GTFS/REM/070/ITA

Regional Integrated Pest Management (IPM) Programme in the Near East

HISTORY OF IPM/FFS IN IRAN

By:

Hooman Fathi, Hossein Heidari, Alfredo Impiglia, Marjon Fredrix

Web: www.ipm-neareast.com

Email: info@ipm-neareast.com

History of IPM/FFS in Iran

By:

Hooman Fathi, Hossein Heidari, Alfredo Impiglia, Marjon Fredrix

August 2011

History of IPM/FFS in Iran

Table of Contents

ABBREVIATIONS

AESA	Agro-Ecosystem Analysis
APERI	Agricultural Planning and Economic Research Institute
FAO	Food and Agriculture Organization of the United Nations
FFS	Farmers Field School
MOJA	Ministry of Jihad-e Agriculture
GEF/SGP	Global Environment Facility/Small Grants Programme
GTFS/REM/070/ITA	Regional Integrated Pest Management Programme in the Near East
IPM	Integrated Pest Management
IGRA	Institute for Green Rural Advancement
MRL	Maximum Residue Level
SMLWR	Sustainable Management of Land and Water Resources
NPPRI	National Research Institute of Plant Protection (also abbreviated as IRIPP)
NGOs	Non-governmental Organizations
TCP	Technical Cooperation Project
TOT	Training of Trainers
UNDP	United Nations Development Programme

History of IPM/FFS in Iran

1. INTRODUCTION

The present paper overviews the introduction of IPM/FFS approaches in the Islamic Republic of Iran from a historical perspective. It describes how within one decade this approach gained momentum to become a mainstream research, extension, and plant protection strategy in the country. The paper briefly describes the pilot projects which were instrumental in this process. These pilot projects, supported by national and international institutions, provided the basis for introducing the science, policy, and human resource capital for development of IPM/FFS in Iran. Notably, two projects, one implemented under the auspices of the FAO Regional IPM Programme and the other supported by GEF/SGP, widened the horizons for IPM/FFS in the country. In particular, the FAO Programme created a national capacity in IPM/FFS as an efficient approach for sustainable agriculture.

The paper heavily draws from the experience of the authors working directly with many of the international and national projects and institutions involved in promoting IPM/FFS in the country. The paper does not focus on describing the principles and process of IPM and FFS in Iran, as they are addressed in two subsequent papers.

2. THE SETTING BEFORE THE IPM/FFS

Since the first National Plant Protection Congress (Karaj, 1968), where one of the earliest references to IPM in Iran can be traced, the need to introduce IPM has been a recurrent theme in all forums related to plant protection in Iran. In practice, however, the authors did not find any documented cases of farms managed using the principles of IPM until the late 1990's, when the FFS approach was first introduced to Iran.

In the inaugural session of the 13th National Plant Protection Congress (1998), the then Minister of Agriculture stated that: "*It is a loss if we do not look at all the elements on the farm in a holistic manner. Pest is not isolated from machinery neither is machinery from irrigation and irrigation from the farmer…This [holistic view] should be considered carefully in laying the foundation of Integrated Field Management (IFM)*".

In the same Congress, a symposium was dedicated to IPM. The Congress concluded that: "*There is a need to a national IPM Strategy for implementation of IPM programmes by the Government. This requires close cooperation between the research institutions and the Extension Service for developing and supporting appropriate*

technologies for pest-predator management. The farmers should also be trained as experts of their own farm. The farmers should be the center of the IPM programme. Parallel to the introduction of these policies, measures should be taken to discourage excessive or improper use of pesticides".

An interesting article presented in the 13th Congress introduced the findings of a research on integration of pest control with plant nutrition in mango using IPM methods. The research, conducted in Hormozgan Province, had yielded very promising results. It was, however, applied only on one hectare of mango plantation and never extended to a larger scale. Furthermore, a combination of various methods like releasing parasites, winter oils, pheromone traps for mating disruption, was tested in another research in seven selected pilot orchards in Urumieh. This study, too, was never translated into practice, because there was no mechanism at hand to secure the farmers' involvement.

Most of the similar research cases, pilot works, and even versatile programmes of the Government, such as the large ambitious Programme for Reduction of Pesticides Use, failed to make an impact. The latter Programme put specific crops or pests in the center or attention, but overlooked overall pest management and the central role that farmers play in it. The Second Five year National Development Plan mandated the Government to gradually reduce heavy subsidies paid to farm inputs. The plan anticipated a 35 percent reduction in pesticides use over five years. In the annual breakdown of the said Plan, about three percent (up to four million US dollars) of the total subsidies on chemical fertilizers and pesticides was allocated to Ministry of Agriculture to strengthen research, extension and operational work on reducing the use of pesticides through biological control, plant nutrition and other sustainable alternatives.

Accordingly, a High Council for Pesticides and Chemical Fertilizers Use Reduction was set up at the Ministry of Agriculture in 1994, as a first major system-wide attempt to reduce and optimize the use of the chemical inputs in the country. Under this High Council, three Committees were set up as Research Committee, Planning and Coordination Committee, and Operation and Extension Committee. Provincial Pesticide Reduction Committees were established under the Operation and Extension Committee.

A fairly inclusive set of goals and policies were adopted for this Council and its subsidiary committees. The programmes implemented by the Council, however, largely focused on substitution of chemical micronutrients, propagation and release of biological agents (mostly on rice), and improvement of pesticides management.

The High Council and it committees benefited from political support at the highest level, and a sizable annual budgets for its national and provincial activities for several years. The authors, however, could not find any documents on assessment of its impacts, or on any strategy sought by the Programme for empowerment of the farmers.

The National Programme implemented under the High Council of Pesticides and Chemical Fertilizers Reduction spent significant funds for propagation of biological agents. According to a time schedule, in the first few years, the propagated agents were released on the fields free of charge, with assumption that the farmers will start paying part of the costs in the later years. This assumption, however, did not come true and the Programme in its last years started looking for approaches to involve farmers. In this context, a study was approved in 1997 to test IPM/FFS on rice at pilot level. The FAO,

through GIF, fielded an Indonesian IPM/FFS expert to help in organizing pilot FFS sites in Mazandaran Province. Due to logistics issues, however, the presence of the FAO expert lasted just too months and the activity died at its inception stage.

