



Using integrated pest management to help Albanian apple farmers increase their income

D. Babendreier and U. Kuhlmann

Summary

Despite significant progress made over the past 15 years, the agricultural sector in Albania remains underdeveloped, characterized by low technology, low productivity and institutions that struggle with a lack of funding, as well as poor connection to international partners. To tackle these problems, between 2008 and 2011, CABI implemented a project in Albania, funded by the Swiss Agency for Development and Cooperation (SDC), on Integrated Pest Management (IPM). This was followed by a three-year institutional partnership project funded by the Swiss National Science Foundation (SNF) within the Scientific Co-operation between Eastern Europe and Switzerland (SCOPEs) programme.

In 2009, an Apple Integrated Production (IP) Producer Club was established in seven different villages in the Korca region of Albania. It was officially accredited by the government in Tirana. All Producer Club members had to agree to produce according to an IP standard, developed by project partners and based on the internationally agreed standards set by the International Organization for Biological and Integrated Control (IOBC). Season-long training ensured that IP producers were able to understand the rules and follow them. A membership fee for the Producer Club was also defined and agreed upon, enabling the establishment of an advisory service and training for the Club's members.

By the end of the first SDC funded project, Apple IP producers:

- no longer carried out prophylactic spraying
- completely eliminated the use of highly toxic World Health Organization (WHO) class I pesticides
- applied 40% fewer treatments using WHO class II pesticides than non-members
- applied 20% fewer pesticide treatments throughout the season, compared to previous years

Together with a 50% reduction in the volume of pesticides applied per treatment, an overall reduction of 60% of the amount of pesticides was achieved, compared to common practice. Producer Club members improved quality substantially, with 85% of the apples produced rated as grade I at the end of the project, compared to 55% of the apples produced in previous years. The number of apples

infested by apple scab was two to five times lower for Producer Club members than for non-members. Most of the c. 2,000 apple producers in the Korca region are aware of the activities of the Producer Club and many have been adapting their pest management strategies according to what they see happening at neighbouring IP producers' farms or are showing a high level of interest in joining the Club.

Building upon the relationships, and in order to upscale and multiply the positive effects achieved by the SDC project, Albanian partners Agrinet (NGO), the University of Korca, the Agrobusiness School Korca and the Centre for Agricultural Technology Transfer were further supported through the SNF-funded SCOPES programme. Knowledge was transferred to partner institutions on technical aspects of IPM, improving capacities for scientific experiments and teaching. Most importantly, IPM lectures were established at both the University and Agrobusiness School of Korca, allowing further transfer of knowledge on IPM and sustainable agriculture to students, who will influence the agricultural sector in the near future. In addition to the 800 Microsoft PowerPoint slides, lecture hand-out books were developed and printed to provide the students at the University and Agrobusiness School (20–40 students each year) with first-hand information for the next six to eight years. Based on the project's positive outcome, the Albanian government decided to implement the same IPM lecture in all of the other five Agrobusiness Schools in the country. Some copies of the lecture hand-out books were transferred to them at the end of the project. In addition, two young Albanian researchers were selected to receive advanced, season-long training on IPM and biological control in Switzerland.

The project is expected to lead to the implementation of more environmentally-friendly and sustainable pest control solutions in Albanian agriculture.

Project objectives

- To support the development and implementation of IPM approaches, in order to reduce over-reliance on pesticides and the associated risks to farmers and the environment through exchange of scientific and indigenous knowledge
- To anchor IPM and improve research capacities in the Albanian partner institutions and establish an IPM network, enabling the increase of links in sustainable agriculture at a national and international level
- To improve students' knowledge on IPM in the agricultural sector

Findings



The Producer Club was accredited by the Albanian government with an organizational and management structure based on democratic principles to ensure good governance. Pivotal

to this management structure was ownership of the Club by the producers (as members of the General Assembly), which means the producers control the Club's organization, management and activities. The Club started with 40 members in 2008 and reached 110 by the time the project ended at the end of March 2011. Currently, seven different villages of the Korca region are represented by the Producer Club.

