ill-effects of the pesticide use on the export markets, and (iv) long-term sustainability of the agro-economic systems to ensure food security in the region..

2.2 INTEGRATED PEST MANAGEMENT AS A COPING STRATEGY

The programme adopted the IPM approach, which is defined as a knowledge-intensive process of decision-making that combines various strategies (biological, cultural, physical and chemical) to manage pests. The Programme aims in the first instance at improving sustainable agricultural production by reducing the use of chemical pesticides, and promoting the adaptation of IPM strategies to horticultural crops through Farmer Field School (FFS) methodology.

The Programme was specifically designed to strengthen capacities in participating countries in order to: reduce hazards linked to chemical pesticide use, promote IPM and other more appropriate agricultural practices for selected crops, identify market opportunities for such crops, and inform policy makers about the importance of production approaches that meet quality standards for domestic and international markets, focusing on farmers' participation and understanding of local ecosystem

2.3 FARMERS FIELD SCHOOL METHODOLOGY

The Farmers Field Schools (FFS) is a community-based form of adult education, which evolved from the concept that farmers learn optimally from field observation and experimentation. It is a participatory approach which allows farmers to learn together using hands-on methods of discovery learning. A FFS session has four activities: Agro-Ecosystem Analysis (AES), Crop Dynamics, a Special Topic and an Evaluation, which allow farmers to participate in observations, discussions, analysis, decision-taking and implementing appropriate actions. It was developed to help farmers tailor their IPM practices to diverse and dynamic ecological conditions.

An External Evaluation Mission was organized by the FAO-RNE to evaluate the Regional Integrated Pest Management Programme in Near-East and North Africa in February/March of 2011 according to the ToRs provided (ANNEX 6). The Mission consisted of three members, namely, Mr. Surendra Beniwal, Team leader, Mr. Na'im Sharaf, and Mr. Salvatore Ceccarelli.

3. METHODOLOGY OF EVALUATION

The Mission evaluated the programme and its activities based on the following:

1. Study of the ToRs provided by the FAO-RNE especially the tasks and objectives to be achieved. The Mission in particular evaluated the aspects of the programme at:
 - Local, national and regional levels
 - Sustainability issues
 - Programme strategy and design
 - Overarching strategic issues
 - Programme efficiency
 - Performance, management and budget
2. Evaluation of the programme and its activities by study of the published materials provided by the Programme Coordination Unit (PCU)
3. Evaluation of the regional activities of the programme based on the published materials provided by the Regional Programme Coordinator (RPC) and his briefings and discussions with the National Project Coordinators (NPCs).
4. Evaluation of the programme budget
5. Evaluation of the progress in programme activities in 10 countries based on the country reports provided by the PCU.
 - Country Reports provided by the PCU
 - Visits to different IPM/FFS field sites
 - Participation in all the four components of the IPM/FFS in progress in different countries
 - Active participation discussions and by directed questioning to farmers, facilitators and plant protection staff associated with the IPM/FFS
 - Visits to and discussions with regional Directors of Agriculture and Plant Protection departments
 - Evaluation of progress on the establishment of special facilities/laboratories for multiplying bioagents by visits to such facilities (for example in Syria).
 - Visits to and discussions with the high officials of the MoA Plant Protection Directorates to get their feedback on the programme activities and suggestions on the future course of action.
 - Visits to and discussions with the FAO Representations in the countries visited
 - Discussions with National Project Coordinators (NPC) on their national activities, progress made, problems and suggestions for future.
 - Visits to the officials of the Embassy of Italy in Damascus to get the donor perspective on the programme.
 - Final discussions with the RPC in Damascus on the programme performance and his perceptions on the programme's future.
6. Regular discussions among the Mission members to draw conclusions and recommendations for the Aide Memoire and the Final report.

4. ASSESSMENT OF PROGRAMME FORMULATION AND DESIGN

4.1 PROGRAMME JUSTIFICATION

As indicated earlier, fruits and vegetables are an important component of agriculture in the NE region, where good potential exists for their improvement and access to both the local and international markets. The programme is very much justified considering the widespread use of pesticides in the target countries had reached at the time of the project formulation levels which were incompatible with agro-ecosystem balance that could: (a) cause severe ecological disruptions, such as pest resurgence and the development of pesticide resistance, (b) cause health damages to both the farmers and the consumers of treated products (it has been estimated that at least three million cases of pesticide poisoning occur worldwide each year, with 220,000 deaths); (c) cause environmental pollution; and (d) limit market opportunities because potential markets such as Europe have introduced more stringent requirements for pesticide residues.

Appearance of new pests in some countries in the region which cause serious damages to horticultural crops is another justification. These include Tomato leaf miner, *Tuta absoluta*, tomato spotted wilt virus in tomato (not new but become epidemic) and bacterial disease (black leg on potato, which is also not new but became epidemic). Thus, it becomes important to understand the biology and epidemiology of such economically important pests to develop suitable control strategies for their management. These pests in the absence of such a programme would have gone unattended and caused damages to the horticultural crops in the countries of the region. Even if these pests were attended to through the use of pesticides it would have caused damage to the environment and would be a further threat to human health. The IPM programme by using the integrated pest management approach has to a great extent addressed to these pests and helped in preventing the damage to the environment and human health aspects through a minimal use of pesticides. Considering these aspects, in Mission's opinion the programme formulated was fully justified.

4.2 PROGRAMME STRATEGY, OBJECTIVES AND DESIGN

The overall goal of the Programme is "to contribute to the achievement of food security and to improve the nutritional status of the rural population through development and implementation of sustainable agricultural practices involving local farmer communities". The programme was rightly built on a range of priorities as defined under the Special Programme for Food Security (SPFS): (i) reduced environmental degradation, (ii) use of community participatory processes, (iii) regional, national and local ownership, (iv) attention to policy and funding constraints, and (v) a cost-effective crop production.

The immediate objective of the programme is "Improved food security in the target areas in the six participating countries through community-based IPM for horticultural production, aiming to reduce and possibly eliminate pesticide related risks for health and environment, and to improve access to markets". These are relevant considering the problems that the programme intended to address.

4.3 PLANNED RESULTS OF THE PROGRAMME

The following planned results were outlined by the programme for the six original member countries:

- Result 1: Strengthened analysis, planning capacity and awareness at community and institutional levels on IPM technologies and related health issues and environment protection.
- Result 2: Scaling up programme-financed, semi- and self-financed FFSs implemented over the project span life in the participating countries.
- Result 3: Improved quality and quantity of selected produces through the adoption on a profitable basis of tested IPM approaches and improved crop management by selected pilot communities/farmers within a market environment.

Result 4: Established information network on IPM among involved stakeholders (including farmers and communities), documenting and sharing information on best agricultural practices and relevant experiences.

These planned results were in line with the program objectives. In 2009, when four new member countries were added, the programme's goal and immediate objectives remained the same. However, to reflect the different context and to promote synergies with other ongoing FAO programmes, the programme results were further defined which include the following:

1. Strengthened capacity for IPM and good agricultural practices (GAP)
2. Strategy for improved marketing access
3. Strengthened phytosanitary capacities, if requested
4. Use of pesticides further reduced through a framework for sound pesticide management
5. Information base established and maintained for IPM management and planning, and stakeholders participation enabled
6. Final national and regional overview report to serve as a basis for development of a comprehensive strategy and programme

Results reflected under 1, 2 and 5 coincide with the earlier strategy of the programme, while Results 3 and 4 aim to enhance synergies with other relevant projects of FAO and other international organizations in the region. Result 6 underlines the importance to create a strategy to further enhance promotion of IPM and development of comprehensive pest and pesticide management frameworks.

In view of the Mission, further modification of the programme results from four to six in 2009 was rightly done and was relevant to the changed situation when four new countries were included in the programme.

4.4 PROGRAMME MANAGEMENT STRUCTURE

The programme management structure was justifiably designed considering the regional nature of the programme and included the following:

1. **A Programme Coordinating Unit (PCU)** at the regional level, with a Regional Programme Coordinator (RPC) to provide technical, operational and administrative support to ensure smooth implementation and coordination of the programme activities at the regional level. The PCU was to encourage and facilitate the exchange of information and field visits among the member countries and territories.
2. **A Regional Steering Committee (RSC)** was established by having at least one member from each participating country and territory, who is assigned by the country. The RSC is recognized by the participating countries and territories and closely collaborates with PCU, local partners and institutions at the country and territory level to overview and guide technical and implementation aspects of the programme. The RSC is in place for the entire duration of the programme; however, the membership may change during the programme life because country and territory representatives are assigned by the participating countries and territories at the regional workshops.
3. **The National Working Groups (NWGs)** in each participating country and territory consist of relevant experts, NGOs and farmer representatives covering the relevant technical areas of interest to the programme (IPM, community development, marketing, etc.). These Groups provide technical guidance and overlook the activities of the IPM/FFS in their region/area.
4. **The National Programme Coordinators (NPCs)** are appointed in each country by the MoA of each participating country and territory. They are responsible for the planning, implementation, coordination and monitoring of the programme activities in close collaboration with the PCU and the RPC. They are also responsible for disbursement and accounting of the programme funds provided to them by the PCU.

In Mission's opinion, the programme management structure was well conceived, designed and implemented. In its experience, the structure in place is practical, good quality and is evaluated to be working very well. The structure in place is similar to the ones that are generally adopted for many other regional programmes. It ensures efficient implementation, follow up and management which the Mission has also observed in this regional IPM programme.

5. ASSESSMENT OF PROGRAMME IMPLEMENTATION, EFFICIENCY AND MANAGEMENT

5.1 PROGRAMME IMPLEMENTATION

5.1.1 APPROACH

A regional programme with six participating countries in Near East was started in 2004. The programme from the very beginning has been lead by a RPC based in the PCU in Damascus, Syria. The programme has been based on IPM and FFS approach with the following seven interventions:

- Capacity building and strengthening of IPM/FFS approach taking into account the local eco-systems
- Promote the participation of women in the programme activities
- Improving access to markets
- Strengthening phytosanitary capacities, if requested
- Strengthening the framework for sound pesticide management
- Sharing information and establishing partnership for a broad IPM approach
- Development of a comprehensive strategy to promote IPM and pesticide management in the region

The programme activities aimed to manage different diseases and insect-pests in different crops by IPM through FFS approach. It also aimed to reach an increasing number of farmers' communities by creating a solid basis for local IPM knowledge, enhancing the development of national programmes and strengthening the networks among farmers, local institutions, NGOs, government agencies and the private sector.

The programme currently targets 10 countries (as mentioned earlier under **INTRODUCTION**). At the country level, the programme is managed by a NPC who is nominated by the participating government. In most cases, the NPC belongs to the MoA except in Jordan, where the NPC belongs to the National Centre for Agricultural Research and Extension (NCARE), an autonomous institution which is not attached to MoA.

The programme has successfully followed a participatory-process learning approach for farmers through FFS for strengthening capacities on IPM and FFS. The programme has to a great extent succeeded in promoting the equity and ownership of the change process by the participating farmers. The MoA of the five countries, which the Mission visited, acknowledged the success and usefulness of the IPM/FFS approach in not only the crops for which it was demonstrated but also for other important commercial crops and productions systems as well.

The programme activities have been carried out as per the work plans in different horticultural crops in different governorates/provinces of each country. The crops were selected based on their importance and also the need and scope for the use of IPM for their improved production and reduction in the use of pesticides. In this decision, the requests of the farmers and the respective Directors of Agriculture were also influential.

Activities implemented in each governorate were based on the local disease/insect-pest problems and needs. Accordingly, a systematic approach was followed by first carrying out the Agro-Ecosystem

Analysis (AES) and, based on its results, the technical interventions were planned and carried out. Selection of farmers for FFS was based on their interest and needs to participate in FFS. For each IPM/FFS, a Facilitator was appointed who was first trained by the programme through the involvement of the staff of the Department of Plant Protection of respective MoA.

The FFSs were organized at weekly/10-day intervals with the participation of 15-25 farmers in each school. In each FFS, there were two plots, one with the IPM practices (IP) and the other with the local practices (LP). At weekly meetings of participating farmers each FFS had four sessions, (i) AES, (ii) Group Dynamics, (iii) a Special Topic, and (iv) an Evaluation of the day's work.

In the countries which the Mission visited a very active involvement of the staff of the Plant Protection Departments of the MoA was observed. However, the Mission could clearly see less involvement of the extension agents in the programme activities in four out of the five countries, viz., Syria, Jordan, Morocco, and Lebanon. The situation in Iran was observed as the best because of very active involvement of the extension staff in the programme activities for spreading the FFS in the country. The country employs private consultants where the extension staff is not available. In Syria, which has a very strong Department of Extension in the MAAR (Ministry of Agriculture and Agrarian Reforms) with a large number of extension agents, a very poor involvement of extension agents in the programme activities was observed. A similar situation was found in Jordan, but the non-involvement of extension agents there could be understood as the extension system in the country is weak with only a very limited number of extension agents in the country. The situation in Morocco is similar although its extension system is stronger than Jordan. In Lebanon, the situation was not good till 2010 but has improved lately with the establishment of 28 Regional Extension Departments. It was good for the Mission to see that they are now being trained by IPM/FFS programme on IPM and FFS approaches. This certainly will help strengthen the IPM/FFS activities of the programme in Lebanon in 2011. The little involvement of the extension staff of the MoA in the programme activities is considered a weakness in the national programmes by the Mission, which needs immediate correction by the MoA of the respective countries. In the Mission's strong opinion, the Extension Departments and their extension agents must be closely associated with IPM/FFS activities.

The programme has succeeded in developing good partnership with the farmers and among farmers of each FFS. It has also developed good partnership between the farmers and staff of the Plant Protection Departments of the governorates, where the FFSs are organized. However, much is left to be desired from the partnership with the extension staff. Similar is the situation with the partnership with the universities, NGOs and the private sector. At the national level, the Mission did not observe a good collaboration between Plant Protection and among other departments of MoA, Research and Education institutions, farmers' organizations, NGOs and private sector (private companies, traders and exporters unions, etc.).

In the opinion of the Mission, the implementation of programme and its activities has been exceptionally efficient and professional. All the NPCs in different countries have done an efficient job in carrying out the programme activities as per the plans. The Mission was repeatedly convinced of the usefulness and effectiveness of the IPM/FFS learning process through participatory approach in all the five countries that it visited. In the opinion of the Mission, the programme is serving as a good example of a "South-South Cooperation approach" in 10 different countries of the Near East and North Africa, and could serve as a good example for adoption by other regional collaborative projects/programmes

5.1.2 FIELD ACTIVITIES

The Mission received an exhaustive list of publications/documents, which have been prepared by the P MU and the participating national programmes, for information and review. The Mission could review the field activities on IPM/FFS in different crops both in plastichouse and open-field situations in the five countries (Iran, Jordan, Lebanon, Morocco, and Syria) representing regional status of the programme and included the following:

Syria: Seven field sites: Two on apple, one each in Al Swaida and Bersheen; three on plastichouse tomato in Lattakia, and two in Tartous.