3. IPM/FFS PILOT PROJECTS DURING 1999-2009

3.1 Damghan Pistachio Project: The first IPM/FFS site set up in Iran; 1999-2001

In May 1999, the Semnan Agricultural Organization requested the National Plant Protection Research Institute (IRIPP) to help in controlling two surging pests on the Provinces main crops: Psylla on pistachio and the melon fly on summer crops. Preliminary investigations showed the inefficiency of chemical control. The IRIPP recommended the application of IPM/FFS approach. As the use of this approach was unprecedented in the country, it was agreed to set up in Damankooh region of Damghan Township to test the applicability of the IPM/FFS approach in addressing the problem. The site included a group of 25 farmers, representing the farmers of nine villages. The FFS activity, facilitated by the researcher from the Biological Control department of IRIPP, went on for two successive seasons and it led to full removal of the surging pest problem in the pistachio orchards of the participating farmers. The results were welcomed by the provincial authorities. The IPM/FFS site was also visited by the national authorities of the Ministry of Agriculture and other relevant institutions.

3.2 The Garmsar Plain Irrigation Improvement Project (1997-2002)

The National Action Plan (NAP) for Sustainable Management of Land and Water Resources (SMLWR) was initiated in 1997 by the Ministry of Agriculture, with financial support of UNDP on 1.2 million hectare Hable-Rud watershed as a pilot study area. A main objective of the Programme was to develop appropriate methods for sustainable management of land and water resources, community participation and empowerment, and unsustainable planning and policy making.

A major component of the Programme was the "Garmsar Plain Irrigation Improvement Project', implemented by the Agricultural Planning and Economic Research Institute (APERI), with technical backing of the FAO. This project utilized the IPM/FFS approach at the pilot level in the Garmsar plain in 2001-2002 on wheat (for Sunn pest *Eurygaster integriceps*), barley and melons (for melon fly, *Bacterocera sp*.). The participating farmers were empowered to use alternative pest control methods and conserve the natural enemies, and protect themselves from pesticide exposure.

In the case of melon fly, the frequency of pesticide treatment was reduced by the participating farmers from more than 16-32 times per season to zero.

The FFS farmers also learned how to test alternative irrigation methods by comparing different lengths of furrow, and depth of water application, to increase yields while reducing water use. This pilot activity, too, demonstrated the validity of the approach with farmers significantly reducing their pesticide use and identifying more efficient water management practices.

Alumni of this FFS continued to meet and conduct their experiments even after the completion of the project.

Encouraged by the results of the pilot work, the second phase of the Land and Water Programme, adopted an operational plan for scaling up, with technical support of the FAO, the FFS activity in Hableh Rud basin, including the establishment of 100 FFS sites on improving soil, water and pest management practices; and 50 FFS on rangeland management practices.

3.3 The Project for Farmers' Empowerment towards Sustainable Agro-ecosystem Management in Rice Fields' in Ferydoonkenar (2002-2010)

In 2002, the UNDP/GEF/SGP) launched a project in Sooteh Village, Mazandaran Province called 'Farmers' Empowerment towards Sustainable Agro-ecosystem Management in Rice Fields'. The project, implemented through the Institute for Green Rural Advancement (IGRA), aimed at empowering the farmers to adopt alternative crop management techniques such as participatory IPM to eliminate excessive use of pesticides.

The Siberian crane, the third rarest species of crane in the world, over-winters in the nearby seasonal wetlands in the Caspian Sea area. The project has contributed to its conservation by introducing eco-agricultural practices to the area and reducing the quantity of dangerous pesticides entering the environment.

The first FFS group comprised of 26 farmers. Later on, they passed their knowledge on to around 1,600 additional farmers. The pesticide use decreased by 60-80%. Compost replaced about 50 percent of the chemical fertilizers, while crop production on the pilot site rose by about 17-25% and the FFS farmers saved an average of $200/ha from decreased seed and pesticide costs.

In the conventional quota system, a typical rice farmer in the region sprays his paddy field nine times a season. But the majority of the FFS alumni managed to reduce the number of treatments to two times per season and some even to zero.

After the first year with IPM, the tests undertaken by the IRIPP detected only one pesticide (Diazinon), with a residue level of 0.05 ppm. In the second year, this level had

reduced to 0.005 ppm, which was ten times lower than the MRL specified in Codex Alimentarius 1992. By the end of the third season with FFS, no residues were detected.

After the first season the farmers' group started to market their IPM produce to consumers based on its safety. The rice was sold in 10kg sacks and distributed to a small niche market of IPM products. In the second year, the consumers ordered more rice for themselves and their friends. In the third year, 25 tones of IPM rice were marketed with added value.

The participating farmers' groups deposit 50% of their annual income in a local finance system to provide interest-free micro credit to the members of the group to prepare land for safe crop practices.

Farmers use a label on their crop to inform consumers about pesticide hazards, which is increasing demand for safe food among coops and health conscious consumers.

Realizing the benefits, farmers in several neighboring villages have been inspired to adopt the FFS approach. At the national level, the project has been selected as a demonstration site for farmers, the government officials, and NGOs.

While the initial emphasis of the UNDP GEF/SGP-backed IPM Project was on rice, it supports the extension of the approach to other crops. IPM training activities and FFS have now been extended to vegetables like cucumbers and selected fruits like dates, which are more prone to absorbing pesticides.

3.4 Empowerment of rice farmers for sustainable management of rice fields in Roudbar (2003-2005)

This SGP-funded project was implemented in Rostamabad Roudbar Township with the broad goal of the River Sefidroud biodiversity preservation. It was originally planned to only focus on training the students of an agricultural vocational school as IPM/FFS trainers, so that they could work with the local farmers. In practice, however, it proved to be unfeasible as the students were not native to the area and left the region after graduation.