In parallel to the establishment of the Producer Club, a 16-page 'Technical Guideline for Apple IP' was developed jointly by project partners. Based on IP standards of the IOBC, this guideline defines the minimum agricultural requirements for apple production, which Producer Club members must implement such as appropriate site selection and management, implementation of fruit thinning and appropriate fertilizer and pesticide application, etc. Three annexes (the Key Pests and Diseases List, the Green and Yellow List and the Pesticide List) were also developed as supporting documents to the Technical Guideline. The Pesticide List, which provides technical and safety-related details about the

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pesticides recommended for use in Apple IP, was harmonized with Albanian legislation and European Standards (Annex I of EC 91/414) in 2009.

To support the practical implementation of the Technical Guideline for Apple IP, field and classroom training sessions involving all Producer Club members were implemented by Agrinet throughout the project. Training topics included relevant aspects of IP such as monitoring and forecasting of key insect pests and diseases, record keeping, pruning and thinning, fertilization and orchard establishment and management. In total, and throughout the season, farmers receive 12 training sessions, each between three and five hours.

Depending on the subject, project partners supported the training, in order to enhance the level of knowledge transferred to the farmers. CABI provided initial capacity building to Agrinet and other partners and facilitated the development of comprehensive training material and a curriculum. In addition, CABI and TAP jointly developed a number of farmer-friendly documents and distributed them to all Producer Club members. This included:

- a pest monitoring booklet to facilitate population assessment of the key insect pests and diseases of apples, and decision making with regards to pest management
- a farmer-friendly Green and Yellow List to support the IPM 'thought process', i.e. prevention, monitoring and intervention
- a natural enemy and pest identification tool to facilitate recognition of important natural enemies, and key insect and disease pests in the apple orchards
- 12 leaflets on specific issues relevant for IPM in apple production

An area where training was particularly important was Rational Pesticide Use (RPU). To allow farmers to overcome serious pest problems using participatory training methodologies, Agrinet now offers four classroom sessions to transfer knowledge on the theoretical aspects of RPU, as well as one outdoor-based session covering a range of practical topics related to pesticide handling, use and application. This is followed up by an examination to assess the farmers' knowledge uptake and comprehension. It is a requirement of the Producer Club that all members participate in this course and pass the final examination, in order to market their apples under the Club's label.

Despite national plant protection laws specifying that farmers must be qualified to apply pesticides, there is no national scheme in place offering the training and certification required. The Producer Club's RPU course is, therefore, looked upon favourably by the Agricultural Minister of the Regional Directory of Agriculture and Food of Korca as a progressive step towards fulfilling national law. The aim is for this training scheme to become officially recognized and approved by the national Ministry of Agriculture (MoA).

As a result of the project activities, Apple IP producers no longer carry out prophylactic spraying. Instead, their increased knowledge of IP means they are aware of the importance of monitoring the insect pest and disease situation in their orchard and then using this as a basis for deciding if and when a pesticide application is necessary. Until 2008, two treatments per season were carried out on average using highly toxic WHO class I pesticides. However, based on comprehensive data collected from 30 Producer Club members and 10 conventional farmers, the former have now completely eliminated the use of such products. In 2009 and 2010, Producer Club members applied 40% fewer treatments using WHO class II pesticides than non-



members. Data from 2009 and 2010 show that, overall, Producer Club members make 20% fewer pesticide treatments throughout the season than non-members. All Producer Club members now use a modern ventilation sprayer to apply pesticides, rather than the traditional equipment used by many at the start of the project. This has led to a 50% reduction in the volume of pesticides applied per treatment, as well as a more thorough coverage of the foliage that, in turn, has contributed to enhanced pest control.