Jordan: Two open-field tomato IPM/FFS in Ghor Safi (one male and one female IPM/FFS), and one plastichouse tomato IPM/FFS in the Jordan Valley

Iran: One IPM/FFS on apple in Bivanij (both men and women) and one FFS in Sahneh (only women (15 farmers)). In the latter village the programme covers peaches and apples and started only last year.

Morocco: Two IPM/FFS field sites: one on mint in village Ouled Hamida of Beni Yagrine region, and other on plastic house tomato in Ayer region of Safi Province.

Lebanon: Two IPM/FFS field sites: one in Jiyeh, (close to Beirut), and the second one in Rzai in Safi, both on plastic house tomato.

Such information on the five countries not visited is provided under **STATUS OF IPM/FFS APPROACH IN FIVE OTHER COUNTRIES NOT VISITED** in CONCLUSIONS AND ISSUES IDENTIFIED.

It was evident during the discussions with the IPM/FFS-participating farmers and facilitators during the field visits that the farmers have immensely benefitted from the IPM/FFS and continue to do so. The benefits as highlighted by the farmers include: (i) production of cleaner and quality fruits which were good for health, (ii) reduction in the cost of production and thus increased net returns, (iii) improving the environment by using either no pesticides or much less pesticides (*i.e.* replacing and by not using the toxic methyl bromide for soil fumigation as per the Montreal protocol on Methyl bromide).

The participation of farmers in the IPM/FFSs has empowered them to (i) make their own decisions on the use of proper crops and pest management practices for production of different crops, (ii) take decisions on the marketing of their produce for the local markets as well as the export markets when possible, (iii) boosted their confidence for interacting with the government officials, private chemical company agents and other farmers, (iv) improved their knowledge and confidence, several of them became IPM/FFSs Facilitators/Co-facilitators in the programme, (v) ability to guide and support other IPM/FFSs for new farmers and/or crops based on the knowledge and confidence they have gained, and (v) form on their own groups or associations. The last one was more evident in some countries than others, for example, it is already happening in Jordan, Lebanon, Iran, and more recently in Syria and Morocco.

The Mission also observed that new farmers were joining the IPM/FFSs on their own initiative because they learnt about their benefits from the IPM/FFSs-participating farmers. This does clearly indicate that the programme work has been able to create an effective awakening among the neighbouring farmers on the utility of IPM/FFSs; this is a good example of spill-over effect.

The Mission observed different degrees of involvement of the extension department agents and staff of MoA in the programme activities irrespective of the numbers of extension staff especially in certain countries. Less involvement of extension staff in the programme was evident in Syria, where there are sufficient number of extension staff, and in Jordan, where there is shortage of extension staff. This situation certainly needs improvement. The Mission suggests that the PMU help each country in defining strategies on how to enhance IPM and FFSs, and then see what makes sense to enhance institutionalization which might include shifting to extension, especially for FFS work. This is important in view of the sustainability focus of the programme and the limited available programme resources. This would also imply that the PMU would have to stop direct implementation of the programmes in the six countries which have participated in the programme for the last six years. For these countries, the best approach would be to hand over implementation of the programme to the national programmes and, in that case, the PMU will provide support to the national programmes as a coordination role (without direct implementation role) to assist the national programmes in developing strategies for further follow up and strengthening of trainer teams, policy support and exchange of

visits. The Mission also would like to suggest the idea of establishing a Regional IPM Technical Support Unit (RITSU) in the PMU. At the national level, the Mission observed varying degrees of collaboration between Plant Protection and other departments of MoA, only a little collaboration with Research and Educational institutions, a fairly good collaboration with NGOs, but weak with the private sector (private seed, pesticide and fertilizer companies, traders and exporters unions, etc.). This aspect certainly would need attention in future.

As stated earlier, the Mission believes that the programme is a good example of a “South-South Cooperation approach” in the 10 different countries of the Near East and North Africa region and could serve as a good example for adoption for other collaborative regional projects/programmes. The Programme also assisted other non-programme-participating countries with study tour, trainings and other activities in the region (i.e. Saudi Arabia, Libya, Ethiopia, and Mauritania).

Backstopping and support to the programme and RPC from FAO HQ, FAO Regional Office for the Near East (FAORNE) and the FAO-RO in Damascus were considered timely, adequate and of high quality, whereas the support from the FAO Country Representations in Iran, Jordan, Lebanon, and Morocco was considered fair. The programme received good technical backstopping from the AGP/LTU Officer in FAO Headquarters. The Mission after having reviewed different aspects of the programme activities in different countries and at the regional level considers the operation and management of the programme by the RPC, as outstanding.

Meetings with high officials of the MoA of the five countries visited indicated a very positive opinion on the usefulness and success of the programme. In their opinion, the programme was unanimously considered a great success and offered excellent possibilities of up- and out-scaling the IPM/FFS approach to other crops/production systems and areas in their countries and interestingly through their own resources. This has two implications: First, the IPM/FFS-related work becomes sustainable in most countries, and secondly, it creates further possibilities for the use of the IPM/FFS approach in not only the Near East but also in other countries of the world, and the FFS methodology could be used for other agriculture-related activities/subjects.

It was also good to learn from the high officials of the MoA that IPM/FFS approach has been included in the national plans for agriculture development in Syria, Jordan, Iran, and Palestinian Territories, for instance. However, they still require FAO assistance to consolidate on the institutionalization of the IPM/FFS programme in their system; however, this is certainly going to positively influence the sustainability of the programme activities in the programme-participating countries.

5.2 PROGRAMME MANAGEMENT

From the very beginning in 2004, the Regional Programme on IPM in the Near East and North Africa has been coordinated by a PCU based in Damascus, Syria. The PCU has been led by a RPC, Dr. Alfredo Impiglia, since the inception of the programme in 2004, who has been highly successful in providing a very effective and efficient leadership and guidance for the implementation and management of the programme and its activities in 10 different countries of the two sub-regions. Overall, the Mission is quite impressed with the achievements of the programme under his leadership and considers the programme a great success.

In the opinion of the Mission, the PCU has worked effectively and in harmony with the NPCs of the program in 10 different countries. The style and functioning of the RPC has been considered effective and appreciated by the NPCs that the Mission had the opportunity to talk to. The PCU has been successful in providing an effective backstopping to the management and technical aspects of the programme.

The PCU has done an excellent job in reporting and highlighting the programme activities following FAO and donor requirements as is clearly evident from many reports and publications that the Mission

has seen, e.g., publications on training manuals, programme activities, regional meetings, bulletins and guidelines produced by the PCU.

The PCU has succeeded in providing inputs and equipment for the program activities both at the national and regional levels in accordance with the FAO rules and regulations. The procurement of expandable and non-expandable inputs for use in the FFS programme was done timely and adequately which facilitated the timely conduct of field study of FFSs in different countries.

The recruitments in the programme at the PCU and national levels were made according to FAO rules and regulations. Thus, one RPC and three support personnel were recruited for PCU. Similarly, two national and three international consultants were recruited based on the programme needs. The participating national programmes appointed the NPCs to coordinate the program activities, who have also done good jobs for their countries.

The programme activities at the national level and the NPCs received an excellent support from the PMU and the RPC in technical backstopping, logistics and support for follow up of the programme activities. The NPCs of the five countries that the Mission visited were very appreciative of the efforts of the RPC for providing adequate and timely support to and follow up of the national as well as the regional programme activities. Backstopping and support to the programme and RPC from the FAO HQ, FAORNE and the FAO-RO in Damascus were also considered timely, adequate and of high quality.

In view of the Mission, the PSC also played an effective role in over viewing the programme activities at the regional level and providing technical guidance and implementation aspects. The mechanism was found useful by the national programmes and the RPC. Similarly, the NWGs were found useful in providing the needed guidance in technical issues of interest to the national programmes. However, the Mission found little or no involvement of educational institutional institutions and private sector in NWGs. Also, the Mission had no opportunity to interact with such groups.

Discussions of the Mission members with high officials of the MARA in Syria, the NCARE in Jordan, MoA in Iran, the Office National de Securite Sanitaire des Produits Alimentaires (ONSSA) in Morocco, and the MoA in Lebanon, who have themselves visited the program IPM/FFSs at different programme sites in their countries, clearly indicated a very positive opinion on the success and usefulness of the programme in their respective countries. They were unanimous in considering the programme a great success and saw excellent possibilities of up- and out-scaling the IPM/FFS approach for work on other crops/production systems and areas in their countries, and in fact were making plans for extending the IPM/FFS approach to other important crops/production systems in their countries through their own resources. It was especially interesting to see in Morocco, where the programme has been carried out for less than a year only. It was the most heartening piece of information for the Mission as it has two implications. One, the IPM/FFS-related approach has been accepted by these countries, and two, it creates further possibilities for the sustainable use of the IPM/FFS approach in not only the Near East and North Africa but also in other countries of the neighbouring regions.

5.3 PROGRAMME BUDGET AND EXPENDITURE

The programme budget spent up to 31 Dec 2010 is presented in Table 1. Of the total budget of US\$ 7,610,480 provided to the programme an amount of US\$ 5,856,585 has been spent till December 2010, which is about 85% of the total programme budget allocation. The disbursement rate seems to well reflect the planned expenditure for different implemented activities. An amount of US\$ 1,546,925 is available for 2011.

The PMU developed a good and workable system of budget disbursement to the participating countries. Accordingly, the NPC requests the budget allocation to the RPC, who, based on the review of the requests from NPCs and the approved work plan, places the request to the Budget Holder (Mr.

Reza of FAORNE) for budget authorization. The budget is then sent to the respective FAOR Offices of the countries based on the requests for advance from the concerned NPC to initiate the activities the money is provided to him/her. The NPCs have to settle the expenditure with and then settle it upon presenting relevant receipts/invoices to the concerned FAO Representation Office; only after closing the balance with FAO office, he/she can ask for a second advance. The advance amount is defined by each FAO-RO and according to FAO Policy. Sometimes, no advance payments are requested by the NPC; he/she just presents the invoices/receipts to the concerned FAO-RO for settlement at the end of the activity. Payments are effected once the final technical report of the activity is cleared by the RPC. Some activities are also implemented through Letters of Agreements (LOAs) or contracts. Both are implemented upon agreement with the counterpart and approval of RNE, AGP and the PMU Office.

The money for activities in different governorates in the countries is provided by the NPCs. Although the system has worked well but occasionally, the NPCs are late in requesting the budget authorization or the advance payments, which could raise some problems and delays in the field, sometimes resulting into filing of complaints by the implementers/Facilitators, etc.. The Mission did not hear any complaints/suggestions from the NPCs of the five countries that it visited.

The PMU also developed an activity-wise-based system of budget appropriation, distribution and accountability according to the activities to be carried out by each country. Thus, it keeps a record of the activities carried out in each country and budget spent on each activity. The Mission feels that the PMU and the RPC have managed the budget effectively and well.

The year 2011 is the last year of programme. It is good to see that there is sufficient budget (US\$ 1,546,925) available in the programme to carry out the remaining and planned activities of the programme in different countries. Furthermore, there are some savings from previous years (US\$ 283,529 and in addition the savings from the 2010 earmarked component of Iraq), which would help achieve the completion of the planned activities in 2011. The budget for the programme was requested on yearly basis up to 2009 based on the needs and planned activities of the programme. But in 2009, the FAO HQ decided to allocate all the remaining funds in a “one shot allocation” to the programme account. However, the PMU is able to handle the budget yearly allocation properly.

Table 1: Status of budget of the Regional Integrated Pest Management Programme, 2010-2011

Items of expenditure	2010			2011		
	Budgets	Expenses	Balance	Budgets	Expenses	Balance
Total Funds Received (Parent account)		<1,108>	1,108			
5011 Salaries Professional	228,639	228,639	0	409,168	305,786	103,382
5012 Salaries General Service	82,090	82,090	0	93,029	92,460	569
5013 Consultants	44,539	44,539	0	116,872	9,632	107,240
5014 Contracts	6,817	6,817	0	30,343	651	29,692
5020 Locally Contracted Labour	3,086	3,086	0	26,778	0	26,778
5021 Travel	146,441	146,441	0	178,030	7,896	170,134
5023 Training	483,554	483,554	0	303,154	16,488	286,666
5024 Expendable Procurement	6,969	6,969	0	56,390	7,838	48,552
5025 Non Expendable Procurement	35,377	35,377	0	63,839	1,529	62,310

5026 Hospitality	163	163	0		119	<119>
5027 Technical Support Services	0	0	0	27,000	0	27,000
5028 General Operating Expenses	24,915	24,915	0	31,923	4,262	27,661
5029 Support Costs	138,137	138,137	0	177,965	8,675	169,290
5040 General Operating Expenses - external common services	0	0	0	1,434	0	1,434
5050 General Operating Expenses - internal common services	0	0	0	31,000	0	31,000
Total Expenditure	1,200,726	1,200,726	0	1,546,925	455,337	1,091,588
		1,199,619			455,337	

6. CONCLUSIONS AND ISSUES IDENTIFIED

The Mission evaluated the progress and status of IPM/FFS approach of the programme in five countries, viz., Iran, Jordan, Lebanon, Morocco, and Syria. Among these five, the IPM/FFS work has been successfully carried out in four countries (Iran, Jordan, Lebanon, and Syria), where the program activities have been carried out since the start of the project in 2004 and are now in the seventh year of project implementation. In Morocco, some good progress has been made in spite of the fact that the programme activities started there only in 2010.

The Mission agrees that the overall goal of the programme which is “Improved food security in the target areas in the six participating countries through community based IPM for horticultural production, aiming to reduce and possibly eliminate pesticide related risks for health and environment and to improve access to markets”. This goal is important given the large and often unjustified use of pesticides, particularly in horticultural crops and in orchards, and given the “pesticide culture” created by the capillary presence of the pesticide companies and by their incentives campaigns in the Near East and north Africa region..

The Mission concludes that the programme has been very successful in positively influencing the culture of excessive pesticide use in the areas and crops targeted by the programme, and in some cases beyond, helped in reducing drastically the use not only of chemical pesticides but also of fertilizers, thus reducing the cost of production and, therefore, develop good agricultural practices and hence improving the net returns, reduce risk of investments and improve the environment and livelihoods of the participating farmers and their families and their communities. The programme has also succeeded in (i) creating effective awareness among farmers on the harmful effects of pesticides on humans and the environment, and (ii) improving social relations at community level.