The work plan was therefore revised to cover also the local farmers. First, a 15-member working group of farmers was organized to work on rice. The group worked for two seasons on IPM/FFS. As a result, the farmers not only achieved obvious results in reducing the use of pesticides, and subsequently the costs of production. They also increased their income through introducing duck and fish farming. After two seasons, the farmers decided to extend IPM/FFS to olive, which is the major perennial in the region.

Subsequently, a letter of agreement was signed in 2009 between the Ministry of Agriculture's Directorate General for Office Programme, the SGP Office, and the Directorate General for Rural and Nomadic Women. The reason for involvement of the latter office was the prominent role played by women in olive production, in particular the harvest and post-harvest phases. The project being planned under this agreement includes a baseline study and an operational phase. The NGO IGRA, which acted as the implementing partner since the outset of the project, was selected to serve the expansion process as well.

The Directorate General for Office Programme also approached the FAO Regional IPM Programme, requesting the FAO's technical support in implementing a huge IPM/FFS project on olive in Kermanshah Province. A sizable fund has been allocated by the national authorities for implementing the project. TOT training is a major component in this activity.

3.5 IPM/FFS in post-Earthquake Bam (2004-05)

After the catastrophic earthquake in Bam, Kerman Province, a project was implemented by UNDP in Bam on restoration of water supply systems, including date palm orchard irrigation works.

During the implementation of this project, the local authorities requested assistance for the devastated farmers to help them find ways to control the date palm pests. Subsequently, an IPM/FFS activity started in Bam in 2004, thanks to a grant offered by SGP.

The project started by training 35 IPM trainers from the Government and Non-governmental sectors through a TOT programme.

After the TOT programme, five IPM/FFS groups were set up in five different villages of Bam. The groups were facilitated by ten of the TOT Programme graduates who had volunteered to help the farmers.

Each of the five participating group was equipped with a field lab, including a stereo-microscope, experimental tools and items, a computer, a printer, and stationary.

The IPM/FFS work focused on Dubas bug, which is the most important pest of date palms in the region. The participating groups also worked on composting, date vinegar production, and dates processing. The women showed great interest and active participation in the IPM/FFS activity in particular in Dehshotor village. Several years after the completion of the Project, the IPM/FFS activity is still ongoing in this village and the dates produced by the group is marketed with IPM label.

3.6 IPM/FFS Project in Fereidoonkenar No-Shooting Area

In 2004, the officials of the Wetland International Project for Siberian Crane visited the IPM/FFS Project at Sooteh Village, which is located in the vicinity of the internationally recognized over-wintering site of the rare Siberian Crane. Based on their observation of the environmental and socio-economic results obtained with two seasons of IPM/FFS in Soothe, they decided to incorporate the approach in sustainable management of the rice field located in the wetland.

After one season with IPM/FFS, Mr. Hassan Zadeh, a local rice farmer at Ezbaran village, expressed the following when asked about his experience with this approach:
"Before the FFS, I was afraid of pests and I thought that the scheduled application of pesticides was the only way to fight the stem borer and other pests on my paddocks. Working with IPM, I realized that my crop loss by pests were not as serious as I feared. Rather, I learned that I should be more afraid of the pesticides for the risk they pose on the health. I will try to use IPM methods as much as possible to avoid pesticides".

3.7 The Pesticide Free Rice Project through IPM/FFS in Ezbaran Village, Caspian Region (2006-2007)

This pilot project started in December 2006 in Ezbaran Village, located in the Caspian Sea Coast, with a small grant provided by the GEF/SGP to the Cooperative of the local farmers/duck hunters at Ezbaran Village in Fereydoonkenar, Mazandaran Province. The project was linked to the UNEP GEF SCWP.

This project aimed at expanding the IPM/FFS approach to Ezbaran site based on Sooteh Pilot. In fact the alumni farmers of the Sooteh IPM/FFS were directly involved in training the Ezbaran farmers. The Ezbaran farmers were highly motivated to take part in the activity as they had observed the success of their neighboring farmers at Sooteh village. Therefore, they took direct responsibility of the project through a contract with SGP. The NGO IGRA was contracted to provide technical advice to the group. A 3,000 square meter rice plot belonging to the village Council was selected as the FFS site. Active participants included fourteen farmers from Ezbaran village and three farmers from Sorkhroud village.

3. 8 Tehran Province Vegetable IPM (2007-2010)

In 2004, the FFS was incorporated into a joint study of the Office of Tehran Provincial Governor and the Agricultural Organization of Tehran Province on approaches to rural development. The official support to the study terminated after four months from its commencement, due to logistic reasons. The participating farmers from Tarand Village, however, continued their group work and kept contact with the external Facilitator, as a strong mutual trust and working momentum was created during the sessions. They implemented the IPM/FFS work on eight vegetable crops in 2004. The SGP provided a small grant to support the activity. This site was also used for training 25 local experts on IPM FFS. Later on, these facilitators constituted the core human resources for the implementation of a project for safe vegetable production approved by the Ministry of Agriculture in 2006.

The Varamin Vegetable IPM is the story of a group of farmers in Tarand Village of Tehran Province who continued their group work in spite of the premature closure of the Study that was just introducing FFS to them. Only in four months the farmers had realized the benefits of the approach and had established a strong sense of trust with the external facilitator. So when the Study terminated, the group decided to continue the work.

In the first year, the group focused on resolving the issue of irrigation, which was given the highest priority in the FFS planning sessions. The group constructed a two-kilometer irrigation canal to conduct irrigation water from a deep well to the farms of the group members. With this canal, each participating farmer could irrigate half a hectare more land, resulting in an average value added of 4,500,000 Rials (US$450) per farmer in each irrigation period. To finance the construction, each participating farmer contributed 1,000,000 rials (US$100).

The next year, the FFS group focused on IPM production of vegetables. In 2004, the group set up an experimental plot on different vegetable crops, including pepper, tomato, cabbages, cucumber, beans, and squash. The participating farmers transferred the results of their observation to their own farms and applied the methods on their actual fields. They have gained value added through selling their produce to selective customers.