In 2010, all of the pesticides applied by Producer Club members were included on the Pesticide List of the Technical Guideline. This is an improvement from 2008, when 25% of the pesticides applied by Producer Club members were not on the recommended list. Furthermore, 30% of the pesticides applied by non-members in 2010 were not included on the Pesticide List, which, again, exemplifies the higher standard of pest management that the Producer Club members have managed to achieve. General knowledge about RPU has been enhanced through the specialized RPU training course run by Agrinet, such that all of the existing Producer Club members had attended the RPU training and passed the examination by March 2011. All members are now using the specially-developed, lockable pesticide storage cupboards, thus reducing the health and safety risks associated with on-farm storage of pesticides.

A steady increase in outreach to non-member apple producers has been observed throughout the project. Most of the c. 2,000 apple producers in the Korca region are aware of the activities of the Producer Club and many are showing a high level of interest in joining the club. Many have been adapting their pest management strategies according to what they see at neighbouring IP producers' farms, for example, avoiding the application of highly toxic pesticides belonging to WHO class. It has been determined from producer feedback, for example, that virtually no highly toxic pesticides (from WHO class I) were applied in 2010 by apple producers throughout the Korca region, whereas most farmers had been using such pesticides at least once per season in 2008. Furthermore, the majority of the c. 2,000 apple producers in the Korca region are now using a modern ventilation sprayer to apply pesticides rather than the traditional equipment used by many at the start of the project. This modern type of ventilation sprayer results in a 50% reduction in the volume of pesticides applied per treatment, as well as a more thorough coverage of the foliage, which, in turn, contributes to enhanced pest control, reducing the amount of active ingredient applied on a wider scale.

A new concept of fertilization and soil management has been introduced to the Korca region. Soil samples have been taken for the first time by all Producer Club members in this region and sent to the Centre for Agriculture Technology Transfer (CATT) for nutrient content analysis. Based on the results of this sampling, as well as the training provided by Agrinet and CABI, a reduction in the overuse of fertilizer has been observed. Producer Club members applied c. 40% less nitrogen in 2010 compared to 2008. This likely contributes to enhanced fruit quality but is also anticipated to lead to reduced contamination of ground water.

Improved pest management practices by Producer Club members have led to a reduction in apple damage inflicted by the key insect pests and diseases. The number of apples infested by apple scab was two to five times lower for Producer Club members in 2009 and 2010 than for non-members. In addition, the quality of apples has significantly improved. A total of 85% of the apples produced by Producer Club members were rated as grade I at the end of the project, compared to 55% of the apples produced by typical apple growers in 2006.

Due to substantial capacity building activities and the development of a Fertilization Guideline, farmers are being more careful about fertilization and are no longer following the traditional behaviour of 'the more, the better'. Instead, farmers have started to calculate fertilizer needs based on soil samples sent to the CATT for nutrient content analysis. This reduction in fertilizer use will not only contribute to enhanced fruit quality but also reduced contamination of ground water. The private-sector approach of the advisory system for apple farmers in the Korca region via Agrinet is providing timely and reliable information to the farming community for the first time since the early 1990s.

The equipment transferred to Albanian partners improved technical capacities for the teaching of students at the University of Korca and the Agrobusiness School (ABS). With the equipment provided,

the partners, particularly the University of Korca, were able to improve the practical exercises for students in the area of plant production, as well as their research.



The course on experimental design, statistics, literature and databases provided, and study hours/workshops in Switzerland improved the research skills of all partners and allowed them to connect with international partners working in the same field, e.g. fruit production. Knowledge obtained was used to design and analyse several experiments, e.g. on the effect of virus-based products against codling moth and the performance of different potato varieties under growing conditions in Korca. Experiments conducted during the course of the project, as well as subsequent data analyses, were of a higher quality compared to trials conducted in the Korca region prior to the project. Several national publications

were published and one international publication was drafted.