In view of the considerable achievements of the programme, the Mission strongly feels that an extension of the programme with additional funding is justified, at least for a period of 3 years. Apart from taking advantage of a well-functioning and very productive programme set-up, the Mission sees a need for continuing work to further harness its advantages and to popularize the use of IPM/FFS in different crops/production systems in the two sub-regions. Moreover, this will also ensure much-needed continuity of the good start and progress that the four countries, which joined the project in 2009, have made in order to validate IPM/FFS approach in their countries by utilizing the technical know-how and experiences of the six other countries, which have participated in the programme from the beginning of the programme in 2004. In Mission’s opinion, it would be highly cost effective to coordinate the activities in both the four “new” countries and the six “old” countries through a RITSU, the idea of which has been highlighted in the report earlier (paragraph six under **FIELD ACTIVITIES**).

6.1 PROGRESS OF WORK AT THE COUNTRY LEVEL

6.1.1 STATUS OF IPM/FFS APPROACH IN FIVE COUNTRIES VISITED

The Mission evaluated the progress and status of IPM/FFS approach of the programme in five countries, viz., Iran, Jordan, Lebanon, Morocco, and Syria. Among these five, the IPM/FFS work has been successfully carried out in four countries (Iran, Jordan, Lebanon, and Syria), where the program activities have been carried out since the start of the project in 2004 and are now in the seventh year of project implementation. In Morocco, some good progress has been made in spite of the fact that the programme activities started there only in 2010. The current status on the number of IPM/FFS,

facilitators and farmers trained in different countries are presented in Table 2. A brief description of the progress and status with strengths and weaknesses in the five countries visited is provided below:

IRAN: Iran started participation in the IPM/FFS program in April 2004. So far, a total of 368 IPM/FFSs have been established in different crops and 467 facilitators and 5,077 farmers trained in the country (Table 2).

Only one member of the Mission (Dr. Salvatore Ceccarelli) visited Iran, where he visited Kermanshah province and a Tehran market. On his visit to Kermanshah province, he was accompanied by the Marketing Consultant of FAO IPM project in Iran and the provincial IPM/FFS Coordinator.

The program activities in Kermanshah province started in 2004 and have made an excellent progress since the total number of IPM/FFSs has now grown to 1,000. Of these, 368 are supported by the FAO IPM Programme and the remaining by the Kermanshah Agricultural Organization Office (KAOO) in Dalahoo. The Province now has a total of 500 IPM/FFS facilitators.. In 65 comparisons between IPM and conventional methods on crops such as wheat, apple and grapes a 62% reduction in pesticide use was estimated. The public awareness is particularly high in Kermanshah province because of the personal commitment of Mr Roointan, who started IPM activities 17 years ago on sunn-pest, now covering 6 000 ha in the province.

Table 2. Information on the number of facilitators trained, IPM/FFS established and farmers trained by the IPM Programme in Syria, Iran, Jordan, Morocco and Lebanon

Country	Crops selected	Facilitators trained	IPM/FFS established	Farmers trained
Syria	Apple, plastichouse Tomato, Grape, Pistachio	290 15% women	119	2009 (10% women)
Iran	Grape, Cucumber, Apple, Grape, Pistachio	467 30% women	368	6 077 (10% women)
Jordan	Tomato (Plastichouse and open-field), Cucumber, Wheat, Watermelon	310 19% women	153	2247 (20% women)
Morocco	Plastichouse Tomato, Mint	79 43% women	5	50
Lebanon	Plastichouse tomato, Olive, Apple, Grape	243 24% women	25	315 (8% women)

A major change introduced by the FAO IPM/FFS programme was the cooperation between different stakeholders such as farmers, extension workers, researchers, private sector and universities, while the work before the IPM programme was guided centrally from Tehran, with little if any, participation of other stakeholders. A specific important activity has been a daily half an hour radio program for six weeks in Kurdish language, the dominant language in Kermanshah.

Comments from the IPM/FFS farmers were very positive as they were now aware of the insect, and disease pests affecting their crops, about which they were aware of in the past. The approach was particularly beneficial in the case of orchards which cover 4 500 ha of the 50 000 ha of arable land in Dalahoo with 2 000 farmers involved. The 44 000 people of the region depend on crop/livestock farming (of which 7 000 ha are barley and wheat).

The farmers expressed a strong feeling for the extension of the programme to cover other crops and production systems (livestock and water management as drought was now becoming a major problem in the area) because this approach has been much more effective than that past approaches. The farmers also expressed the interest and need to recover seeds of indigenous varieties (example of a traditional

grape with seeds and thick skin resistant to cold, with medicinal properties and easy to store, and suitable for some of the traditional processing). Some other topics that needed attention were quality analysis of the nutritional value of the IPM products, marketing especially direct sale of the products in markets. The removal of subsidies for pesticides in the area has made IPM even more attractive. Some other issues highlighted for emphasis in the extension phase are technical backstopping and training because the government budget for training is limited. Also, the linkage between different stakeholders needs to be strengthened. Other aspects which justify the extension of the programme are the regional activities and the exchanges of visits among farmers. Integrating PPB and IPM is also seen as highly desirable.

A visit to Bivanij, a remote area 60 km from the Iraqi border and neglected in the past, which includes 19 villages of which 10 are inhabited permanently (of these, only 3 or 4 rely on orchards) and nine are nomadic (livestock-based), was also useful. Lentil, chickpea, wheat, barley and apples are important crops in the area, where agriculture is rainfed with 350-500 mm rainfall. Here, the IPM is applied on apple, and three private female consultants have been contracted as IPM/FFS Facilitators. Of the 10 villages with sedentary population, 50-70% of the farmers of seven villages have been involved with an average participation of 25 farmers per FFS. Although the FFSs in the villages are only a year old but farmers have the impression that they have gained a better understanding of the agricultural ecosystem. They perceive water management as one of the most important elements to add to the programme. Weeds pose another problem in both wheat and barley. They also believe that the old variety of apple grown in the villages is not necessarily the best to use in the IPM approach. The consultants emphasized to farmers the difference between the one-way-type of interaction with farmers used in the past with the most rewarding two-way IPM/FFS approach. They suggested the introduction of FFS methodology in the curriculum of the universities and to increase the budget for facilitators, which was not sufficient any more to cover the expenses after the government had lifted the subsidies on gasoline. It was suggested by The Facilitator of Central IPM/FFS sites for both orchards and field crops and the Pathologist and Project Consultant suggested to include water management and training (for which the Government has limited budget), exchanges with other regional programs and marketing as the activities that the programme should include in the future. In the next 5-year agricultural plan the Government is forecasting that 25% of the agricultural products should be produced under IPM conditions.

A visit to an IPM/FFS in Sahneh village, east of Kermanshah, with only women farmers (a total of 15) was also made. Here, the program covers peaches and apples and started only last year. The farmers are small holders with intermediate education. They have found the programme activities very useful as they learnt about the insects and diseases and pests. However, they expressed a desire to engage in new activities such as chicken, mushrooms and vegetable production as they have free time, and feel that the women in the other villages share their views. They do not consider marketing of the IPM products a problem. All these additional activities can build on the reputation that the village has developed to produce healthy food as the customers come from Kermanshah to their village to directly buy their products. Water in this area does not seem to be a problem although the water level has gone down. The older women in the group indicated that there was much more diversity of crops in the past with common crops such as maize, wheat and barley. They indicated their interest to use internet, to travel and achieve self-determination in deciding the products they wished to produce.

The success of the IPM/FFS approach in Iran has influenced some policy changes. For example, more funds have been provided for the IPM/FFS work by stopping the use of aerial sprays for the control of Sunn pest. The Director of Crop Protection, and his Deputy, who is a graduate student on IPM, informed that 500 agricultural engineers were contracted by the Agricultural Organization and each one was involved in two FFS. The training of these 500 agricultural engineers included three days theory and two days in field. In the case of new issues (problems) emerging, such as a new insect and disease pests, they are reported to the IPM Council (IPMC, composed of experts) for attention and approval. If approved, the issues are handled by the management for the preparation of a budget and further action. It was confirmed that in the new 5-year plan, 25% of the agriculture production would be produced through IPM approach with different priorities in different provinces. There will be a Ministerial

IPMC with four provincial managers with Kermanshah as the hub for western Iran. The Director of Crop protection strongly pleaded for the extension of the programme which should provide technical support for new crops (for example, olives) and training of personnel to meet the objectives of the next 5-year plan and to facilitate the merging of PPB with IPM. The possibility for the programme to support scholarships for degree training was also suggested by the Deputy Director. Mr Roointan also supports similar views and considers the IPM approach as highly beneficial. The province is also willing to collaborate with FAO on either large or small projects including livestock. A visit to an exhibition on different aspects of IPM and achievements of the programme activities was very useful. The most remarkable aspect was the attempt to analyse the data taken in the control and the IPM treatments using the FFS as replicates.

In Tehran, together with the NPC, a visit to a market was considered very interesting as there is a shelf reserved for the sale of IPM products. Suggestions were made on how to increase the visibility of the shelf within the market. In the concluding visit to the Crop Protection Department of the MoA, the Director was very supportive of the IPM/FFS programme and emphasized the strong need for its extension to assist the Government of Iran in fulfilling the aspirations of its next 5-year plan.

JORDAN: Jordan is one of the six countries that had joined the programme in 2004. The Mission accompanied by the PNC of Jordan, visited two locations in Jordan ; one in Ghor Safi (two sites, both on open-field tomato, one of male and the other of female farmers), and the other on plastic house tomato in Jordan Valley. Both the visits provided good insights into the IPM/FFS activities in Jordan. The Mission observed the following distinct features and advantages of the IPM/FFS approach:

- The number of FFSs increased from five at the beginning of the program in 2004 to 153 in 2010.
- The use of chemical pesticides in IPM/FFS plots is reduced by 70%. Very useful information was received which indicated that the quantity of methyl bromide used for soil fumigation in water melon was reduced from 70 tonnes in 2009 to 3 tonnes in 2010; 95% reduction according to Montreal Protocol on Methyl bromide. Accordingly, the cost of production has also been highly reduced.
- The quality of tomatoes harvested from the IPM/FFSs was enhanced due to the reduction in use of hazardous pesticides and the use of bumble bees as pollinators. The net returns of IPM/FFS farmers increased due to reduction in the cost of production due to reduced use of pesticides and cost of production.
- It was interesting to know that the women IPM/FFS famers would like to have new crops added to their plots to diversify their crop production and increase income to their households. Lately, okra is becoming a popular crop in the Ghor Safi area and needs attention for IPM/FFS approach which would be very useful. The story of a shy young lady who has immensely benefitted from the IPM/FFS is given in Box 1.

The Mission also observed a number of constraints in the country in the work related to IPM/FFSs, which are as follows:

Lema Noem: From a shy young lady to a community leader

This is the story of Ms Lema Noem, a Jordanian farmer from Ghor Safi, who has been involved in the IPM Program since its very beginning. In her own words “It was in 2004 that the National Coordinator of the FAO Regional Integrated Pest Management Programme in Jordan asked me if I would like to be trained to become an IPM/FFS Facilitator for a group of farmers who grew plastic house tomato in my village. That was the time when I was working with my father in his farm, and I felt that I was too young, without experience. Being a women, I also felt strange to directly participate in a FFS as I had never dealt with other farmers’.

Moved by her curiosity Ms. Noem joined the group, and during the training she gained knowledge about agronomy, ecology, IPM technical issues, which helped improve her self-confidence. Then, she

started her first IPM/FFS as a Facilitator. In the first season, she had worked with 12 farmers out of which five were women. In the second year, she led a group of 14 female farmers. In her words 'Together, we learned how to solve our problems at farm level and we started introducing new technologies such as the use of bumblebees for pollination instead of the hormone. Neighbouring farmers started enquiring about it and many of them started using IPM techniques in their own farms. With time, I became more knowledgeable and gained confidence and I was very happy the day when my father asked me about some technical issues to suggest solutions to solve problems in his farm. I felt very proud of myself as he was listening to me to improve crop production and pest management on his farm'.

In 2007, Ms. Noem's father died and her family allowed her to lead the farm and take decisions. 'This became possible only because of the experience that I gained through the IPM/FFS Programme', she added with sense of pride. She further added 'Before the FFS training, I did not know anything about farming and I had only a secondary school certificate. Now, farmers in the area want to consult me. In fact, people now consider me as a focal point and a women leader in the area. I feel very proud of myself when farmers ask me my opinions on how to solve their farming problems. Now, I very much like and enjoy helping them!'

Recently, Ms. Noem established in the village an association of female farmers to provide support to women in agriculture. She sincerely wishes to thank the FAO IPM Programme because it has brought so much of change her life for better, both as a woman and as a farmer. She is so proud that she can now provide a useful service to her community'.

Box 1. The success story of a shy young lady, who became an IPM/FFS focal point and a women leader in her community.

- Lack of rearing facilities for rearing/producing bioagents to control important insect and disease pests to facilitate their economical use in IPM/FFSs, which is currently not possible because of lack of these facilities in the government or private laboratories in the country.
- Presently, the bumble bees for use as pollinators in the green houses are imported from Lebanon. It would be convenient to produce them locally.
- Marketing-related problems for the IPM/FFS products in the local as well as the export markets are depriving IPM/FFS farmers from getting better prices for their clean and quality products.
- Less involvement of extension agents in the IPM/FFS work in Jordan; no extension agents are involved in the Ghor Safi area. This because there only a limited number of extension agents in MoA.

During Mission's meeting with the high officials of the MoA and the NCARE, it was unanimously emphasized that the IPM/FFS approach has been a success story and that they would like to extend this approach to other crops such as olives, date palm, cereals and productions systems in both dry/rainfed and irrigated areas such as livestock and water management. They also recommended that the programme be further extended so that the approach could be applied to new crops/production systems in new areas and more personnel could be trained in IPM/FFS approach.

SYRIA: Syria is also one of the six countries that had joined the programme in 2004. The programme is lead by a senior officer of the Plant Protection Dept of the MoA. From a few IPM/FFS in 2004 now there are 119 IPM/FFS in the country. The Mission, accompanied by the NPC visited seven field sites in three regions of Syria: Two on apple, one each in Al Swaida and Bersheen; three on plastic house tomato in Lattakia and two in Tartous. A brief discussion on the site visits and important information learnt is provided below. However, an overview of the problems faced by the IPM/FFS participating farmers in Syria/national programme would be provided at the end of the description on site visits.

In Al Swaida, meeting with apple IPM/FFS farmers highlighted the usefulness of the approach through which they have learnt by comparing the results of the IPM and local practice (LP) plots: (i) systematic management of their apple trees. (ii) difference between harmful and useful insects and life cycles of

harmful insects, (iii) application of fertilizers based on the soil analysis of their orchards (resulting in 40-50% reduction in the use of fertilizers), (iv) use pheromone traps to reduce the attack of insect-pests, (v) the value of the reduced pesticide use on the environment and human beings, (vi) the value of clean and quality apples and are using them for the consumption by their families, and (vii) teaching the IPM practices and their importance to other neighbouring farmers, who are not participating in the IPM/FFSs.