Encouraged by this pilot work, the provincial agricultural organization prepared a project for expanding this experience to other villages of the province.

This site was also used for training 25 local experts on IPM FFS. These experts were introduced by the Agricultural and Natural Resources Engineering Organization. The experts first passed an eight-day conceptual workshop. Then, they attended the regular weekly IPM/FFS sessions on the field. Later on, these facilitators constituted the core human resources for implementation of a project for safe vegetable production approved by the Ministry of Agriculture in 2006.

3.9 FAO/MOJA Joint Project on FFS to Strengthen Control of Sunn Pest and other Pests (2007-2010)

In 2007, the FAO and the Ministry of Jihad-e-Agriculture commenced a two-year joint project for the introduction of IPM/FFS approach in controlling Sunn Pest infestations in wheat in two selected provinces, namely Kemanshah and Esfahan.

Implemented in close collaboration with the FAO regional IPM project for the Near East, the project sought to empower the participating farmers on ecology and biology of Sunn Pest, learn better pest monitoring techniques, and test alternative pest management strategies such as more tolerant varieties and entomopathogens to control the Sunn pest.

Completed in March 2009, the Project directly supported the establishment of 66 IPM/FFS sites, against 47 sites originally committed. About 17 of these sites were located in Esfahan and the rest in Kermanshah. These schools trained altogether 1358 farmers, 282 of which were females.

The Project developed curricula for the IPM/FFS in Sunn pest, and introduced monitoring techniques for Sunn pest and its associated natural enemies.

Under this project, two trainers' programmes were implemented with a total attendance of 82 facilitators. These facilitators also received comprehensive training on IPM/FFS through two TOT/FFS programmes conducted by the Project. These programmes had remarkable positive impact on the capacity of the participating provinces to plan and implement IPM/FFS activities. During the second year of the FAO Project, the Provincial Agricultural authorities in Kermanshah approved the establishment of 200 additional FFS sites on Sunn pest. The FAO Project supported this initiative by training the facilitators needed by the agricultural organization.

3.10 Twelve IPM projects of the Iranian Plant Protection Research Institute (1999-2001)

In 1999 the IRIPP implemented 12 IPM projects on crops with high priority for food and fiber production. The findings of these projects once again confirmed that IPM cannot be successful without active participation of the farmers.

Taking into account these considerations, and encouraged by the promising results obtained from the pioneer pilot IPM/FFS in the country, the IRIPP included FFS as a major component in its major IPM project on wheat in 2003.

3.11 The FAO Regional IPM Programme for the Near East (2004-present)

3.11.1 A regional overview of the Programme

The Project GTFS/REM/070/ITA "Regional Integrated Pest Management (IPM) Programme in the Near East", funded by the Italian Contribution through the FAO Special Trust Fund for Food Security and Food Safety, is operating in the Near East region since 2004. It started its activities in Egypt, Iran, Jordan, Lebanon, Palestinian Territories and Syria. Following the 3rd Tripartite Review Meeting (June 2009), the Donor endorsed the Project expansion to Algeria, Morocco and Tunisia. An additional budget of US$ 1.8 million was added to the project, bringing the total budget US$ 6,882,629. The project duration was extended for two years; the current NTE is December 2011. At the same time, the Donor approved further additional funds of Euro 500,000 (equal to USD 726,744) to include Iraq into the Regional Integrated Pest Management Programme for the Near East for two years. This brings the overall funding to US$ 7.6 million, with now 10 countries that joined the Project.

The Project main goal remains to improve food security by promoting the adaptation of IPM strategies to horticultural crops through Farmer Field School (FFS) methodology. This approach has already resulted into tangible benefits for farmers in Near East participating countries who have achieved several improvements in economic, health, social and environmental aspects.

The Programme trained about 1,250 people who are potential IPM/FFS facilitators. The best trained people are selected to conduct FFS.

The Programme has conducted a substantial number of IPM/FFS. It should also be considered that in some countries, other local Institutions, NGOs and/or MOA initiated IPM/FFS programmes. For instance in Lebanon, AVSI (an Italian NGO) conducted 24 FFS in 2007/2008; in Syria, the MOAAR conducts 40 IPM/FFS on a yearly basis starting from 2007; in Iran, local provincial Agricultural administrations and UN agencies have adopted similar IPM/FFS programmes inspired by and building on the results and achievements of FAO Regional IPM Project.

Since its inception, the project organized over 870 IPM/FFS in the region. The total number of farmers directly trained through the implemented IPM/FFS is almost 12,500. Many more farmers received indirectly information on IPM through farmer to farmer contacts. Country reports state that, on average, each participating farmer had trained, or otherwise advised, two other farmers about IPM tactics and FFS approach.

The IPM/FFS farmers gained a good level of knowledge and skills about natural enemies and their role in pests' control. In interviews and field days, FFS participants repeatedly stated that previously they did not have any knowledge about these insects and

their interactions. Many of them stated that they had enquired about risks of pesticides to agro-ecosystem balances when extension people prescribed spraying.

Farmers tended to apply the logic of IPM/FFS to other crops or activities (i.e. animal husbandry in Iran). During any self-assessment, the IPM/FFS farmers repeatedly asked for continued support to IPM/FFS, which also led to a decision by some countries on its institutionalization.

In economic terms, the participating farmers have achieved a significant decrease in production costs.

Concerning the health aspects, the Programme demonstrated in practice that the awareness on the risks of chemical pesticides leads to obvious change in the farmers' behaviour. Inappropriate use of pesticides (leading to intoxication and exposing applicators to other risks) is linked with low levels of awareness on the risks of pesticides and practical knowledge on how to avoid such risks. In a study in Iran, none of the IPM/FFS farmers or their families had experienced any intoxication after joining the project; on the other hand, almost all of the non-member or control farmers reported that they had seen or heard about several cases of intoxication in their working environment.