Since the start of the IPM lectures at the University of Korca in 2012, about 25 students have completed the Masters of Rural Development each year, an important part of which is the IPM module. C. 30 students have taken the shorter IPM course each year as part of their Bachelors programme. In addition, since 2012, about 40 students have been taught about IPM in the ABS every year. At both the University of Korca and the ABS, the provision of comprehensive and high-quality training materials is allowing students to follow-up more thoroughly on all aspects of IPM. As training manuals are in both English and Albanian, the students also have the opportunity to increase their language skills. The process of obtaining government-level approval of the IPM lectures for the University of Korca and the ABS raised substantial awareness of this agricultural approach at the Ministry of Education in Tirana. Relevant decision makers within the Ministry agreed that similar IPM courses should also be implemented in the other five ABSs existing in Albania.

The links of partner institutions to relevant regional or national authorities such as the Ministry of Education and the Ministry of Agriculture, including its regional branch in Korca, have been strengthened through the joint activities of the project. During the course of the project, the partners became increasingly aware of how their institutions could play a crucial role in supporting the future development and implementation of IPM in Korca. They formed a regional IPM technical network, responsible for acting as a platform for promoting regional implementation of IPM. A direct outcome of this network was the development of a rational pesticide use training and certification system, which is already being implemented by the Producer Club in Korca and overseen by the Ministry of Agriculture's regional office.

Links have been strengthened between the Universities of Korca and Tirana. For example, one Professor from the University of Tirana is providing the module on rational pesticide use (which is a part of the IPM lecture) to students of the University of Korca. Impressed by the high quality teaching material, the Professor aims to also use that material for plant protection courses at the University of Tirana.

Impact

Apple IP producers and their families benefit from increased income and are able to continue investing in new orchards and equipment, as well as into higher education for their children. The general health of IP producers, their families and consumers is anticipated to improve due to the phasing out of highly toxic pesticides, the observation of pre-harvest intervals and the reduction in pesticide misuse. The implementation of apple production according to IP standards, together with the improved quality of the apples, makes Albanian apples competitive for the first time in many years and improves the likelihood of the producers being able to export apples to neighbouring countries.

The overall reduction in pesticide misuse and fertilizer use will support the mitigation of the negative

environmental impacts of apple production. In fact, reduced water and soil contamination are expected and reduced non-target effects are expected to act positively on biodiversity within and surrounding the orchards. In particular, natural enemies could play a more important role in pest management, resulting in a further reduction in the need for pesticides.

The private sector approach established in this project for the extension system – with Agrinet in a key position – was highly successful and is being used in other regions of Albania such as Peshkopi and Pogradec, facilitated by the IPM network and regional MoA branches. Moreover, the successful operation of the IP Apple Producer Club and positive recognition at regional and national level, e.g. at the MoA in Tirana, resulted in it being considered as a model for many other farmers' associations, which the MoA wishes to build up. This mainly overcomes the problem of small farm size, which hinders good market access. At the moment, the number of Producer Club members is not limited by the producers' desire and interest to join, but by Agrinet's capacity to train them and to organize the advisory service and general management of the Club.

Altogether, it is anticipated that the number of farmers producing according to IP standards will continue to grow from 150, as an increased number of traders, retailers and consumers become aware of the IP apples and the benefits associated with their production compared to conventional practices. Towards the end of the project in 2012, Agrinet expanded the IPM activities towards other apple growing areas in Albania without support from the project. Farmers in the Peshkopi and Pogradec regions received the first modules of the IPM training package developed during this project.

Finally, novel approaches for calculating fertilizer amounts according to the needs of the apple trees were introduced to Albania through provision of the Fertilization Guideline. This guideline could easily be adapted to other fruit crops where the CATT should take the lead. The general concept is even applicable for most agricultural crops.

The partners of this project constitute some of the major stakeholders of the agriculture sector of Korca (farming, extension, government, research and education). The strengthened linkages between these partners will help to increase awareness of, and knowledge about, IPM approaches on a far greater scale within the agriculture sector. This enhanced knowledge and capacity among the stakeholders is anticipated to motivate the promotion of wider scale implementation of Apple IP and the development of similar approaches for other crops in Albania.