Visit to Pistachio Bureau in Hama provided some useful information on the problems of pistachio cultivation in the area and the actions planned. Through its own resources the Bureau has started IPM/FFS approach on pistachio in the governorate. A Pistachio Growers Association has been formed to look after the interest of famers and pistachio cultivation. They would like to have IPM/FFS on olive, cotton, almond and wheat.

Visit to an apple IPM/FFS in Bersheen village in Hama province provided further insights into the usefulness of the approach through a detailed discussion with the participating farmers. The first IPM/FFS in apple in this area was established in 2006. The number of IPM/FFS was increased based on famers' demands. Interestingly, the trained farmers became Facilitators of FFS in this area. It was very clear from farmers that they had several advantages including greater economic returns (through reduction of cost of cultivation), cleaner and quality fruits for good health and healthier environment by the reduced use of pesticides. All these together created a favourable social impact on the farming community which realized the importance of reduced use of pesticides and their favourable effects on their health and environment.

A visit to a tomato IPM/FFS in Dwaileh Al-Khatib village in Lattakia province, which has a total of 24 FFS, provided a firsthand information on the functioning of an IPM/FFS as the Mission participated in all the four sessions of an IPM/FFS : (i) agro-ecological observations, (ii) preparing charts on the observations and conclusions and sharing them with all the farmers, (iii) discussion of the main points and recommendations, and (iv) evaluation session in which the farmers draw the lessons from the day's exercise and discussion topic(s) for the next meeting. As a special topic, the precautions to be taken during spraying were demonstrated, followed by a lively discussion and lessons learnt. In all this, the Facilitator plays the important role of moderator and technical guide to farmers. An impressive farmer participation in the exercise and discussions was observed and they certainly seemed very well familiar with different problems of protected tomato cultivation. A visit to the tomato greenhouses of a widow, Mrs. Maria Abraham Saleh, an ex-IPM/FFS farmer was considered very inspiring. One significant program achievement observed was the use of soil solarization for the control of nematodes and soil-borne diseases replacing the use of methyl bromide.

Equally useful and inspiring was a visit to the tomato plastic houses of an ex-IPM/FFS farmer, Mr Mahmoud Mansur, who was trained by the programme in grafting technique in tomato and who has very successfully used the techniques not only for his tomato cultivation and but also trained other farmers. Now, he is helping other farmers in producing grafted tomato seedlings. His success story is presented in Box 2.

A visit to an IPM/FFS in Al Basateen village of Tartous province, which has 98,000 plastic houses of which 99% are under tomato and 1% under other crops, again demonstrated its usefulness for farmers. In IPM plots, a drastic reduction in the use of pesticides was achieved; from 10 in LP plots to 1 in IPM plots. The cost of production in IPM plots was reduced by 50-70%, thus resulting in increased net returns. The Mission was impressed with the interest and enthusiasm of the participating farmers. One farmer used the grafted tomato seedlings in his plastic house. Also, impressive was the willingness of other farmers to join IPM/FFSs considering the advantages that they are seeing and realizing of the IPM/FFSs.

The Mission was also shown the plastic house tomato crop of a farmer of Al-Kharab village. The farmer had earlier participated in the IPM/FFS and had benefitted from it. However, he had much higher expectations and now grows cherry tomatoes to supply to hotels. Instead of using soil

solarization to control the soil-borne diseases and insects as before now he is using the methyl bromide pesticide to control them. He is also using different types of pesticides to keep his crop free from insect-pests although he continues to use the IPM/FFS stickers, which he had obtained when he was participating in the IPM/FFS earlier, to sell his cherry tomatoes as IPM produce. This example shows a possible problem of the misuse of IPM labelling and could happen anywhere. However, the Mission was happy that it was provided an opportunity to visit this farmer to see the misuse of the official IPM/FFS stickers.

From a Tomato Farmer to an Expert in Tomato Grafting and Leader of Private IPM/FFS Tomato Growers

Mr. Mahmoud Mansour was a plastic house tomato farmer in Al Aedia village of Lattakia province in Syria growing tomatoes by the local practices and using methyl bromide as soil sterilizer and other herbicides, pesticides and fungicides to control weeds, insects and diseases, respectively in his plastic house tomatoes. Like other tomato growers in the area, he hardly realized the harm that his tomato growing practices were causing to the environment and human health. When informed and approached by the Plant Protection Department of the Provincial Directorate of Agriculture, he agreed to join the IPM/FFS. He participated in the IPM/FFS for two years, and benefitted from his participation in the IPM/FFS. 'I learnt the details of the IPM methodology and appreciated its immense advantages in the reduced use of pesticides and my increased net returns', he said with a lot of sense of achievement and pride. He further added that 'I also realized its importance in improving the quality of fruits, surrounding environment, and health of my family and the neighbours'.

Considering his immense interest in IPM/FFS approach and his interest in learning techniques to further improve his crop, the PCU provided him an opportunity to learn the grafting technique in tomato from an International Consultant from Jordan. Mr. Mansour quickly learnt and mastered the grafting technique to the surprise of the Consultant and the RPC. First, he started its use in his own tomato plastic house and tested 200 grafted tomato seedlings. Encouraged by his results, he also started testing different tomato varieties to see their characters and advantages. He selected three varieties out of a total of 15 that he tested and propagated them for their use in his plastic houses. He found that the grafted tomatoes were tolerant to nematodes and could increase tomato yields by 15-20%. Soon, he had all his tomato produced from grafted tomatoes.

He showed excellent interest and desire to popularize this technique to other plastic house tomato growers in his area and voluntarily taught the art of grafting to other tomato farmers in his area. He soon realized that he had earned a reputation of a good teacher of tomato grafting and became known in the area as the 'Tomato grafting farmer'. On demand, he then decided to teach this technique to other farmers, on payment basis. Thus, he has played a major role in popularizing the use of grafted tomatoes in plastic houses in Lattakia r province.

It is heartening to note that he is now voluntarily supporting and managing several private IPM/FFS in his neighbourhood. What an inspiring example for other farmers to follow!

Box 2. The success story of Mr. Mahmoud Mansur an ex-IPM/FFS farmer of Al-Aidea village in Lattakia province of Syria

The IPM/FFS participating farmers have immensely benefitted from their participation in the IPM/FFSs. However, they unanimously voiced the following problems:

- Problem in marketing of their cleaner and quality products are receiving any premium price compared with the non-IPM produce. The logo developed by MoA and used by them is not recognized by traders and consumers.
- No systematic organization to help them market their quality produce
- The problem of the timely procurement of bumble bees
- Need to apply the IPM/FFS approach to other crops in their areas
- Need for the availability of options for the use of other suitable varieties

- Easy access to bioagents for use in the plastic houses

The Mission also observed a number of constraints related to work in IPM/FFSs at the national level, which are as follows:

- Need to develop facilities for local production of bumble bees (may be by a private laboratory) for use as pollinators in the plastic houses, which are presently imported from Lebanon and, at most times, arrive late, locally.
- Although some rearing facilities for producing bioagents (two parasitoids, *Trichogramma* sp. and *Bracon* sp. and red mite predator, *Phytoseiulus persimilis*) to control important insect, disease and phytophagous mite pests have been developed by MoA. Similarly, a laboratory to produce biopesticides (from *Trichoderma* spp.) has been established. However, it would be desirable to further strengthen them. In fact, it would be desirable to encourage and promote private enterprises for their production at commercial levels to facilitate and popularize their economical use in IPM/FFSs.
- Less involvement of extension agents in the programme work was noticed although there is a good network of extension agents in the country. Their active involvement would have further benefitted the programme work and its popularization.
- Presently, the programme at the national level is coordinated by the Department of Plant Protection. In the Mission's opinion, it would be better to transfer this responsibility to the Department of Extension of MoA.

All the high officials of the MoA including the Head of Plant Protection Department and the Regional Directors of Agriculture visited were unanimous on their opinion on the usefulness of the programme in Syria. They are very encouraged to see the programme progress and results and feel great potential that approach has in Syria. They also emphasized the need to further up- and out-scale the work following the IPM/FFS approach to other crops/production systems and areas. One such good example for adoption and application of this approach is in pistachio by the National Pistachio Growers Board. They also are also convinced of its use in other crops like olive, cotton, livestock production and water management although concerns of financial resources to out-scale its use were mentioned.

MOROCCO: Morocco joined the programme in 2010 and is the first year of the programme activities. The programme in Morocco is lead by a senior officer of ONSSA of the MoA. The IPM/FFS approach in the country is being introduced through three field schools on mint and two on tomato. The Mission visited one IPM/FFS on mint and one on plastic house tomato. The Mission during its visits to these two field schools was impressed with the enthusiasm of the participating farmers and observed that they had already started benefitting from them. Although only in the first year of their participation in IPM/FFSs the farmers stressed that they were certainly benefitting from their weekly participation in the field schools on mint and tomato crops from the weekly agro-ecological studies and learnt different insects and diseases and their control through monitoring of ecosystems of the crops, use of safer pesticides and their application techniques, spot and preventive treatments for certain diseases and insects, use of pheromone traps, and realizing the value of producing cleaner and quality products.

The Mission is happy to report that the IPM/GIFFS approach has now been accepted by the plastic house tomato farmers who have/are participated/participating in the IPM/FFS approach. Now, they wish to extend it to the open-field tomato production. They highlighted three advantages of their participation in IPM/FFS: (i) protection of the environment, (ii) producing cleaner and better quality products, and (iii) improving the nutritional quality of the food and thus better health for their families, neighbouring communities and the consumers. The IPM/FFS approach is already becoming popular among them and has already been considered successful in creating awareness among plastic house tomato farmers for not using very toxic pesticides for soil fumigation such as methyl bromide.

Discussions with the high officials of ONSSA highlighted some important points on the usefulness of the IPM/FFS approach that include: (i) its wide applicability, (ii) greater response from farmers because of its bottom-up approach, (iii) allowing the farmers to take their own decisions, (iv)

building technical capacity of farmers because of the element of the agro-ecological study built in the FFS, and (v) its applicability to other projects operating in the country such as the U.S. project on Millennium challenges in environment and soil degradation in resource-poor areas and crops such as almond, olive, palm trees, etc. They were happy to report that the results of the IPM/FFS work, although only in its first year, have been very encouraging and created good enthusiasm among the farmers and the MoA. The results on mint have already started showing their positive results as the consumption of mint, which was adversely affected by excessive use of pesticides, is being resumed. They saw a great potential of the approach at the national level and is being extended to other crops (Olive, date-palm, grapes, apples, etc.) and production systems (livestock production, on-farm water management, etc), and has already been adopted in some crops using the national resources. They also planned to increase institutional linkages at the national level to derive greater benefits from the FFS approach.

LEBANON: Like Iran, Syria and Jordan, Lebanon had joined the program in 2004. So far, the national programme, coordinated by the Department of Plant Protection, has been able to establish a total of 25 IPM/FFS on plastic house tomato, olive, apple and grape and trained 243 facilitators and 315 farmers (Table 2) The Mission accompanied by the NPC, visited two field sites: one on plastic house tomato in Jiyeh, 20 km north of Beirut), and the other (also on greenhouse tomato) in Rzai (between Saida and Tyre),

The visit to an IPM/FFS in plastic house tomato in Jiyeh was considered very informative and useful as it provided good interaction opportunity with farmers. *Tuta absoluta* and grey mould (*Botrytis* sp.) and nematodes and soil-borne diseases are the major problems here. Also high humidity in the plastic houses is a major problem here. It was good to know that all these three problems have been successfully resolved through the activities of the IPM/FFS approach. Pheromone traps and spot treatments are routinely carried out by the farmers to manage these problems. Also, plastic meshes have been employed to improve aeration and reduce humidity in the plastic houses. Also, a double-door system has been developed and used to prevent entry of insect-pests into the plastic houses. Compared with 35-40 sprays of pesticides in the local practice plastic house tomato the IPM greenhouse use only 5 sprays in the crop season and at times the spot treatments only. It was heartening to note that soil solarization has been adopted to control soil-borne nematodes and diseases. The use of Farm Yard Manure (FYM) together with soil solarization has also eliminated or limited the use of fertilizers. The farmers were unanimous in their opinion that the experience with IPM/FFS approach has been a fruitful one and thus would like to expand its use to other plastic house crops such as cucumbers, eggplant and beans

A visit to a plastic house tomato IPM/FFS was also considered very useful by the Mission as it provided further insight into the problems and progress of the work in southern Lebanon. The tomato crop here is rotated with haricot bean, lettuce, crucifers, egg plant and bell peppers and the farmers here have the choice of choosing varieties from 12-15 varieties. Some farmers are using 6-8 varieties but in different plastic houses. The major problems include whitefly, thrips, mites, nematodes and *T. absoluta*. The farmers in general spray the crops twice per week, meaning a total of eight per month with a total of 30-40 sprays per crop season, which is 15-25% of the total cost of production. In the IPM plots, they have so far sprayed only three times in five months that too with fungicides. The farmers have also started the use of grafted tomato seedlings. The IPM farmers are also benefitting

from the use of bumble bees as it is less expensive than the use of hormone. Farmers are now planning to cover 50% of their plastic house tomato production to IPM from the next season.

Like in other countries, the greenhouse tomato farmers in Lebanon have also benefitted from the IPM/FFS in many ways, which include the following:

- Successfully learnt the use of IPM practices to improve their plastic house tomato production and have succeeded in significantly reducing the application of pesticides by adopting soil solarization and grafted seedlings, eliminated or reduced the use of fertilizers by using FYM, together with soil solarization, managed the insect and disease problems by AES observations, preventing entry of insect-pests into the plastic houses by a double-door entry to the plastic houses, management of grey mould diseases by improving the aeration and reducing the humidity, use of pheromone traps and by the use of very limited pesticide/fungicide sprays and spot treatments. They have also adopted the use of bumble bees and bio-agents to improve productivity.
- Reduction in the use of pesticides (about 70-80%) and creation of awareness among farmers on the harmful effects of the excessive use of pesticides..
- The farmers through their participation and experience with IPM/FFS are now aware of the advantages of the IPM approach in improving the quality of fruits, human health and environment.
- The farmers have learnt and have now developed the experience and confidence to take their own decisions on the best practices for successful cultivation of their plastic house crops.
- Reduction in the cost of cultivation by drastic reduction in pesticide and fertilizer use, improved fruit-setting by bumble-bee use and hence the increased net returns.
- The farmers also raised the following concerns and made some suggestions to further benefit from the IPM/FFS approach:
- The problem of marketing and getting some extra payment for their cleaner and quality products. For this, government assistance for proper labelling, marketing and popularization of IPM products was requested.
- Availability of credit facilities to farmers
- The need for developing their own seeds to save the cost of seeds which cost on an average US\$ 400 per feddan.
- Need for reducing the cost of bumble bees either by their local production and availability or by imports in large quantities at wholesale prices.