The Programme also proved that participation in IPM/FFS activity leads to remarkable improvement in the farmers' attitudes and behavior toward improved biodiversity in their agroecosystem. IPM/FFS farmers understand the importance of conserving useful insects in their fields, while non-participating farmers believe that all insects on their fields are harmful. In addition, many farmers of the latter group believe that pesticides are the only viable way to control pests.

Regarding the social aspects, the cross-country observations attested that IPM/FFS leads to a major shift of the farmers' attitudes towards the nature of relationship among themselves, the community and with the government.

A large percentage of the farmers belonging to the IPM/FFS Programme did not use, or otherwise used less, synthetic pesticides. It is interesting to observe that this group of farmers also tends to move towards more appropriate fertilizers applications, often reducing the quantities used.

The project is engaged in a continuous dialogue with policy makers to strengthen national policies plan in support of wider IPM programmes in the member Countries. In some of the member countries, including Syria, Jordan and the Palestinian Territories, the concerned authorities have officially initiated the institutionalization of the IPM/FFS Programme within their respective MOA.

The Programme created a consistent capacity of human resources with both technical IPM and methodological FFS skills within the MOA, Universities and NGOs.

Some IPM/FFS participants have been able, with the project assistance, to trade their products with a premium price at local market and, in some cases, to be export them.

The Programme started regional training activities five years ago. Several regional workshops for IPM/FFS facilitators have so far been completed, bringing together coordinators and facilitators from the member countries. These workshops focused on IPM approaches and FFS methodologies. Two Facilitators' Field Manuals based on the Project experiences have been produced specifically for the Near East local conditions.

3.11.2 The FAO Regional IPM Programme in Iran

> **Mohammad Reza Jahansooz, Deputy Minister of Agriculture:**
> "Iran has had outstanding performance in the FAO Regional IPM Progeamme…Our aim is to make Iran a model with implementing this approach in 2,000 farms, with plans to increase the figure to 60,000 farms in the future. The aim is to promote appropriate technologies and safe crop production at the farm level. "
> Quoted from an interview with Qods Newspaper, June, 2006.

The Programme in Iran began with the Inception Workshop in June 2004. A National Steering Committee, comprised of the representatives of Extension Service ,IRIPP, and other relevant institutions was set up to coordinate the activities of the Project. An NGO was selected as the implementing agency of the Project. Grapes and Protected cucumbers were initially selected as the focus crops.

In the first year, the Project focused on training skilled human resources as IPM trainers or facilitators. The first TOT programmes were held in Tehran (on protected cucumbers) and Qazvin (on grapes).

The initial workplan for Iran anticipated 60 FFS groups in total, to be divided on equal basis between Tehran and Qazvin Provinces. However, the institutional capacities of these provinces at the early stages were only enough to set up about 16 FFS groups. Therefore, the Steering Committee agreed with the circulation of a call for participation in the Project by other interested provinces. In response, several provinces, including Semnan, Jiroft, Azarbaijan Gharbi, Azarbaijan Sharghi, and Zanjan expressed interest in linking to the Project. To provide the required skilled facilitators, additional TOT programmes were organized, with priority given to Azarbaijan Gharbi and Jiroft.

Subsequently, headway was made in the implementation of the Project. The number of FFS groups increased from 16 in 2004 to 37 in 2005, over 40 in 2006, and 60 in 2006. A greater portion, about 40, of these groups sustained for several seasons.

Table n.1.
Number of FFS sites and farmers trained under the FAO Regional IPM Programme in Iran

Year	Crops	# FFS Sites	# Farmer trained
2005	Grape, Cucumber	20	214
2006	Grape, Cucumber, Apple and Grape-pistachio	53	718
2007	Grape, Cucumber, Apple and Grape-pistachio	55	1105
2008	Grape, Cucumber, Apple	115	1525
2009	Grape, Cucumber, Apple	125	2515
2010	Grape, Cucumber, Apple	125	2515
Total		493	8592

Table. N.2.
Number and composition of facilitators and experts trained under the FAO Regional IPM Programme in Iran

Year	TOT and Master TOT	Facilitators trained IPM/ FFS		Total
		Male	Female	
2004	2	32	13	45
2005	4	53	32	85
2006	3	38	27	65
2007	2	33	19	52
2008	2	59	14	73
2009	3	77	21	98
2010	3	33	16	49
Total	**13**	**325**	**142**	**467**

As regards the selected crops, grapes and protected cucumber remained as the key crops, but other crops such as apples and other protected crops were added to the IPM/FFS. The reason for this was the local specific socio-economic and agro-ecological conditions, which is characterized by mixed farms and orchards in particular in traditional agricultural systems.

In terms of geographic coverage, the Project's focus shifted from Qazvin and Tehran to Jiroft and Kermanshah Provinces. Spectacular results have been achieved in both of the latter regions, briefly described below:

3.11.2.1 Jiroft

The FAO Regional IPM Project's work on protected cucumbers in Jiroft Region started in 2006 at the pilot level, with FFS 19 groups, comprising about 220 farmers, covering about 20 percent of the total protected cucumber area. In just three seasons, however, the approach grew from a pilot activity to a concrete regional solution to complex problems existing in intensive greenhouse environments in Jiroft. More than 80 percent of the total (1700 ha) protected cucumber area of the region was covered by

IPM/FFS groups. There are few farmers in Jiroft who are not directly involved in an IPM/FFS group, or have not heard about it.

At present about 584 farmers, organized into 67 sites, are applying IPM methods on their farmers, with a total area of 405 hectares, supported by 20 trained facilitators. They work on pests and diseases such as leaf miner, spider mites, leaf feeder, whitefly, aphids and fungi diseases. They test alternative solutions to manage each of these problems.

The volume and number of chemical pesticides applications reduced by 50 percent in the Project area. In Jirof region (South East Iran), where 4,000 ha are under greenhouse cucumber, 30% of the production costs are for the purchase of pesticides. In some cases, some farmers spray US$12,000 per farm of different pesticides to protect their crops from pest damage. Therefore, the change brought about by the Project in the trend of pesticides use has substantial impacts on decrease production costs.