IPM was anchored both at the University of Korca and the ABS and, thus, knowledge on IPM will remain at these institutions and constitutes an increasing part of the students' education. Awareness about IPM has increased at the Ministry of Education in Tirana and subsequent action taken by the Ministry will lead to the implementation of IPM lectures at all five other ABSs operating in Albania. These lectures will be based on those developed within the current project. At all six ABS of Albania, c. 200-250 more students will receive the training each year, substantially enhancing the knowledge on IPM of future farmers and other employees of the agriculture sector in Albania.



According to information provided by the Director of the ABS, the Director of the University of Korca and Professors, the established IPM lectures were seen as a model for other courses at the University of Korca, being based on Microsoft PowerPoint slides, comprehensive training manuals and advanced exams. The ABS, thus, increased the quality of other lectures and courses at these partner institutions.

Improved infrastructure and knowledge acquired on how to conduct and analyse experiments allowed CATT staff to conduct robust experiments and to obtain reliable data, resulting in a manuscript being submitted to an international journal for the first time. This increased capacity, in turn, enables the GATT to respond better to farmers' needs, which is their key mandate.

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The fact that Apple IP producers get their soil sample results from the CATT significantly increases its reputation.

Through the outputs achieved during the project, particularly the trainings and experiments conducted, the scientific reputation of the above-mentioned institutions in Albania has significantly increased nationwide and is expected to increase further in the future.

The wider context

As those involved in the Producer Club continue in their training and careers, the project's benefits can be seen in a wider national, or even international, context. Recognition by the regional and national government of the positive impact of implementing agricultural production standards for apples is anticipated to result in the promotion of elevated standards of production in other crops and regions and the enforcement of national agricultural legislation. It is further anticipated that students graduating from the University of Korca and the ABS will put their knowledge on IPM into practice. For example, many students of the ABS will become farmers and will, thus, immediately benefit from their IPM knowledge in terms of farming in a more sustainable way and being less dependent on toxic pesticides. Other students from the University of Korca and the ABS will become employed in the government (e.g. the regional branches of the Ministry of Agriculture or the CATT), thereby facilitating the implementation of IPM at various levels and across different sectors of the farming community at a national, and hopefully also international, level.

Written and other outputs

- 'Building IPM knowledge and capacity for sustainable agriculture in Albania' case study video: <http://www.cabi.org/about-cabi/cabi-centres/switzerland/video-cabi-in-albania/>
- A 421-page IPM book in English and Albanian published and provided to Master students with an adapted version to 4th year Agribusiness students to support the IPM lectures
- A shorter 45 page booklet in both English and Albanian provided to Bachelor students at the University and an adapted version provided to 3rd year students at the Agribusiness school
- Copies of the training material distributed to relevant stakeholders such as the University of Tirana, the ABS of Tirana, Elbasan, Berat, and Fier, the Ministry of Education
- A pest monitoring booklet to facilitate population assessment of the key insect pests and diseases of apples, and decision making with regards to pest management
- A farmer-friendly Green and Yellow List to support the IPM 'thought process', i.e. prevention, monitoring and intervention
- A natural enemy and pest identification tool to facilitate recognition of important natural enemies, and key insect and disease pests in the apple orchards
- 12 leaflets on specific issues relevant for IPM in apple production
- Poster presented on IPM Education in Albania at 'Future of IPM in Europe' conference, Riva del Garda, Italy, March 19-21 2013
- Babendreier, D., Holmes, K., Jenner, W., Hunt, E., Grossrieder, M., Toepfer, S., Zhang, F. and Kuhlmann, U. (2010) Framework for the sustainable use of pesticides across the EU member states: challenges and opportunities for implementing IPM. European Congress of Entomology, 23-27 August 2010, Budapest, Hungary
- 'Fertilization in apple orchards in Albania', a 16-page fertilization guideline that was distributed to IP producers

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Authors

D. Babendreier and U. Kuhlmann

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