The programme in Lebanon did have some setbacks in the beginning. As a result of some serious diseases (brown rot and late blight) a FFS in potato had to be discontinued. Also, a grape IPM/FFS had to be discontinued because of the departure of the Facilitator. The programme has also suffered because of shortage of staff in the MoA. However, the programme was able to help an Italian project on olive by implementing 10 IPM/FFS in 2006.

Discussions with the high officials of MoA were considered very useful. Meeting with the Director General in MoA revealed that he was personally aware of the usefulness of the IPM/FFS programme in the country. He informed that now the extension staff have been appointed in all the 28 Regional Extension Centres of the MoA, which should provide a boost to the IPM/FFS work. Although the programme has provided training to all these new staff members on IPM/FFS there is need to for greater efforts on training of staff and provide training in technical schools including their visits to IPM/FFSs. He agreed that there was an urgent need to further strengthen the existing 15 minute TV programme and to create awareness of the IPM products among traders and consumers. He stressed the need to extend the current programme in Lebanon to further consolidate its achievements and extend its use by providing the much-needed training programmes.

6.1.2 STATUS OF IPM/FFS APPROACH IN FIVE COUNTRIES NOT VISITED

As stated earlier, of the 10 programme-participating countries the Mission visited only five countries and could not visit the other five countries, viz., Egypt, Palestinian Territories, Iraq, Algeria and Tunisia. Based on the perusal of the 2009/2010 Country Reports, the current status on the number of IPM/FFS, facilitators and farmers trained in different countries is presented in Table 3. A brief description of the progress in these five countries is provided below:

EGYPT: Egypt started participating in the programme since April 2004. So far, a total of 251 IPM/FFSs have been established in citrus, strawberry and mango, and 252 facilitators and 2978 farmers trained in the country (Table 3).

The programme has successfully demonstrated the effective management of soil-borne insects and diseases in strawberry by use of repeated ploughings, soil solarization and manure application. Similarly, major insects were effectively managed; white grub by good pre-planting soil preparation, insect monitoring by blue traps and pesticide application around plants, two-spotted red mites by regular burning of the affected foliage and entomophagous fungi (*Metrhizium anispoliae*). Two major diseases (Powdery mildew and black root rot) were effectively managed by pruning of affected leaves/removal of affected plants and sprays of wettable sulphur and microbial fungicides (*Bacillus megaterium* and *Trichoderma viridae*). In tomato, weeds, insects (cutworm, aphids, leaf miner two-spotted spider mite and whiteflies) and diseases (late blight and blossom-end rot) were effectively managed in the IPM/FFSs. In addition to soil solarization, the notable are the use of malathion bait for cutworm control, use of Biovar and Biofly for aphids, and the use of Azadirachtin (Neemzal) for leaf miners, two-spotted spider mites and whiteflies. Similarly, the late blight disease was effectively managed by the use of less susceptible varieties, scouting and safe contact fungicides.

Table 3. Information on the number of facilitators trained, IPM/FFS established in different crops and farmers trained by the IPM Programme in Egypt, Palestinian Territory, Iraq, Algeria and Tunisia

Country	Crops selected	Facilitators trained	IPM/FFS established	Farmers trained
Egypt	Citrus, Strawberry, Mango	251 40% women	251	2978 (15% women)
Palestinian Territories	Greenhouse cucumber, Tomato, Citrus, Fig	28 22% women	79	1185 (18% women)
Iraq	Date palm,/Citrus, Tomato, Wheat	8	9	No information
Algeria	Tomato (Plastichouse and open field), Citrus	29 31% women	5	87 (0% women)
Tunisia	Tomato,(Plastichouse and open field), Citrus	115 26% women	4	60 (5% women)

The major programme achievements are considered as follows:

- FFS participants, after the end of the training programmes, developed critical thinking and creativity to question, to experiment and to start new initiatives and greater self-confidence in taking decisions on good agriculture practices.
- Increased crop yield quantity, quality and profit per area and, consequently increased farmers' interest.

- The strawberry farmers were able to produce strawberry runners according to their needs and also for marketing including for international markets
- Well trained MoA Extension Service's staff on IPM and FFS is now providing active support to farmers' communities
- The IPM/FFS approach has been found beneficial for all the components of rural livelihoods (natural, human, social, physical and financial). The farmers developed and strengthened their physical assets (better housing conditions) and financial assets (raising village's revenue).
- Farmers were able to build associations to help one another, and these gave them a stronger voice.
- There was an increased interest of decision makers in the results obtained through the project activities
- Establishment of specialized laboratories for producing bio-agents in the Plant Protection Research Institute and natural enemies of insects in Ismailia governorate. A bio-agents manufactory established in collaboration with Private Sector (Kafr El-Zayat, Co.) for mass production of microbial insecticides.
- Training course programmes on IPM delivered through PPRI for young researchers and farmers in different governorates.
- The programme achieved reduced insecticides utilization through selection of suitable control measures, utilization of the recommended quantity of pesticides per unit area, implementation of the recommended number of sprays per season, assistance to the distribution of microbial insecticides and natural enemies to farmers, support to poor farmers (bio-agents, traps and other environmental friendly tools distributed free of charge), and increased awareness of pesticides associated risks through workshops, TV and radio programs.

In Mission's opinion, the programme in Egypt has made a good progress.

Palestinian Territories: Like Egypt, the Palestinian Territories also started participating in the programme since April 2004. So far, a total of 79 IPM/FFSs have been established in plastic house cucumber, tomato, citrus and fig and 28 facilitators and 1185 farmers trained in the country (Table 3). The programme has achieved satisfactory outputs in different crops which include the following

- Plastic house cucumber farmers have adopted the biofumigation as a successful alternative to soil fumigation using methyl bromide and metam sodium.
- Plastic house tomato growers have adopted the double-door system in the plastic house, different types of insect traps for monitoring, mass trapping of *Tuta absoluta* using a modified multipurpose traps (sex pheromones, yellow sticky color, water and light)
- The citrus farmers are using a new technology to control the Mediterranean fruit fly (*Ceratitis capitata*) using Multi-lure traps for mass trapping. IGRs, mineral oil, and detergents are the only chemicals are now used to control other economic pests as scales and whiteflies.
- The fig farmers are using a special trap to control the most important insect pest which is the stem borer, IGRs are now being used to control fig wax scale (*ceroplastis rusci*) replacing the insecticides conventionally used.

The programme obtained remarkable results in reducing the use of pesticide and the cost of production as indicated by the results of an impact study carried out by An Najah National University from 2006 to 2009. In plastic house cucumber, the pesticide sprays have been reduced by 73%. in plastic house cucumber and the cost of total input reduced by 20% whilst yields increased by 15%. In plastic house tomato, the overall use of pesticides was reduced by 73% and the cost of inputs reduced by 25% while yields increased by 10%. The IPM/FFS farmers gained better understanding about pesticides' impact on human health and now pay more attention to pre-harvest intervals when handling agro-chemicals compared to non-FFS farmers.

One important achievement of the programme is that more women farmers are now participating (152 in 2010 to 2 in 2007) which is 415 of the total IPM/FFS farmers. The women facilitators make up for 25% of the total facilitators.

Another important development has been a favorable change in the Institutional Palestinian Agricultural Policy which has improved the implementation environment for present and future IPM Programmes.

The results of the impact study on the marketing potential of IPM product are also very important as 54% of the consumers stated that they would be willing to pay more for safer and healthier IPM products (39% are willing to pay up to 5% more) and 57% of the consumers are seriously concerned about the health hazards of high pesticides residues in the food. However this potential is still to be exploited and the Palestinian Territories could strongly benefit from adoption of other successful marketing initiatives taken up by the programme in other countries e.g. Iran and Syria.

The programme has organized a number of training activities for farmers, facilitators and MoA staff on Phytosanitary Issues, Pesticide Use, New Pest Control Techniques, IPM Key pests, PRA, Post Harvest Management, FFS Management, ToT for the selected Crops

The programme highlights the seriousness of *Tuta* problem in the Palestinian Territories and seeks assistance from the PMU.

In Mission's opinion, the program in the Palestinian Territory has so far made good progress. They certainly can further benefit from the work on *Tuta* done in other countries of the programme especially Jordan.

IRAQ: Iraq joined the programme in 2009 and started the activities in 2010. A total of nine IPM/FFSs were established in date palm, citrus, tomato and wheat. The programme trained right facilitators during the year. No information on the number of farmers trained was provided.

The progress in 2010 was adversely affected by the political situation in the country which did not allow free movements and as a result some activities were postponed. Another problem highlighted is the shortage of facilitators. Of the 18 facilitators trained only 10 were available. In Nejeef governorate FFS on tomato had to be terminated due to lack of interest of farmers. However, the national programme benefitted from participation in training activities/study visits to other countries such as Iran and Jordan. Also, the programme was able to collaborate with the IFAD/ICARDA project on wheat.

Considering the political situation in the country, the programme has been supported by the PMU by organizing training activities in Amman, Jordan. The FAO-Iraq based in Amman is also providing support to the programme in Iraq

ALGERIA: Algeria was included in the programme in 2009 and started the activities in 2010. In the first year of the programme, six IPM/FFSs were established in plastic house tomato and citrus, and 29 facilitators and 87 farmers trained in the country (Table 3).

In tomato, *Tuta absoluta*, mites, thrips and aphids are important insect pests and Botrytis grey mould and mildew are important diseases, In citrus, leaf miner and aphids are important insect-pests.

In the first year, the concept of IPM/FFS was successfully introduced to the IPM/FFS-participating farmers of the two crops from which the farmers benefitted. The programme organized a training programme on Training of Trainers and trained 29 facilitators. It also started base studies on tomato and citrus.

The programme published reports on the base studies on tomato and citrus in Algeria and participated in the international training activities organized by the PMU.

It is clear from the Country Report that Algeria has made a good start and plans to make further progress during the next year.,

TUNISIA: Like Algeria, Tunisia was included in the programme in 2009 and started the activities in 2010. In the first year of the programme, four IPM/FFSs were established (one each in plastic house and open-field tomato and two in citrus) and 115 facilitators and 60 farmers trained in the country (Table 3).

In tomato, the principal themes addressed included: Soil analysis, soils diseases, fertilization based on soil analysis results, integrated control of *Tuta absoluta*, viral diseases, mildew, *alternaria*, etc. In citrus, the principal themes addressed included weed control, nitrogen and potassium fertilization, control of leaf miner and aphids, harvesting and organic manures.

The programme organized a number of training courses including one each on the integrated pest control in tomato and citrus and participated in international training activities organized by the PMU. The programme also published on base studies done in tomato and citrus in Tunisia.

The programme has been able to establish itself well in the first year of its activities and proposes to extend the IPM/FFS activities to olive and date palm in Sahel, north and south parts of Tunisia in 2011.

6.1.3 CAPACITY BUILDING

The programme has succeeded in capacity building among farmers and the personnel of the MoA of the project-participating countries. These include:

- Training of large numbers of farmers and MoA personnel through IPM/FFS approach and its use through their (i) participation in IPM/FFSs in different crops and (ii) interaction opportunities provided to them through visits to PM/FFSs in other crops in other regions of their country or other countries.
- Training of farmers in special techniques such as grafting in tomato which helps in the use of tolerant rootstocks against insects and diseases
- Significant improvement in farmers' technical capabilities and their very clear understanding of the concept of IPM/FFS approach. As a result, some of them have now taken the responsibility of serving as facilitators of IPM/FFSs and also guiding the formation of voluntary group of farmers
- Production of bioagents and biopesticides, which are both important in IPM, at the country level; the project facilitated their in-country production especially in Syria.

6.1.4 ADVANTAGES TO FARMERS

The farmers who have participated/are participating in IPM/FFSs have derived/are deriving a number of benefits. The following are the advantages highlighted by the farmers which include: (i) improved net returns through reduction in the cost of production by reduced use of pesticides, (ii) significant changes in the perception of farmers about managing their crops through IPM with the least use of pesticides/fungicides, and new ways of crop cultivation, (iii) confidence-building by successfully growing the crops through the use of IPM/FFS approach and improving their decision-making capacity, (iv) greater awareness on the beneficial effects of the IPM/FFS with respect to protection of environment and production of clean and quality produce and their impact on human health, (v) changes in their attitudes towards the use of safer pesticides, and (vi) created awareness among them about the use of new crops and varieties in their areas

6.1.5 USE OF PESTICIDES

Pesticides from different classes (insecticides, fungicides, miticides, nematicides and herbicides) have been widely and intensively used as protective and curative measures to alleviate pest problems on horticultural crops. Pest resistance, pest resurgence, residue effects, environment pollution and health

hazards are the common problems associated with their use. Some of these pesticides are now banned; others are restricted for their use. Some are carcinogenic while others are mutagenic. IPM/FFS approach followed in different countries that the Mission visited has greatly helped in the reduced use of pesticides in managing insect and disease pests in the IPM/FFSs plots. It has not only reduced the use of pesticides by 50- 70% but also limited the use of pesticides that are least harmful ones through the “hot spot” application approach..

This has happened due to awareness created among the IPM/FFS-participating farmers on the ill-effects of pesticides on human health and environment. FFS also either minimized and in most cases eliminated the use of highly toxic materials (such as methyl bromide according to the Montreal Protocol), and in some cases did not use any pesticides or concentrated only on nontoxic pesticides of plant origin such as neem extract to control insects, and recommended the use of sulphur and copper products to control fungal diseases (Annex1, 2 and 3). Soil solarization is the safest recommended method to combat soil-borne diseases, nematodes and also weeds when and where it is appropriately applicable based on the climatic conditions (availability of higher temperatures of 45 C and above for about 42-60 days. It has been successfully and now routinely used by the IPM/FFS farmers of the programme and also by farmers outside the programme. Hand-weeding has been used to control weeds although black plastic mulch has been more frequently used together with soil solarization. The use of pesticides has been reduced due to the intensive use of bio-agents especially in Egypt and Syria although farmers in Jordan and other countries have been able to reduce the use of pesticides with proper monitoring of the crop and pests, traps and agronomic practices without the use of bio-agents due to their non-availability.

It should be highlighted that the Syrian IPM/FFS farmers used biocontrol agents intensively and lowered the use of pesticides to a great extent. On the other hand, the Jordanian IPM/FFS farmers although lack the use of natural enemies but they have still reduced the use of pesticides to a minimum. However, the Moroccan IPM/FFS mint farmers lack the availability of natural enemies and thus depend largely on different pesticides to control mint pests. All the IPM/FFS farmers visited in the five counties used different cultural and physical control measures but still there is some scope to use some other measures which could also be used (Annex 1, 2 and 3).

6.1.6 MARKETING

Facilitating access of farmers to markets to help them sell their IPM produce is one of the major objectives of the programme. Marketing was quoted by all farming communities visited as a major concern. Farmers highlighted that: (a) their products are now cleaner and of better quality and, thus, would like to receive recognition of their products and get better prices, and (b) they are not receiving any support for grading and marketing of their products from the government. This situation, however, varies from country to country depending upon different entrepreneur attitudes of the people, including farmers, involved.