The story of Ms. Ebadi

Ms. Ebadi and her husband are farmers in Asiabtanour village, in Krend Township, Kermanshah province. The main products of the village are pear, lentils, and barley. Apple crop is the only fruit that is produced for marketing. In the recent years crop production faced numerous problems, particularly regarding the control of pests.

A group of farmers in this village, including Ms. Ebadi and her husband, were involved in a FFS group for apple with the support of the FAO Regional IPM Programme. Participating actively in two consecutive FFS/IPM seasons, Ms. Ebadi and her husband have developed tremendous skills in experimenting and making informed decisions on their orchard. She speaks about her experience in the following way:

"We began our work in the IPM/FFS group in 2008. At first I had little information about pest management but gradually I learned and I knew enough about pests and I can choose now the right way to control them with high confidence. In addition I gained a good understanding of the insect's life cycle. I learned how to use pheromone traps, also light trap and lanterns to hunt the moth.

In my opinion the key to control the pest is to prevent the worm from penetrating into the fruit. For this reason, we collect the fruits shed in the first generation. Then we leave the fruits in a full water bucket so that the worms are suffocated. In this way we minimize the possibility to conversion to the moth stage.

Some of our fellow farmers bury the infected apples after taking them out from the bucket. But I use them to feed my chicken, because the apples and the worm are a rich source of nutrition for them.

Another way we follow to control the moth is wrapping paper strips around the trunk of the apple trees. This way the codling moth larvae are easily trapped, leading to a big reduction in the pest's population.

Thanks to these methods and other things that I learned during the FFS, I did not apply pesticides anymore on our field. Moreover, this year we set up a women's community fund, using saved money to implement sustainable agricultural activities".

The participating farmers rapidly adopted biological fungicides and pesticides for pest management. They use: yellow sticky traps to control whiteflies, leafminers, and plant hoppers; Trichomix® to control soil-borne diseases (damping-off and wilts); installing pheromone traps to monitor and control the moth; release phytoseiid predatory mites to control broad mite; apply *Trichoderma* to control soil born diseases, etc. Just as an indicative, in 2010 these agents were applied by almost all the farmers, while only one farmer had the experience of using these biological agents before the Project.

Due to the Project, calendar spraying is no more a common practice among the greenhouse farmers of Jiroft. They have learned to avoid spraying as much as possible. If inevitable, they do the spraying in a very selective manner. Now they know that invariable application of different pesticides with the same functions or mixing pesticides

are of no use to their farm. They have acquired the skills to differentiate between different formulations, while in the past even the difference between the fungicides and pesticides were not known to the farmers in the past.

Other changes brought about in spraying behavior of the farmers were calibrating the sprayers and the replacement of inefficient sprayers with more efficient ones, such as sprayers with micro and electro-static heads.

The participatory research also led to substantial increase in applying soil aeration as a very effective method to reduce pesticides use. The number of sites which practice soil aeration increased from seven sites in the beginning of the Project to 54 in 2009. Releasing natural predators is also finding its way in the greenhouses.

There has been a huge reduction, by 35-42 percent, in the use of chemical fertilizers, in particular N. P. K., in the Project area. Instead, they have developed a skill to utilize palm compost alone or mixed with poultry manure as organic fertilizers.

3.11.2.2 Kermanshah

The outcomes of the Project in Kermanshah Province is an example of successful extension of IPM/FFS approach from pilot level to mainstream activity at township and provincial levels. The Project was first introduced in the Province in 2007, when another FAO IPM Project on Sunn Pest had just started. Encouraged by the outstanding achievements of the Sunn Pest Project, the Provincial authorities placed formal request to FAO for assistance in extending the approach to orchard sector in the project. Accordingly, the FAO included Kermanshah in the activities of the Regional IPM Programme in 2007.

The Project started its work with providing 25 TOT alumni of the Sunn Pest Project with special TOT training on orchards. The pilot orchard was a traditional apple-grapes plantation in Krend Township. By completion of the TOT training, 17 FFS sites in Gahvareh District (on grapes) and Krend (on apples) were organized through the veteran facilitators in March 2007. Taking into account the priorities expressed by the participating farmers, the FFS focused on irrigation and pruning (on grapes), as well as soil management (on both crops). The work on pests in the first seasons was mainly on understanding the biology and life cycle of the insects, the main pests being codi moth in apples and Lobesia in grapes.

In the second season the number of FFS sites was increased to 45 and the work on pests was intensified. Through collective work and careful participatory field research, a workable management model was designed and tested for codling Moth in the central FFS site. The main elements of this model included installation of pheromones, wrapping the trunk of the trees with paper strips, enhancing orchard hygiene, and collecting the fallen apples and smearing them in water buckets, and releasing poultry in the orchard to pick the worms. By the end of the second season, the models developed in the central FFS site was already translated into a working practice in all the other 45 FFS sites.

In the second season there was also a practical model developed to effectively control powdery mildew in grapes. The model included green pruning (together with collecting and burning the pruned branches) and application of lime sulfurs under the creeping vines.

In the third season, the number of FFS groups increased to 66 sites on grapes and apples. This figure comprised of the 45 groups set in the first and second seasons as well as 21 new sites. In this season, the models developed in the central FFS sites, which were repeated in other FFS sites in the second season, were extended as integral part of farming practices to the majority of the 132 hectares orchards belonging to the participating farmers. The only element which was not adopted by all the farmers was releasing poultry. The reason was that some orchards were not surrounded with fences or other barriers to keep the birds in. By and large, the occurrence of the pest in the orchards of the participating farmers was reduced to almost nil.

The expansion of the local-specific IPM/FFS technology, however, was not limited to the orchards of the farmers participating in the Project. Rather, an impressive up-scaling of the models introduced by the Project occurred in the Province, which can be described as the largest scale expansion of IPM/FFS approach from pilot to mainstream level as a result of a single project in Iran and perhaps in the Middles East.

In this up-scaling process, more than 2,000 farmer groups were organized across 14 townships in the province. About 500 experts were trained to facilitate the work of these farmer groups. The training of the trainers was mainly undertaken by the master trainers

Extracts from the statements of Engineer Ramazan Rouintan, Head of Kermanshah Province Jihad-Agriculture Organization during his meeting dated with Mr. Alfredo Imiglia, the Regional IPM Programme Coordinator in September 2010:

Holding a BSc. in Plant Pathology and MSc. in Habitat Management and with a long record of distinguished work, Mr. Rouintan himself is a prominent promoter of IPM in Iran.

"IPM is a strategy, a policy. It is more of a decision making process than of merely dealing with a pest of plant protection. Rather it addresses diverse subjects related to biological and non biological agents and their interactions. It incorporates biology, economics, social aspects, marketing, meteorology, soil science, entomology, plant pathology, and a range of other disciplines.

Our major problem in the past was that our experts were inclined to look at things from their own expertise angle, rather than a holistic view. Fortunately this has changed. Now we have quite a number of people in Iran who understand IPM and practice it….

I would like to provide you with a snapshot of such fundamental changes in attitudes and the growing interest IPM in Kermanshah Province over the last two decades.

The key pest in Kermanshah is the Sunn Pest. It used to be controlled by air spraying. Every year the area under control increased. Each time an aircraft took off, it indiscriminately killed the pest, the bird, the snake, the rabbit, and the useful insects. By air and by land, about 400,000 hectares used to be sheath sprayed every year. Thanks to participatory work with the farmers, however, this year the total area sprayed was reduced to 60,000. About ten years ago the per capita pesticide use in Kermanshah was about 0.8-1 liter per hectare. Today this figure is at most 0.3-0.4 liter and the crop loss is quite negligible, this is while annually about 30-40 percent of the crops was lost in years with air spraying. In spite of the reduction in sprayed area and in pesticides use, the yield has increased substantially.

A main reason to this outstanding change is the farmers' participation. Our farmers got the belief that IPM works. They learned that by observing the pest population and intensity, they can better decide how to manage it without the need to blind spraying. They learned to apply these techniques on other crops as well.

The approach was also extended to the use of chemical pesticides. Five years ago, about 256,000 tons of chemical fertilizers were used in the province. This year only 150,000 tons were used. A greater part of the chemical fertilizer is replaced with organic fertilizers, with a consumption rate arriving at 200,000 tons this year.

This again owes to participation and empowerment of the farmers through approaches such as FFS. For example, the replacement of chemical fertilizer with manure on maize was first tested with the farmers in a very small field, compared to a larger plot fertilized with chemical material on the same farm. The yield was about 400 kilograms higher per hectare in the plot fertilized with manure, where pesticides were also not used. Encouraged by these results, the method was first extended to 100 hectares and soon after to thousands of hectares.

Today more than 500 agricultural engineers are working with IPM/FFS approach, thanks to the pilot efforts undertaken in the province. This also reflects the strong belief created in the province on the need to enhance the linkages and contacts with the farmer communities. "

educated through the FAO Regional IPM Programme. The experts were divided into 10 groups each with 50 members. then each group received a three-day intensive training conceptual and practical course Each expert covers in average about 300 hectares of farmland.

With the completion of the training of the trainers, the process of involving the farmers started in 2009. As a first step, each facilitator was contracted to hold at least ten weekly workshops for four groups of farmers. The funds for training the trainers and organizing the farmers were provided by the Provincial Agricultural Organization.

3.11.2.3 Contribution to research development

The Regional IPM Programme in the Near East in collaboration with the Research Institute of Plant Protection (IRIPP) and other international agencies like UNDP/GEF/SGP, which are working on IPM for better environment and biodiversity, established a technical training site on IPM, Biological Control and Good Agriculture Practice (GAP) at the Biological Control Research Department, IRIPP. This site was inaugurated by Vice Minister of Jihad-e-Agriculture Dr. J. Khalghani on April 17, 2010. Fifteen trained facilitators from IPM projects country on several crops started to be trained IPM and Biological control methods.

In 2009, the Iranian Research Institute of Plant Protection (IRIPP) requested the FAO Regional IPM Programme National Project Director in Iran to set up a Unit for National and Regional Training on Biological Control at Farm Level. Accordingly, the Unit was designed and constructed taking into account the all the basic needs for such a unit, including greenhouses, labs, insects and predators propagation sites, classroom, and other requirements. Inaugurated in 2010 at the premises of the IRIPP, This site has now become a major reference facility in to conduct comprehensive research on IPM science and technology. As of today, more that 65 experts/trainees have been trained on IPM and biological control methods in this Unit.

IPM/FFS approach contributed to strengthen links among farmers: The story of Mansour Abbasian and his farmer/trainer fellows

The results of IPM/FFS projects in Iran have proven that farmers can be effectively empowered not only making their farming practices more sustainable, but also convincing other farmers within their community to adopt the same approach. Mansour Abbasian is a pistachio farmer in Zarrinabad village of Damghan Township, who has now become an active promoter of IPM/FFS techniques. In an interview with the authors, he puts his experience as follows:

"*Before being trained by the IPM Project, I used to spray our pistachio orchards heavily to fight pests. Only for Psylla pest, we treated the orchards 5-7 times a season. That was why in our community when we talked about spraying, we would ask each other: "when are you going to wash your trees?" But more we applied chemicals, and higher was the population of Psylla. We always blamed the Government because we thought that chemicals they were giving were not as good as before.*

Then our attitude changed completely when the first IPM/FFS site was set up in our community about five years ago. In one season we could recognize the difference between useful and harmful bugs. We studied their lifecycle. We observed how the useful bugs eat up the harmful ones. The community for the first time learned that pesticides were not the only way to control pests, and that they destroyed beside pests also useful insects and environment in general.

It was of course very difficult at the beginning to believe that what we learned in the IPM/FFS could make a difference in our real life and on our orchards. My mother used to warn me about consequences if I listened to the IPM/FFS facilitators and stopped spraying the orchard. Her concerns were quite understandable, because our trees were the only resource of our maintenance.