The programme in the past has focused on the marketing issue and had positive results. In Iran, support for marketing has been provided to IPM/FFS farmer groups by the programme. It is suggested to replicate this successful marketing support at the regional level. Some IPM/FFS farmers are able to export their produce due to the experience they gained and the assistance provided by programme. The programme has also provided assistance to establish a labelling of the IPM/FFS products especially in Syria, where the MOA developed an IPM label to facilitate their marketing. The Mission feels a strong need for creating awareness among the traders as well as the consumers on the availability of clean and quality products from the IPM/FFSs for their purchase and consumption, respectively. One possible solution for this may lie in formation of IPM/FFS Farmers’ Groups or Associations, which could help them get better access to markets and better prices for their better quality products. Such IPM/FFS farmers’ groups/associations have been formed in Iran, Syria, Jordan and Morocco to look after their interests. In Syria, a Pistachio Farmers’ Association has been formed to help the pistachio farmers in production, processing and marketing of pistachio. However, policy interventions certainly are required

from the governments of the countries to facilitate access of farmers and their products to internal and export markets.

6.1.7 PRODUCT CERTIFICATION ISSUES

These issues have registered a slow progress. The IPM/FFS farmers may be encouraged to be introduced to the Global GAP certification especially for products to be exported. Thus, there is an urgent need for actions and assistance by governments or private institutions on the above-mentioned subject. This will immensely help IPM/FFS farmers in better marketing of their clean and quality products.

6.1.8 OTHER TECHNICAL ASSISTANCE PROVIDED

The programme provided technical assistance to IPM/FFSs and other organizations of the programme-participating countries, and also to UNDP (in Iran), NGOs, FAO (Iran, Lebanon, Palestine, Syria), and ICARDA (in Iraq) for conducting IPM and FFS- related activities. Furthermore, the Programme assisted the participating countries with baseline studies and surveys, assessments of the present situations with respect to the use of pesticides and fertilizers, and marketing problems in important horticultural crops relevant to the programme activities. These studies provided good insights into the practical problems associated with the production of the important horticultural crops, which were included in the programme activities, and helped in planning the programme activities in IPM/FFSs of different horticultural crops.

The programme also assisted the countries in in-country production of bumble bees (in Syria), bio-agents (in Iran) and bio-pesticides (in Syria and Egypt). In the first case, the programme recruited an international consultant to help in the local production of bumble bees. For production of bio-agents in Iran the local expertise was used, while for bio-pesticide production in Egypt assistance was provided in terms of support for restructuring of plastic house facilities at the Plant Protection Research Institute (PPRI) Institute in Ismailia Governorate.

6.1.9 INSTITUTIONAL COLLABORATION AND LINKAGES

The programme activities in most countries (9 out of 10) are coordinated by Plant Protection Departments of the MoA. In Mission's opinion, the programme (both the PMU and the NPCs) has made good efforts in encouraging and developing collaboration and linkages with other departments (i.e., Extension departments), crop bureaux and other agricultural institutions (research and educational institutions, NGOs, etc.) that deal with agriculture in the country. For this, a strong assistance was provided to all the countries by the RPC to develop a strategy for this through collaboration with NPCs. However, the national programme success has varied from country to country depending upon the country situation. Good success has been achieved in Iran and Jordan compared with Syria, Egypt and Lebanon, where there is certainly a need for better inter-institutional collaboration and linkages with other departments of the MoA and/or agricultural institutions, NGOs, private sector, etc. The plant protection departments which are coordinating the programme activities in nine out of 10 countries, however, have provided strong technical support to the programme. The Mission would also like to emphasize that both the groups of countries (old and new) would need a good continuous strategy support from the TSC in the PMU.

6.1.10 SUSTAINABILITY OF THE PROGRAMME ACTIVITIES BEYOND THE PROGRAMME DURATION

Sustaining the programme activities beyond the programme duration is important for harvesting the fruits of the programme and to expand its activities to other crops/production systems in different areas of a country. Based on Mission's discussions with different stakeholders of the programme, the Mission concludes the following:

1. The participating countries are very satisfied and happy with the programme activities and results and thus would like to sustain the programme activities beyond the actual programme duration.

2. Some countries have already extended and adopted the IPM/FFS approach in other crops/production systems through their own resources, whereas some countries are planning to extend its application to other important crops/production systems and are making budget provisions in their national plans to carry out the activities. However, they still need technical assistance and guidance from TSC/PMU to ensure good quality work and to develop long-term strategies.
3. Some countries, although very supportive of extending its use to other crops and production systems, did express the national budgetary limitations and thus requested that the programme be extended to at least more three years.
4. In Morocco, where the programme is only in the first year of operation, made a strong case of the usefulness of the programme and requested that the programme be certainly extended. Although the Mission did not visit the three other countries in this category, expects a similar response from them, namely, Algeria, Tunisia, and Iraq.

6.1.11 ISSUES IDENTIFIED FOR INCLUSION IN THE EXTENSION PHASE OF THE PROGRAMME

During visits and discussions with the participating farmers and facilitators of the IPM/FFS the Mission could identify certain technical issues that need follow up in the extension phase of the programme. These include: (i) use of tolerant/resistant varieties is an important component of IPM approach. During its field visits, a very little emphasis on this component was observed, (ii) crop diversification as plastic house IPM/FFS were organized in mostly mono-cropping situations without any crop rotations, (iii) training of farmers for the local seed production, (iv) encouraging graduate students to have these problems related to participatory extension and IPM, which has happened in Jordan, and (v) use of different varieties to capture variety x pest management approach interactions by using at any time a range of varieties, particularly and initially in vegetable crops, in both the control and the IPM field.

6.1.12 MONITORING AND EVALUATION

The IPM/FFS approach has been successfully demonstrated and popularized with a large number of farmers and trained personnel of the MoA and other institutions/organizations in the six countries which have participated in the programme since the beginning in 2004. However, the Mission, after visiting the IPM/FFSs and discussions with the participating farmers and officials of the MoA, feels that the adoption of IPM/FFS approach by the farmers at the national level has been at a pace slower than what one would have expected. There could be a number of reasons for this including lack of or limited support (including the policy support) from the MoA to expand its use in other crops/production systems in different areas of their countries. Thus, there is a good scope of finding out limitations for such a situation which would greatly help in understanding of the reasons for such a situation and also in finding a course of action that the national programmes could adopt in making it much more popular by a faster rate of adoption. An impact study was conducted by the programme using the programme database in 2008; an additional impact study is recommended for the near future, when the programme receives an extension with additional funding.

6.1.13 PUBLICATIONS

The programme has produced a number of publications in Arabic, English and Farsi languages. These publications include posters, booklets, and leaflets on problems in cultivation in different crops; the results of the IPM/FFS work in different crops, specific crop information at country level (baseline study), marketing studies of selected commodities, surveys of pest and natural enemies of particular crops and countries, etc. These publications are of good quality, attractive and provide information to interested stakeholders as well as farmers for their easy understanding. Although, the PMU has been very productive in preparing many publications in different languages used in the NE region, the Mission felt the need for PMU to produce some technical bulletins on different aspects of cultivation of different crops with which the IPM/FFSs are associated.

6.2 PROGRESS OF WORK AT THE REGIONAL LEVEL

6.2.1 REGIONAL ACTIVITIES FOR CAPACITY BUILDING

The programme through its activities has successfully : (a) strengthened the scientific expertise at the regional level through strengthening of the IPM/FFS approach, and the management of pests of specific importance such as *T. absoluta* and codling moth (*Carocapsa pomorella*), another major pest, exchange of experiences through scientific visits and training on specific aspects of crop production (grafting, etc), (b) strengthened capacity building among farmers through exchange of visits among countries, and special training programmes for farmers, (c) established linkages among the participating countries through establishing effective linkages with NPCs, publications of regional nature, communication system among regional IPM networks, and conducting training and information systems and continued monitoring on health and environment issues, and (d) developed an IPM database information system, and an excellent and dynamic programme website ([www.IPM-Near East.com](http://www.IPM-Near-East.com)).

6.2.2 PUBLICATIONS AT THE REGIONAL LEVEL

The programme has been active in producing different types of publications – manuals, bulletins, leaflets for use of farmers, achievements of the IPM/FFS project at the regional level and preparing summary documents of the programme activities as well as minutes of important meetings such as the Regional Annual Tripartite Meetings.

7. RECOMMENDATIONS

The Mission would like to make the following recommendations. The recommendations on the extension of the programme, assistance by the PMU in the extended phase, capacity building, institutional collaboration and linkages, marketing issues, sustainability of the programme beyond its duration, formation of farmers' groups/associations and recommendations of the regional nature are priority recommendations for the programme.

7.1 EXTENSION OF THE PROGRAMME

Considering the success of the programme, it is strongly recommended that the programme be further extended for a minimum of at least three years as highlighted earlier under Conclusions and Issues Identified.

The extension is required by the six countries which have participated in the programme since 2004 and have achieved significant progress in different activities. The extended phase would provide opportunity to these countries to further consolidate the on-going work on the following:

- Have opportunity to further intensify efforts on creating a greater awakening about the advantages of the IPM/FFS and to make it a popular participatory approach for solving farmers' problems at the local, governorate, national and regional levels. Help not only in greater sustainability of the programme activities after the expiry of the programme but would also help in expanding the use of the approach in other crops/production systems and in other areas.
- Help extend the IPM approach, combined with identification/development of suitable varieties to different crops exploiting the expertise built through the programme;

Similarly, the extension is essential for the other four countries that joined the programme in 2009 to provide them sufficient time to further carry on and strengthen the program which has made an excellent beginning. In fact, in Mission's strong opinion, it would be unfair to these countries if the programme would stop for them in 2011.

7.2 PROPOSED COMPONENTS OF THE EXTENDED PHASE

The extended phase should emphasize on the following aspects:

7.2.1 ASSISTANCE BY THE PMU IN THE EXTENDED PHASE.

The PMU should provide the need-based assistance to governments of different program-participating-countries in policy interventions to the IPM/FFS programme in (a) marketing, product certification, establishment of in-country facilities for specific subjects such as for local bumble bees production, or production of bio-agents and bio-pesticides, (b) facilitating and supporting the NPCs of the IPM/FFS programme through staff and logistic support, (c) supporting inter-departmental and institutional collaboration and institutionalization of the IPM/FFS approach, (d) actions to expand the use of IPM/FFS approach to different crops/production systems in their countries through large-scale training programmes for staff of the MoA, university staff, NGOs and farmers, (e) supporting sustainability of the IPM/FFS programme at the country levels by providing the needed financial and administrative support, and by helping to create a National Cell/Unit in the MoA of their countries for coordinating the IPM/FFS and other participatory programmes in agriculture, (f) greater efforts on creating awareness among farmers, consumers and traders and general public through the use of public media, (g) extending the present IPM/FFS into an integrated crop management (ICM)/FFS programme to further benefit the horticultural farmers of the Near East, and (h) establishing formal Regional Networks at the regional level. This could be done through establishing a RITSU in the PMU. Alternatively, an IPM Platform could be developed at the regional level. Exercise for such a new arrangement should be done in consultation with the member countries and FAO RNE Office and

Country Representations to prepare specific objectives, structure and operational modalities, institutional linkages and funding mechanisms. Similarly, the PMU may help program-participating in establishing a National Cell (Unit) in the MoA in each country.

7.2.2 CAPACITY BUILDING

Capacity building in the extended phase should emphasize on the following:

- Greater emphasis should be given to training activities and infrastructure strengthening of the national programmes associated with the IPM/FFS programme. These should include (a) training extension personnel of the MoA, (b) technical assistance in developing facilities and expertise by the MoA to facilitate production of local bumble bees at the country level, (c) technical assistance to the MoA for the establishment of facilities for in-country production of bio-agents and bio-pesticides, which are both important in IPM, either by the public or private sector.
- There is a need for greater exposure of IPM/FFS participating farmers in the IPM activities in other crops and areas. Visits to other participatory extension activities of other programme in the region such as participatory plant breeding (PPB) programmes to be organized because they could serve a useful purpose. In the same context, visits of IPM/FFS-participating farmers to the relevant vegetable and fruit breeding stations would be extremely useful. Thus, a greater emphasis on exchange of farmers visits at national levels.
- Since the IPM/FFS approach has proved its utility through the programme, the Mission would like to recommend to expose undergraduate and graduate students to IPM/FFS methodology and participatory approach in crop improvement and explore the possibility of its inclusion in the syllabus of two-year diploma course of technical schools and also of the agriculture undergraduate programmes in agricultural universities and institutes. ;
- Need to train at least one person for the participatory plant breeding in each country based on the interest and need of the country.

7.2.3 INSTITUTIONAL COLLABORATION AND LINKAGES

Presently, the programme at the country level is executed by the Plant protection Departments of MoA in nine of the 10 countries and by NCARE in Jordan. Although the programme NPCs and the RPC in different countries have made good efforts in encouraging and developing collaboration and linkages with other departments of MoA (Extension departments), crop bureau and other agricultural institutions (research, teaching, NGOs, etc.) that deal with agriculture in the country, much greater efforts are needed to strengthen institutional collaboration at the local and national levels to help achieve institutionalization of the project initiatives and its activities relevant to the five years plan of the respective MOAs. In particular, the Mission recommends that: (a) the extension staff of the MoA be more actively involved in the programme activities to facilitate the up- and out-scaling of the IPM and FFS approaches, (b) greater efforts should be made to involve the local and national NGOs, where possible, in the programme activities, (c) agricultural universities/educational institutes in agriculture should be involved in the programme activities, wherever possible, (d) better collaboration with ministries of health, education and economy is also recommended and would certainly add value to the programme outcomes, and (e) a National Cell (Unit) be created in the MoA in each country to develop strategy and coordinate the IPM/FFS and other participatory extension activities in each country; such a unit has already been established in Jordan and an IPM Council exists in Iran. Each country may examine its suitability and format with inputs from the PMU..

7.2.4 MARKETING ISSUES

The Mission recommends the following:

- A strong need for creating awareness among the traders as well as the consumers on the availability of clean and quality products from the IPM/FFSs for their consumption.
- Need for policy interventions by the government to facilitate access of farmers and their products to internal and export markets.

- Formation of IPM/FFS farmers' Groups or Associations to help them get better access to markets and better prices for their better quality products.
- Assistance from the government through establishment of facilities for routine analysis of pesticide residues in IPM/FFS products.
- Actions to raise the awareness (through newspaper, television etc.) of the consumers of the advantages of using IPM products.

7.2.5 TECHNICAL ISSUES

7.2.5.1 USE OF PESTICIDES.

The Mission would like to recommend the following:

- Routine analysis of the pesticide residues and of the nutritional values (vitamins, minerals, etc.) of the IPM products.
- Preparation of information on the classification of the commonly used pesticides according to certain parameters of safety, etc. for farmers' use to help ensure that only safer ones would be used in IPM/FFS programmes.
- A systematic study to quantify the reduced use of pesticides, especially methyl bromide as per the Montreal Protocol.