But in just two seasons farmers started receiving results from the IPM/FFS exercise. I developed a strong sense of curiosity and one day I had the opportunity to observe in my own orchard, by chance, how a lacewing larva was feeding on Psylla. This made me more determined to create a safe environment for the growth of lacewing and other useful insects.

Farmers in our community managed to minimize the use of pesticides through a better understanding of local ecosystem and performing analysis of the soil.

For IPM/FFS farmers of our village, generally this approach has brought to a substantial saving in costs of production, for about four million Rials (400US$) per orchard every season; technical skills are increased and farmers can take decisions more aware about the pesticides associated hazards to local environment and human health.

Our community is now recognized by the local and even national agricultural authorities as a model of farming system since we became able to organize ourselves in groups or even in associations, taking together decisions for producing and selling IPM products.

Recently our community was requested by the FAO Regional IPM Project to assist in empowering farmers of other communities to apply IPM/FFS approach on mixed pistachio-grapes orchards.

Some of us are linked to an association in Tehran to sell IPM products without intermediaries. This helps us making higher profit margins.

I am happy to use IPM/FFS methodologies. I do believe that producing healthy and safe products contributes to create a more sustainable world which will guarantee a safer future for us and for our children."

4. MAINSTREAMING OF IPM/FFS AT THE NATIONAL LEVEL

4.1 The National IPM/FFS Programme

From pilot to mainstream: the growing trend of IPM/FFS sites implemented under the aegis of the Ministry of Jihad-e-Agriculture's National IPM/FFS Programme

Capitalizing on the results of the FAO RIPM and other similar pilot activities, the National Extension Service adopted a national IPM/FFS Programme to expand the approach across the country in the mid 2000's. .

In its early stages, the National Programme implemented a limited number of projects due to shortage of skilled human resources, however, after the graduation of more trainers and facilitators from the TOT courses of the FAO Project and other pilot projects, the National Programme finally managed to expand its activities. Today, the Programme supports about 250 IPM/FFS projects, dispersed in almost all the provinces. The goals of the Programme are as follows:

- Elimination or optimization of the use of chemical inputs in agriculture.
- Production of safe and organic crops, according to the provisions of the Five Year Plans.
- Conservation and protection of the natural resources, the environment, and biodiversity in agriculture.
- Enhancement of productivity through reduced costs and increased income per hectare
- Enhancement of the safety of products, producers, and consumers.
- Management of vocational health and safety of the farmers and their families.
- Enhancement of ecological balances, with a focus on agro-ecosystem management.
- Biological soil conservation.
- Sustainable balance of water, soil, and plant.
- Establishment of the national network of safe/organic products producers.
- Establishment of the national certified safe/organic production sand management system.

Table N.3
The National IPM/FFS Programme

Year	Number of FFS sites	Number of provinces	Number of crops
2004	5	2	4
2005	28	8	8
2006	91	15	10
2007	172	22	27
2008	252	29	37

Table N.4
Provinces and crops covered by the National IPM/FFS Programme

Province	Crops covered
Azarbaijan Gharbi	Grapes, cherries, apples, sugar beet, kolza
Ardebil	Protected cucumber, wheat, apples, tomatoes
Esfahan	Protected cucumber, wheat, apples, onions, pomegranate, sugar beet, rice, milk, potato, pulses, cotton
Tehran	Protected cucumber, wheat, kolza ,apples, potato, livestock
Jiroft and kahnouj	Citrus fruits, protected cucumber
Chahar Mahal va Bakhtiari	Apples, fish
Khorasan Razavi	Pistachio, apples, wheat, melons,
Khuzestan	Dates, wheat, vegetables, kolza, milk, honey, red meat, sorghum, tomatoes
Semnan	Wheat, kolza, olive, barley, sorghum, sugar beet
Sistan va Baluchistan	Rice, protected crops, pistachio
Kurdistan	Wheat, grapes, strawberries
Kokiluieh va Boir Ahmad	Apples, citrus fruits, protected cucumbers, maize, livestock
Golestan	Kolza, vegetables, cucumbers, wheat, fruits, tomato
Gilan	Livestock, rice, olive
Lorestan,	Livestock, wheat
Mazandaran	Citrus fruits, rice, kolza, kiwi fruit
Hormozgan	Citron, onions, citrus fruits, wheat
Yazd	Pistachio, maize, protected cucumber, almond, wheat, Kolza
Bushehr	Tomato
Ilam	Wheat, fruits
Hamedan	Potato, forage crops
Khorasan Janoubi	Pistachio
Khorasan Shomali	Fruits, wheat, livestock
Fars	Wheat, tomatoes, protected cucumber, fig, kolza, apples, citrus fruits
Qom	Kolza, wheat
Kerman	Pistachio, protected crops, citrus fruits
Kermanshah	Wheat, fruits
Markazi	Wheat
Azarbaijan Sharghi	Fruit
Total	252

4.2 IPM in the National Development Plans

Paragraph D, Article 134 (Development and Parity) of the Chapter on Agriculture of the Fifth Five year National Development Plan (2010-2014) anticipates that:

"*The grounds should be prepared to gradually expand IPM, appropriate use of pesticides and fertilizers, biological agents, animal drugs, as well as biological control, organic farming, Integrated Production, and application of national standards on agricultural products quality control to at least 25 percent of the total area of production by the end of the Plan*".

In Addendum 1, Article 6 of the Act on Agricultural Productivity, the Government has been mandated to formulate, within six months, national standards for safety of fresh and processed agricultural products. Three key agencies, including the Ministries of Jihad-e-Agriculture and health, as well as the National Institute of Standards have been specifically enumerated by the legislature to undertake this task.

These standards are now being formulated using MRL and other safety measures as a reference. Further, to assure the attainment of the standards, crop-specific process-based Guideline are being formulated, which will be largely based on IPM standards. Once prepared, these Guidelines will be circulated across the country as binding documents. This will be another major step in mainstreaming IPM in the country.

ACKNOWLEDGMENTS

The authors would like to express their gratitude and appreciation to the National Research Institute of Plant Protection of Iran, to the FAO Representation Office in Iran and to all the farmers for their support and co-operation