7.2.5.2 RECOMMENDATIONS FOR EFFICIENT IPM/FFSs.

- Use of pest-free transplants produced at the farm
- Use of pest-free containers
- Use of clean irrigation system
- Removal of weeds in and outside the planting area of the open fields and within 3 to 9 m of plastic houses
- Change of clothes and boots before entering to inspect plastic houses
- Use of grafted transplants on resistant stocks, when and where appropriate
- Use of pest-resistant/tolerant species or cultivars
- Initiation of programmes for rearing biocontrol agents for the important insects and diseases within the countries
- Introduction of biocontrol agents at the appropriate rate and timing
- Produce bumble bees locally to reduce their costs and timely availability

7.2.5.3 RECOMMENDATIONS FOR MINT IPM/FFS IN MOROCCO.

- Production of mint plants at the optimal growing conditions
- Use of light, colour and pheromone traps for monitoring and controlling mint pests
- Use of neem extract for controlling insect-pests of mint instead of the toxic insecticides used now
- Regular monitoring of the pest populations.

7.2.5.4 USE OF NEW TECHNICAL COMPONENTS IN THE IPM PACKAGE.

The Mission recommends that the following new technical components be included and evaluated in the IPM for different crops.

- **Use of different genetic materials** with resistance/tolerance. In the case of grapes and apples the Mission recommends the identification, introduction and evaluation of different genetic materials through IPM/FFSs programme (in collaboration with national agricultural research systems). Also, it would be very useful to re-evaluate the local varieties available in different areas and also have access to different genetic materials.
- **Crop diversification as additional component** is recommended considering the presently prevalent trend of mono-cropping in IPM/FFSs. It would be important to offset the risks associated with mono-cropping.

- **Exploitation of conservation agriculture** in managing important insects and diseases in IPM/FFSs. For example, use of broad-bed and furrow system of cultivation would be specially found useful for open-field vegetable crops such as tomato and mint.
- **Use of different varieties in IPM/FFSS** in vegetable crops be tested in both the control and the IPM fields. The use of mixtures especially in tomato is recommended to develop the most suitable varieties to fully exploit the advantages of the IPM approach.
- **Use of statistical design in IPM/FFS work.** The IPM/FFS farmers, in view of the Mission, are now ready to move a step further in experimenting to decide for themselves, for example, which practice(s) to use based on their own observations. For this, a further improvement in the IPM/FFS study will be to divide each of the two plastic houses or fields (the IPM and control) in two (better three) sections and to assign 2-3 farmers to each section where observations will be made using the current methodology but independently in each section. Such an approach has been used by the Iranian National Program in Kermanshah, which has already started the analysis of observational data using the FFS as replicates. This approach, in addition to the approach used in Kermanshah, will allow testing differences between FFSs by providing an estimate of experimental data. An advantage of adding this element is that it allows graduate students to use these data across locations and years for their theses without affecting the learning process of farmers.
- **Product certification issues.** The Mission strongly feels that urgent interventions/actions from governments/or private institutions are required by observing the rules and regulations of GLOBAL GAP or other useful certification models for adoption by farmers. This will immensely help IPM/FFS farmers in the marketing of their clean and quality products. It is important that these institutions are well recognized at the global level to issue the necessary certifications. They can also provide certain information to farmers on the characterization of the safety standards for the products.

7.2.6 SUSTAINABILITY OF THE PROGRAMME ACTIVITIES BEYOND ITS DURATION.

In Mission's opinion, it is important to sustain the project activities beyond the programme duration considering the progress made so far. The Mission recommends that:

- Discussions with the relevant ministries of different countries are initiated by the NPCs and the RPC and also the FAOR to convince of the advantages of the IPM/FFS and its potential for other crops and production systems.
- In the remaining period of the programme, certain budget provisions be made to facilitate its expansion to other crops/production systems.
- Intensify training programs on IPM/FFS to train as many extension staff of the MoA and other relevant ministries to facilitate adoption of the approach to other crops/production systems and areas in each country
- The program is extended to another phase of three years to further intensify the efforts to make it a popular participatory approach for solving farmers' problems.

7.2.6.1 NEED FOR FORMATION OF FARMERS' GROUPS/ASSOCIATIONS.

The Mission believes feels that there is a strong need to empower the farmers by formation of IPM/FFS Farmers' Groups or Associations through which they may be able to organize themselves and get better market accessibility and prices for their better quality products. The Mission recommends that the programme provide guidance to farmers in the formation of IPM Farmers' Groups/Associations for different crops. Such an activity has already occurred in Jordan and to limited extent in Syria (as Pistachio Farmers' Association under the guidance of the Pistachio Bureau).

7.2.6.2 MONITORING, EVALUATION AND IMPACT STUDY

The Mission, after visiting the IPM/FFSs and discussing with the participating farmers and officials of the MoA, feels that there exists a good scope of monitoring the progress of work through a systematic constraints analysis, which would help in better understanding of the reasons for such a situation and

finding a course of action that the national programmes could adopt in making it much more popular by a faster rate of adoption. In this context, the Mission feels that there is a strong need to initiate a systematic impact study similar to the one which was done by the PMU in 2008 and recently initiated in Jordan.

7.2.6.3 PROGRAMME PUBLICATIONS

It is recommended that (a) the programme should now prepare and print bulletins on production problems of different IPM/FFS crops, e.g., tomato, cucumber grapes, apple, etc., and (b) the NPCs now prepare scientific articles for highlighting the IPM/FFS achievements including the economic analysis and their implications in their countries and the Near East Region. This will also help provide visibility to the programme.

7.2.6.4 RECOMMENDATIONS FOR THE REGIONAL ACTIVITIES

The Mission recommends strengthening of the following aspects of the Regional programme: (a) strengthening scientific expertise at the regional level by organizing regional level training courses on IPM/FFS and management of specific pests and exchange of experiences through scientific visits, (b) putting greater efforts on farmers' capacity building through exchange of farmers' visits to other countries, special training programmes for farmers on IPM/FFSs, IPM and crop production aspects, and training on specific aspects of crop production such as training on grafting in tomato, (c) establishing formal regional linkages among the participating countries through developing formal Regional Networks on different aspects of IPM/FFS work in the region with countries taking the coordination role depending upon their strengths, and (d) initiating organization of study tours for the policy makers (high officials from the Prime Minister's office, ministries of planning, agriculture - plant protection and extension and national agricultural research organizations of each country) to countries which have made extra-ordinary progress in the use of IPM/FFS. The Mission recommends that such a study tour be organized for the policy makers of Syria to Iran, which has made an extra-ordinary progress in expanding the use of IPM/FFS approach in different crops.

7.2.6.5 NEW RESEARCH PROJECT PROPOSALS.

The Mission recommends the following new project proposals related to IPM/FFSs and as a result of the outcomes of the Programme. These projects will support the special activities of the programme.

- a. Monitoring the progress of the IPM/FFS work through a systematic constraints analysis. This will help in understanding the reasons for slow progress in popularization of the IPM/FFS work and deciding a course of action to make the IPM/FFS approach more popular through actions that would result in faster rate of adoption. In this context, a systematic impact study would also be carried out. Management of post-harvest associated with food safety and waste problems;
- b. Assess and eventually support, where needed and possible, in-country production of beneficial bumble bees, bio-agents and bio-pesticides production facilities; and
- c. Study of policy issues relating to providing subsidies on activities associated with IPM/FFSs.

Annex I. IPM Control Methods Used by IPM/FFS farmers in Tomato, Apple and Grape in Syria

Crop	Common and/or Scientific Name of Pests	Control Methods			
		Cultural	Physical	Chemical	Biological
Tomato	Leaf worms - <i>Chrysodeixis chalcites</i> - <i>Plusia gamma</i>	Cut infested leaves, leave them overnight and collect & kill the larvae found in the next morning	Remove infested plant parts	None	<i>Bracon</i> sp. (Hymenoptera: Braconidae) for larva <i>Trichogramma principium</i> (for eggs)
	Fruit worms - <i>Helicoverpa armigera</i> Lepidoptera	Collect infested fruits, burn or bury them in deep holes (more than 30 cm deep).	Remove infested fruits	None	<i>Bracon</i> sp. (Hymenoptera: Braconidae) for larva. <i>Trichogramma principium</i> (for eggs)
	Tomato leaf miner, <i>Tuta absoluta</i> (Meyrick), Lepidoptera: Gelechiidae	None	Remove infested plant parts Use of muslin cloth in plastic house, Use light traps.	Pheromone traps	<i>Trichogramma achaeae</i> , Hymenoptera: Trichogrammatidae, Egg parasitoid of <i>T. absoluta</i> Nesibug, <i>Nesidiocoris tenuis</i> , Heteroptera: Miridae
	Sweet potato whitefly, <i>Bemisia tabaci</i> Genn., Homoptera; Aleyrodidae	Use resistant varieties such as var. Jolnar	Muslin cloth, Plastic net Remove infested plants	Neem extract (Azadirachtin or Azadirachtin)	<i>Eretmocerus mundus</i> Mercet, Hymenoptera: Aphelinidae. <i>Encarsia formosa</i>
	Spider mites, Tetranychids	None	None	If the predator is not available use acaricides such as Pyroba	<i>Phytoseiulus persimilis</i> Athias-Henroit, Acari: Mesostigmata: Phytoseiidae
	Rust mites, <i>Eriophes</i> sp.	None	Remove infested plant parts	Sulfur as hot spot spray	None
	Root-knot nematodes, <i>Meloidogyne</i> spp.	Grafting on tolerant rootstocks	Soil solarization		<i>Trichoderma</i> spp. Plant oily radish for one month, plough it with the soil and cover the soil with plastic sheets for one month
	Soil fungal diseases	Grafting on resistant rootstocks	Soil solarization		<i>Trichoderma</i> spp., Soil Fungi - opportunistic avirulent plant symbionts
	Foliage fungal diseases	None	Remove infested plant parts for late blight and grey mold	Sodium Bicarbonate +oil for controlling powdery mildew disease	<i>Trichoderma</i> spp.; A solution for controlling grey mold disease
Apple	Aphids	None	Remove infested shoots	Neem extract	<i>Chresopyrta</i> spp., Aphid lions (Green lacewing), Neuroptera: Chrysopidae
	Woolly apple aphid, <i>Eriosoma lanigerum</i> Hausmann, Homoptera: Aphidae	None	Pruning for removing infested shoots	Hot spot spray	<i>Aphelinus mali</i> Haldemann, Hymenoptera: Eulophidae. <i>Chresopa</i> sp., Aphid lions (Green lacewing), Neuroptera: Chrysopidae
	Codling moth, Apple maggot, Apple worm, <i>Carpocapsa</i> (<i>Cydia pomonella</i> L., Lepidoptera: Tortricidae	None	Cartoon traps for removal of hibernating larvae Removal of infested fruits.	Sex pheromone traps, Insect growth regulators (IGRs)	<i>Trichogramma cacaeciae</i> , Hymenoptera: Trichogrammatidae, Egg-parasitoid
	Apple stem borer, Leopard moth, <i>Zeuzera pyrina</i> L., Lepidoptera: Agonoxenidae	None	Mechanical. Removal of infested shoots, Use metallic iron to kill the larva inside the tunnel	None	None
Grape	Grape berry moth,	None	Removal of infested fruits.	Sex	<i>T. cacaeciae</i> (eggs'

	<i>Paralobesia viteana</i> Clemens, Lepidoptera: Tortricidae			pheromone traps, IGRs	<i>parasitoid</i> <i>B. brevicornis</i> (<i>larvae parasitoid</i>)
	Aphids	None	Removal of infested shoots	Neem extract	<i>Chrysoperla</i> spp.
	Root borers, <i>Capnodis</i> spp, Coleoptera: Buprestidae	None	Collecting adults in early morning. Put metallic sheet around the tree trunk at the soil surface to collect the eggs	Spray the base of the tree when the eggs hatch	Use parasitic nematodes
	<i>Psylid</i> spp.	None	None	Using IGR	<i>Chresopa</i> sp., Aphid lions (Green lacewing), Neuroptera: Chrysopidae

Annex II: IPM Control Methods Used by IPM/FFS farmers in tomato in Jordan

Common and \ or Scientific Names of Pests	Control Methods		
	Cultural	Physical	Chemical
Powdery mildew, <i>Erysiphales</i> fungal spp.	Removing infested plants or plant parts		Hot spot spraying
Tomato early blight, <i>Alternaria solani</i>			
Tomato late blight, <i>Phytophthora infestans</i>			
Tomato fruit rot, <i>Anthracnose</i>			
Tomato wilt/root rots, <i>Fusarium</i> , Soil fungi			
Tomato leaf miner, <i>Tuta absoluta</i> (Meyrick), Lepidopter: Gelechiidae			Pheromone traps
Sweet potato whitefly, <i>Bemisia tabaci</i> Genn., Homoptera; Aleyrodidae	Grafting on resistant stocks		
Yellowing	Water regulation	Soil solarization	Eleviating N or Fe deficiency

Annex III: IPM Control Methods Used by IPM/FFS' Members in Morocco

Crop	Common and \or Scientific Name of Pests	Control Methods			
		Cultural	Physical	Chemical	Biological
Mint	Leaf worms <i>Chrysodeixis chalcites</i> ; <i>Spodoptera littoralis</i> ; <i>Heliothis armigera</i>			Pheromone traps	<i>Bacillus thurugiensis</i>
	Cut worm, <i>Agrotis ipsilon</i>			Lambda – cyaholtrin	
	Snails		Hand collection		
	Brown rust disease, <i>Puccinia menthae</i>			Sulphur, Azoxytrobine, Mancozeb	
	Powdery mildew, <i>Erysiphe cichoracearum</i>			Tebuconazole	
	Wilt disease, <i>Verticilium dahlia</i>	Hand-picking, Proper irrigation			
	Weeds, <i>Poa annua</i> , <i>Convolvulus sp.</i>			Bentazone	
Tomato	Tomato leaf miner, <i>Tuta absoluta</i> (Meyrick), Lepidopter: Gelechiidae	Healthy transplants, Removal of infested plant parts	Use of plastic net	Pheromone traps	<i>Bacillus thurugiensis</i>
	Sweetpotato whitefly, <i>Bemisia tabaci</i> Genn., Homoptera; Aleyrodidae	Resistant varieties	Yellow traps	Abamectin, Thiometoxam	
	Tomato eryiophid mite, <i>Aculops lycopersici</i> , Eyiophidae	Removal of infested leaves		Spot treatment with sulphur, abamectin or maltodextrin	
	Brown rot disease	Removal of infested leaves		Spot treatment with sulphur or cupper compounds	
	Powdery mildew	Removal of infested leaves		Treatment with sulphur or azoxistrolonene	

Annex IV. List of persons visited by the Mission in the five countries (Syria, Jordan, Morocco, and Lebanon)

Country	Name	Designation and Organization	Contact telephone and email
Syria	Ms. Silvia Marrara	First Secretary, Embassy of Italy, Damascus	Tel: +963 11 3338338 Email: silvia.marrara@esteri.it
	Mr. Paul Gasparini	Commercial Secretary, Embassy of Italy, Damascus	Tel: +963 11 3338338 Email: paul.gGasparini.est@esteri.it
	Dr. Abduulla Tahir Bin Yehia	FAO Representative FAO, Damascus	Tel: +963 11 6132920 Email: Abduulla.BinYehia@fao.org
	Dr. Alfredo Impiglia	Regional Programme Coordinator, FAO RIPM Programme, Damascus	Tel: +963 11 44676231 Email: a.impiglia@IPM-Near East.com
	Dr. Abdulhakim Mohammad	Director, Directorate of Plant Protection, MARA, Damascus	Tel: +963 11 2220187 Email: dppsyria@aloola.sy
	Mr. Mohammed Al Sayed	National Programme Coordinator, FAO RIPM Programme, Syria	Tel: +963 11 4467595 Email: me.sayed.955@hotmail.com
	Mr. Hassan Issa Baddour	Director, Dept. of Agric. & Agrarian Reform, Lattakia, Syria	Tel: +963 41 231070/071
	Mr. Hassan Ibrahim	Office Manager of Pistachio Bureau, Hama	Tel: +963 33 3388010 Email: d.m.ibrahim@mail.sy
Jordan	Ashraf Al Hawamdeh	National Programme Coordinator, FAO RIPM Programme, Jordan	Tel: +962 6 4726206 Email: ash_agri@yahoo.com a.alhawamdeh@ncare.gov.jo
	Nahyel Kawalit	Head, Extension Dept. Ghor Safi directorate, MoA, Jordan	Tel: +962 79 5884664 Email: nayel2005@yahoo.com
	Faisal Al Awawdeh	Director General, National Centre for Agricultural Research and Extension (NCARE), Amman	Tel: +962 26 4726680 Email: director@ncare.gov.jo
	Faisal S. Al Barakeh	Deputy Director General, NCARE Amman	Tel: +962 6 472071 Email: faisal_barakeh@yahoo.com
	Naem Mazahrih	Irrigation Researcher, NCARE, Central Jordan Valley, Jordan	Tel: +962 5 3573003 Email: naemm@yahoo.com
	Ms. Feda Rawabdeh	Head, Dept. of Plant Protection, MoA	Tel: +962 79 906 3294
	Ahmed El-Miniawy	Representative, FAO Jordan	Tel: +962 6 5627219 Email: fao-jo@fao.org
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	Amal Nahhas	Asst. Manager, ARABIA IPM, Amman	Tel: +962 6 5666104 Email: amal@russelipm.net
	Fadel El-Zubi	Head, FAO – Iraq and Senior Programme Coordinator, Amman	Tel: +962 6 5562550 Email: fadel.elzubi@faoiraq.org
	Nakd Khamis	Project Manager, FAO-Iraq	Tel: +962 6 5562550 Email: Naked.Khamis @faoiraq.org
	Ibrahim K. Nazer	Professor, Faculty of Agriculture, University of Jordan, Amman	Tel: +962 6 5355000 ext. 22536/22513 Email: nazer@nets.com.jo
	Dr. Ahmed Katebh	Professor & Insect Taxonomist, Faculty of Agriculture, University of Jordan, Amman	Tel: +962 77 749 0803

	Dr. Ibrahim Y. Hamdan	Executive Secretary, AARINENA, c/o ICARDA, Amman	Tel: +962 6 5525750 Email: i.hamdan@cgiar.org
Iran	Mr. Farshid Karkudi	Provincial IPM/FFS Coordinator, Kermanshah province	Tel: +98 918 389 2954 Email: fkarkodi@yahoo.com
	Mr. Aydin Yassemi	Consultant, Marketing	
	Mr. Azizi	Manager of the Dalahoo Office of Agriculture	Tel: +98 918 830 7984 Email: shapormansori@yahoo.com
	Eng. Ramezan Roointan	Director, Jihad-e Agriculture Organization, Kermanshah province	Tel (Mob): +98 918 131 6051 Email: rroeintan@kermanshah.maj.ir, gholamreza.rostami@ymail.com
	Mr. Farzad Jalilian	Facilitator of Central IPM/FFS Sites for Orchards and Field Crops, Kermanshah province	Tel: +98 918 359 6618 Email: jalilif2002@yahoo.com
	Dr. Afshen Safavi	Director of Crop Protection, Jihad-e Agriculture Organization, Kermanshah Province	Tel: +98 918 832 1507 Email: afsafavi2001@yahoo.com
	Mr. Akbari	Deputy Director of Crop Protection, Jihad-e Agriculture Organization, Kermanshah province	Tel: +98 918 832 1507
	Mr Hossein Heidari	National Programme Coordinator, FAO RIPM Programme, Iran	Email: hheidari_2000@yahoo.com
	Dr. Rasoul Marzban	Director, Dept. of Crop Protection, Ministry of Agriculture, Tehran	
Morocco	Ms. Mariam El Akel	National Programme Coordinator, FAO IPM Programme, ONSSA, MoA, Rabat	Tel: +212 5 37676577 Email: mariamakel@gmail.com
	Ms. Assmaa Louriki	Entomologist, Sante Vegetaux et Protection Integree des Cultures, ONSSA, MoA, Rabat	Tel: +212 5 37676573 Email: assmalouriki@gmail.com
	Mr. Rahel Mohammed Amal	Head, Division de la Protection des Vegetaux, ONSSA, MoA, Rabat	Tel: +212 5 37676536 Email: rahelamal@hotmail.fr
	Dr. Mohammed El Belkacemi	Director, Direction des Controles et de la Protection des Vegetaux, ONSSA, MoA, Rabat	Tel: +212 5 376728 Email: Elbelkacemi.mohamed@gmail.com Mohammed.elbelkacemi@onssa.gov.ma
	Mr. Moha Bouchabcheb	Director, Regional de l'ONSSA, Chaouia-ouardigha et Doukkala-Abda, Settat	Tel: +212 523 403781 Email: bchebm@hotmail.com
	Mekki Chouibani	Head, Dept. of Plant Protection, ONSSA, MoA, Rabat	chouibani@gmail.com
	Andre' Hupin	FAO Representative, Maroc	Tel: +212 5 537654308/38 Email: Andre.Hupin@fao.org
Lebanon	Dr. Ali Moumen	FAO Representative, Republic of Lebanon	Tel: +961 5 924005/6/7 Email: ali.moumen@fao.org
	Ms. Solange Matta Saade	Asst. FAO Representative, Republic of Lebanon	Tel: +961 5 924005/6/7 Email: solange.mattasaade@fao.org
	Mr. Georges Nahri	Asst. FAO Representative (Admin.), Republic of Lebanon	Tel: +961 5 924005/6/7 Email: georges.nahri@fao.org
	Ms. Maria-Louise Hayek	Programme Clerk, FAO, Republic of Lebanon	Tel: +961 5 924005/6/7 Email: marielouise.hayek@fao.org

	Mr. Imad nahhal	National Programme Coordinator, FAO RIPM, Republic of Lebanon	Tel: +961 1 849639 Email: imadn@terra.net.lb
	Ms. May Mezher	Agronomist, Specialist Rural Development and Kiwiculture, Republic of Lebanon	Tel: +961 1 830682 Email: mezherm@hotmail.com
	Ms. Majida A. Mcheik	Consultant, Istituto per Cooperazione Universitaria-Onlus (ICU), Republic of Lebanon	Tel: +961 1 449781 Email: iculiban@inco.com.lb
	Dr. Sameer El Chami	Director General, MoA, Republic of Lebanon	Tel: +961 1 841333 Email: samirelchami@yahoo.com
	Mr. Fabio Melloni	Director, Development Cooperation Office, Embassy of Italy, Beirut, Republic of Lebanon	Tel: +961 5 451406/494 Email: Fabio.melloni@esteri.it
	Mr. Dany Lichaa El-Khoury	Project Manager, Strengthening Production and Marketing of Lebanese Agricultural Products, FAO Representation, Beirut, Republic of Lebanon	Tel: +961 5 924005/6/7 Email: dany.lichaa@fao.org

ANNEX V. Itinerary for the EE Mission members for evaluation of the Regional Integrated Pest Management Program in Near East

20 February 2011: Travel to Syria

21 – 24 February: Visit the Syrian national program activities

25 February 2011: Travel from Syria to Jordan

26 – 28 February: Visit the Jordanian national program activities

01 March 2011: Travel from Jordan to Iran

02 – 05 March: Visit the Iranian national program activities

06 March 2011: Travel from Iran (Dr. Ceccarelli)/Jordan (Drs. Beniwal and Naeem) to Morocco

07 – 09 March: Visit the Moroccan national program activities

10 March 2011: Travel from Morocco to Lebanon (only Drs. Ceccarelli and Beniwal) or travel from Morocco to Jordan (Dr. Na'im)

11 – 12 March: Visit the Lebanese national program activities

13 March: Travel from Lebanon to Syria (Drs. Ceccarelli and Beniwal)

13 – 14 March: Finalize the Aide Memoire

15 March: Discussion with FAO Officials

16 March: Travel back to respective destinations (Drs. Ceccarelli and Beniwal)

ANNEX VI. Terms of Reference for the Consultancy



Food and Agriculture organization of the United Nations

Terms of Reference for Consultant/PSA

Name: Mr Surendra BENIWAL	
Job Title: Consultant for the External Evaluation of the FAO Regional IPM Programme in the Near East and North Africa	
Division/Department: RNERD	
Programme/Project Number: GTFS/REM/070/ITA	
Location: Syria, Jordan, Iran, Morocco and Egypt	
Expected Start Date of Assignment: 22 February 2011	Duration: 23 days
Reports to: Name: Mr Reza NAJIB	Title: Field Programme Officer

General Description of Task(s) and Objectives to be achieved

The evaluation team will in particular review the following aspects:

Local

- Relevance of the Programme to the needs of the target group(s) including gender considerations and the environment;
- Clarity, quality, and adequacy of the design of local interventions in the light of identified needs, critical constraints facing fishing communities, and local conditions;
- Development of local capabilities; and
- Capacity of local communities to participate in planning and development.

National

- Extent to which the Programme is integrated into national development programmes;
- Relevance of the Programme to partner Government priorities;
- Learning from local-level development initiatives and informing the policy formulation process at national level;
- Supporting changes at the policy and institutional levels in participating countries to address food security and sustainable utilization of the Integrated Pest Management; and
- National staff capacity building.

Regional

- Extent to which the Programme is liaising with the FAO HQs, regional, sub-regional and country Offices, as well as other relevant FAO projects;
- Relevance of the Programme to Regional Institutions;
- Learning from pilot activities, and sharing lessons and methods among project countries.

Further sustainability

- Institutionalization of the IPM approach within respective national programmes;
- Participatory learning methods based on empowering rural farmers through farmer field school approach;
- Consolidating and strengthening capacity building on IPM and FFS;
- Developing a comprehensive strategy that integrates pesticide risk reduction, empowerment and livelihoods, and sound chemicals management to achieve sustainable production intensification.

Program Strategy and Design

- Clarity and logical consistency between inputs, outputs, activities, and progress towards achievement of objectives (quality, quantity, and timeframe); and

- Advantages and limitations of a participatory process-approach to development. The team will review the results that the approach has produced. It will assess the validity of the overall approach and, on the basis of its results, its value for replication.

Overarching Strategic Issues

- The mainstreaming of gender and environmental concerns;
- The promotion of equity and ownership of the change process by the various stakeholders; and
- The development of partnerships at all levels, from micro to local to national and global, to mobilize the necessary resources for development.

Project efficiency

Overall efficiency of Programme management and implementation, including:

- Adequacy in the formulation of work plans by the Programme;
- Availability of funds as compared with the budget;
- Managerial and work efficiency;
- Extent to which the Programme has been adequately supported by the partner country Governments, the donor Government, and FAO during its implementation;
- Implementation progress, especially in producing target outputs (including their quality), and in involving target beneficiaries in Programme activities; and
- Adequacy of monitoring and reporting.

Performance, Management & Budget

- Realism, adequacy, and clarity of the institutional relationships, management and institutional framework for implementation of the work plan.
- Factors which have promoted or impeded the effectiveness and efficiency of Programme implementation, including the availability of human resources and direct participation of the beneficiary group;
- Achievements of results will be assessed on the basis of a review of Programme outputs; and
- The cost-effectiveness of the Programme in terms of the results achieved and the activities implemented according to the budget frame of the Project and, at community level, the cost-effectiveness of the IPM crop production

Based on the above analysis the mission will draw specific conclusions and make proposals for any necessary further action by Government and/or FAO/donor to ensure sustainable development, including any need for additional assistance and activities of the project prior to its completion. The mission will draw attention to any lessons of general interest. Any proposal for further assistance should include precise specification of objectives and the major suggested outputs and inputs.

The mission will especially focus on the status and quality of planned (and unplanned) work on:

- Curriculum development for horticulture IPM training, including development of ecological production guides and training manuals;
- Training courses, Farmers Field Schools, and field study activities in support of IPM training;
- Capacity development for post-FFS activities initiated, managed and 'semi and self-financed' by farmers;
- Innovation, regional exchange and training with regards to ensuring that the technical IPM options and methods explored in training programmes remain valid and up to date with today's changes in development of horticultural production and protection systems;
- Innovation, regional exchange and training with regards to new planning, implementation, action research, impact assessment and M&E methods being explored and integrated in the programme's ongoing work;
- Gender-sensitive planning and programme implementation;
- Strengthening the abilities of local and national staff in planning, organizing and managing IPM programmes;
- Regional networking for programme planning, implementation and evaluation;
- Assistance to member countries with regards to policy reform for pest and pesticide management;
- Development of frameworks and mechanisms to ensure the sustainability of regional exchange and co-ordination, including that beyond immediate FAO support.
- Progress towards sustainable impacts including for: previous and ongoing training; national capacities; IPM approaches in horticulture at technical and policy level.
- Management and organisational structure (effectiveness and efficiency)
- Governments support to the Programme
- Budget analysis

The mission will also assess whether the strategic approach of the project is efficient, and whether adaptations would need to be made to reflect a changing context. The project is making use of the capacity earlier created in the project to start activities in the new member countries. Their experiences and perspectives should be reflected in the evaluation report. The mission will identify the main achievements of the project, the key lessons learned, and will make a set of detailed comments and recommendations on possible further actions to sustain and expand project results.

Expected Outputs:

- Mission report
- Completed FAO Project Evaluation Questionnaire

Required Completion Date: