GREEN DEAL

The impact on Greek agriculture

HCPA
HELLENIC CROP PROTECTION ASSOCIATION

This text has been prepared by the scientific working group at Hellenic Crop Protection Association (HCPA) and external partners aiming to alert the farming community and the stakeholders in relation to the impact of the Green Deal and the New Common Agricultural Policy, especially on Crop Protection. We hope this text will serve as the basis for initiatives, so to safeguard the viability of the agricultural sector in Greece.

HCPA
HELLENIC CROP PROTECTION ASSOCIATION

The Hellenic Crop Protection Association (HCPA) represents the market leading companies that place plant protection products on the Greek market. Its member companies develop and supply a wide range of innovative conventional and organic products and support farmers with solutions for a wide variety of crops. In collaboration with scientists, technicians and other stakeholders of the food chain, the Association makes every effort to ensure the correct interpretation and implementation of the legislation, so as to ensure an integrated and effective protection of crops from pests and diseases. In addition, the HCPA seeks to achieve food security, good health of farmers and consumers through the development of innovative plant protection products, as well as the promotion of new digital solutions in crop management, for a sustainable agriculture with respect for human and the environment.

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THE POLITICAL AND LEGAL FRAMEWORK

The European Union's Green Deal is a political, non-binding text paving the way for policy reform in Europe in the next decade, setting targets for all sectoral policies from trade and shipping to industry and Agriculture. It continues the tradition of similar texts like the Agenda 2020 and addresses almost all activities in the EU, within the scope of environmental compliance and the promotion of sustainable management of natural resources, utilizing, to a large extent, technological development.

The changes that will occur in the agricultural sector are expected to significantly affect production practices and the rural economy, adversely impacting farmers and the Greek agricultural economy. The «Farm to Fork» policy is the text especially targeting agriculture which derives from the Green Deal.

The objectives of the Green Deal for the Agricultural sector - 25% of the agricultural area covered by organic production and 50% reduction of the use of plant protection products and the corresponding risk) are considered too ambitious by many stakeholders as well as the European Parliament. In particular, the goal related to plant protection products is considered extremely difficult to achieve.

- The production of several so-called «national» agricultural products will be significantly reduced, resulting in the reduction of the agricultural sector and employment in agriculture.
- The structure of crops in our country will change adversely, resulting in the reduction of the competitiveness of Greek agriculture and especially in terms of significant export goods such as cotton and olive.

Plant protection is one of the most sensitive issues at the public European dialogue on the Green Deal (GD). Its legal framework is currently governed by four basic legal texts (Regulations 1107/2009 for approvals, 396/2005 for residues, 1185/2009 for statistics on the use of Plant Protection Products and Directive 128/2009 for the sustainable use), which are expected to be modified as a result of the predictable results of the suitability test of (REFIT[2]) for the first two above-mentioned Regulations, as well as other horizontal policy or regulatory objectives (CAP/ SAIO), but mainly due to unforeseen developments promoted by radical political positions within the European Parliament or the Member States (MS).

The goal set, for 2030, to reduce 50% of the use of plant protection products, with active substances which will either not be re-approved because they fall under the cut-off criteria (Mutagenic/Carcinogenic/Reprotox 1A or 1B and ED for humans) or the environment), or they are or will be characterised during (re)approval[3] as candidates for substitution. This policy will further weaken the already inadequate amount of plant protection products, already suffering significant losses.

The objectives of the Green Deal will be achieved through changes in the legal aquis. In order to implement the policies mentioned in the GD and to achieve the objectives, the EU will introduce or amend legal texts. This effort has already started with the new CAP (Common Agricultural Policy), which sets goals and framework for achieving a series of interventions that are fully compatible with the GD. At the same time, a number of other legislative texts have been scheduled for amendment.

1. Guyomard, H., Bureau J.-C. et al. (2020), Research for AGRI Committee – The Green Deal and the CAP: policy implications to adapt farming practices and to preserve the EU's natural resources. European Parliament, Policy Department for Structural and Cohesion Policies, Brussels.)

2. https://ec.europa.eu/food/plants/pesticides/refit_en

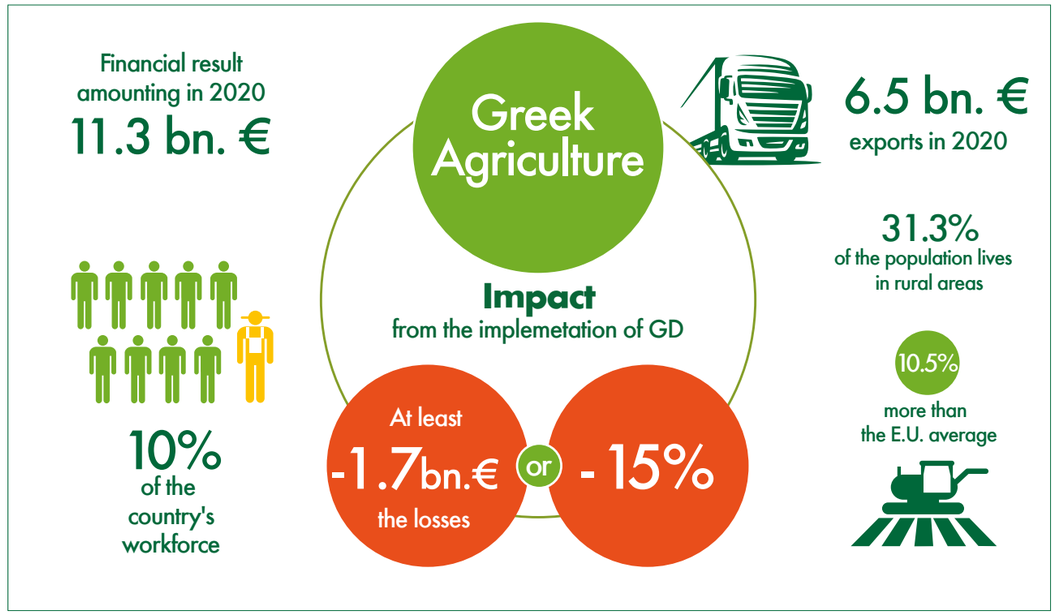
3. The active substances and the PPPs receive approval for a limited time through a regulated procedure. Before the expiration date, the interested parties resubmit the documents for approval adjusted to the new criteria. Cosequently some of the existing products may not receive a new approval in the EU because of more stringent criteria, but will continue to be available in other markets. This may lead to illegal imports in the EU.

The forthcoming changes in the legal status are not fully decided and will be negotiated in the European institutions. For example, the reduction of the use of plant protection products (PP) is predicted to be at 50% by the GD, but Greece is one of the MS with a minimum use of PP per hectare. A horizontal reduction across the EU will hit the Greek producers more, while on the contrary a proportional reduction will have a smaller impact. To achieve this, all stakeholders must work together to achieve the best result for the country.

The agricultural sector is the central pillar of the economic and social life of rural Greece. Employing 10% of the country's workforce with 457 Annual Work Units (AWU[4]), it produces an economic result amounting to € 11.3bn in 2020, when we managed for the first time to have a positive trade balance of agricultural products with a surplus of 106m € and exports € 6.5bn. With 31.3% of the population living in predominantly rural areas (10.5% more than the EU average) and the Gross Value Added (GVA) of agricultural products amounting to 4.7% compared to 1.9% in the EU, the Greek agricultural economy remains one of the most important sectors in the EU with regard to the contribution to the national economy.

The following pages summarize our estimates of the projected impacts, as well as suggestions for addressing them, so that Greek agriculture remains an important economic sector that will continue to support processing and tourism, both with agricultural products and with the required care of the environment of the Greek countryside.

These achievements are confronted with changes in plant protection, as several important crops will face a viability problem, while others less important will remain untouched - perhaps due to the fact that they are found in more EU Member States.



4. All the references come from European Commission, Statistical Factsheet, Greece, June 2021

Detailed impact for each crop

The effects referred to in this paragraph are due to the fact that many of the plant protection products used in agricultural production will cease to be available, for the reasons mentioned in the previous section. The Table in Annex I shows the forthcoming changes in numbers, provided that the objectives set by the Green Deal and the current legal framework are implemented. The changes in the availability of PPPs and active substances that will result from the possible restrictions of active substances and products, as well as our estimates for the impact on important crops for the country are included. Some active ingredients are very important and cannot be replaced by others. It is pointed out that with persistent and vigorous negotiation it is possible to retain more active substances and corresponding formulations than those listed in the table. Finally, it should be noted that the restriction of the active substances and PPPs in the E.U. does not imply their restriction in the rest of the world, which means that the competitiveness of European and national products versus those from third countries will be reduced. This becomes very important when the crops that will be most affected are identified, actually being typical Greek or Mediterranean crops.

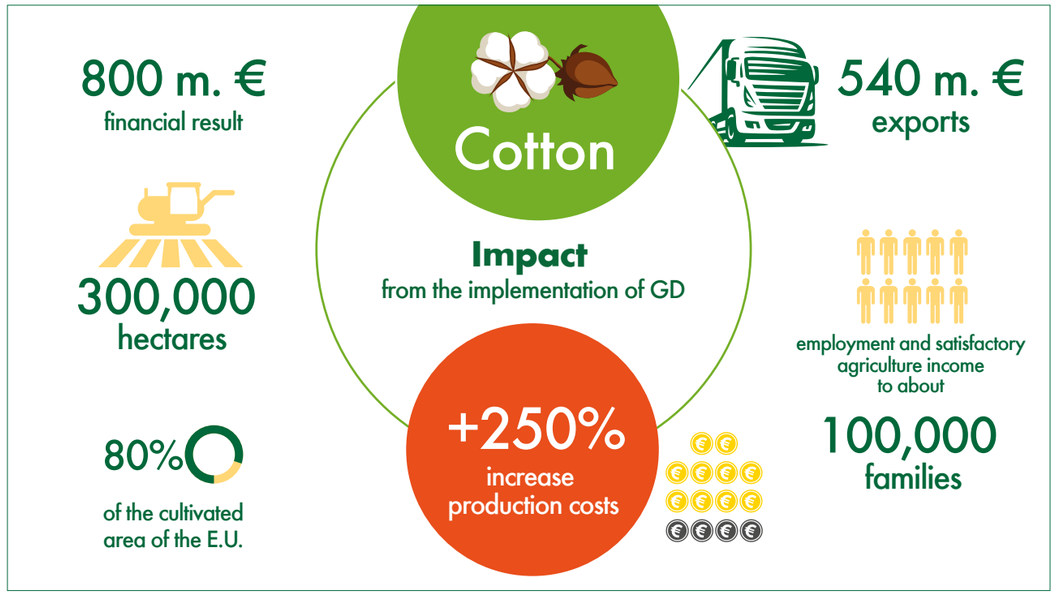
Cotton

Cotton, which is considered a Greek product in the EU, both historically and in terms of production, runs the risk of being abandoned by Greek farmers. . Greek cotton production covers 300th ha corresponding to 80%[5] of the European cultivated area. The output is 800m€ with an export value of 540m€ in 2019, providing employment and satisfactory agricultural income to about 100,000 agriculture families as well as to about 100,000 other families, rural or urban, who are indirectly involved with the product. It is estimated that cotton will face the most serious problem of all crops due to the withdrawal of plant protection products. In particular:

Upon full implementation of the restrictive measures for Plant Protection and the Green Deal, the widely available products with which producers and agronomists are familiar will be greatly reduced. It is expected that few conventional products will be left and some of biological or natural origin - some of which are also characterized as «low risk». However, these are less effective, do not meet all plant protection needs, require more specialized technique training in handling and application and are finally expected to increase production costs.

- Significant problems will arise in weed control (for both pre-emergence and post-emergence of cotton weeds).
- For controlling mites, there are now few acaricides available for use in crop.
- The existing shortage of products for seed treatment of cotton against insects (in the early stages of cotton development), as well as soil diseases (such as Pythium, Rhizoctonia, Fusarium) will be aggravated.

These problems are estimated to **increase production cost by approximately 250%[6],** mainly due to herbicides. The yield in kilos per hectare **will be reduced by at least 30%[7]**, and there will be a gradual abandonment of cotton production by Greek farmers, negatively impacting the inflow of EU funds the agricultural Gross National Product, as well as the trade balance.



5. E. C. (https://ec.europa.eu/info/food-farming-fisheries/plants-and-plant-products/plant-products/cotton_en)
6. European Crop Protection Association, Low Yield II Cumulative impact of hazard-based legislation on crop protection products in Europe, 2020
7. Own elaboration of Paying Agency Data, http://aggregate.opekepe.gr/

Olive

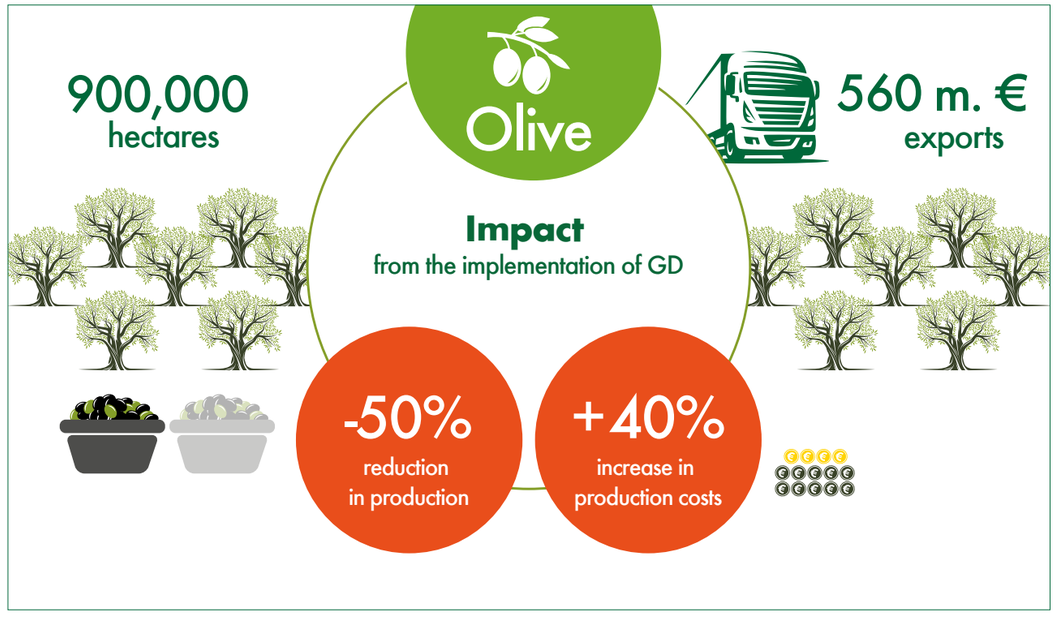
Olives and olive oil are nutritional landmarks of Greece and foundations of the Mediterranean diet. The cultivation of olives, which covers 900th ha is an important component of the Greek countryside with a profound effect on the landscape while promoting environmental sustainability, because olive groves substitute the ecological function of forests to a large degree. With an output of €760m per year (average 2019-2020) and exports of €560m in 2020, it is one of the few food products that opens markets for other Greek products. This significant function is also highlighted by the recent successful export efforts of small producers with high added value- olive oil.

Although the commercial future of the products looks promising, the effects of climate change and plant protection constraints will bring about significant changes in cultivation. Plant protection of olive groves is expected to be severely affected with grave impact on viability and competitiveness.

It is anticipated that:

- There is a minimum choice of formulations and a serious problem is expected in the treatment of entomological infestations, including olive fruit fly. For the treatment of olive fruit fly, there are currently only 4 modes of action of conventional / chemically active substances which are marginal for resistance management) while in the future there will be fewer left that belong to only 3 different mechanisms of action, which are deemed insufficient for resistance management.
- Fungal and bacteriological infestations will be a serious problem, especially if the copper-based formulations (which can also be used in the organic cultivation of olives) become restricted. This will have a direct impact on the quantity and quality of production.
- Weed Control will become problematic, as the few existing products are expected to become obsolete due to the Green Deal.

These problems are estimated to lead to an increase in production costs of approximately 40%, a reduction in production by 50% (European Crop Protection Association, 2020) and a reduction in gross profit of producers by 37%.



Peach

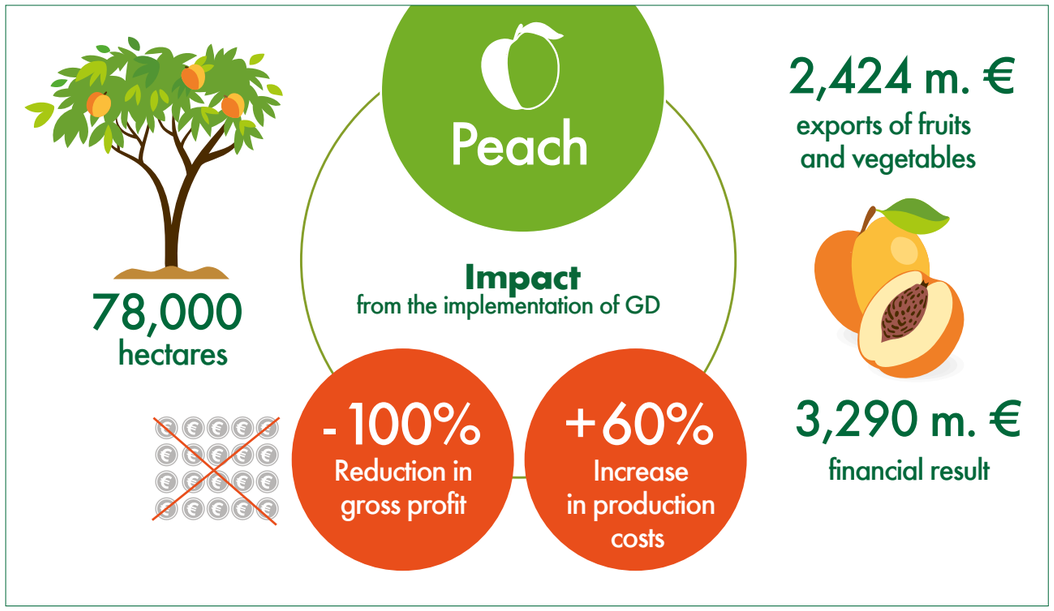
Peach is another specialty food product of our country. Its penetration in the markets of the world both as fresh fruit and as processed has triggered growth for the areas in which it is cultivated. Covering an area of 78th ha, mainly in Central Macedonia, and being a key component of the economic fruit product amounting to 3,290m€, it contributes significantly to the export of fruits and vegetables amounting to 2,424m€, having opened difficult markets such as Russia. It has also contributed to the development of two of the most dynamic cooperatives in the Greek countryside.

The crop is vulnerable to pests, and although significant progress has been made in recent years by using mating disruption technique on insects, many infestations continue to be treated in the traditional way.

According to estimates:

- The reduction of fungicidal active substances is expected to create a huge gap, mainly in the treatment of the peach leaf curl in our country, resulting not only in the loss of production, but also in the loss of plant capital.
- The forecasted future withdrawal of fungicides containing copper is expected to cause major problems for organic Peach, which may become unsustainable for organic farmers in our country.
- Regarding mites, the already Insufficient solutions will be reduced to a minimum, resulting in difficult management of mites.
- Regarding weed management, the already critically low number of solutions will be further reduced creating serious concerns particularly for some of the most harmful and spreading weeds.

These problems are estimated to result in an increase in production costs of approximately 60%, and a reduction in gross profit by 100%[8].

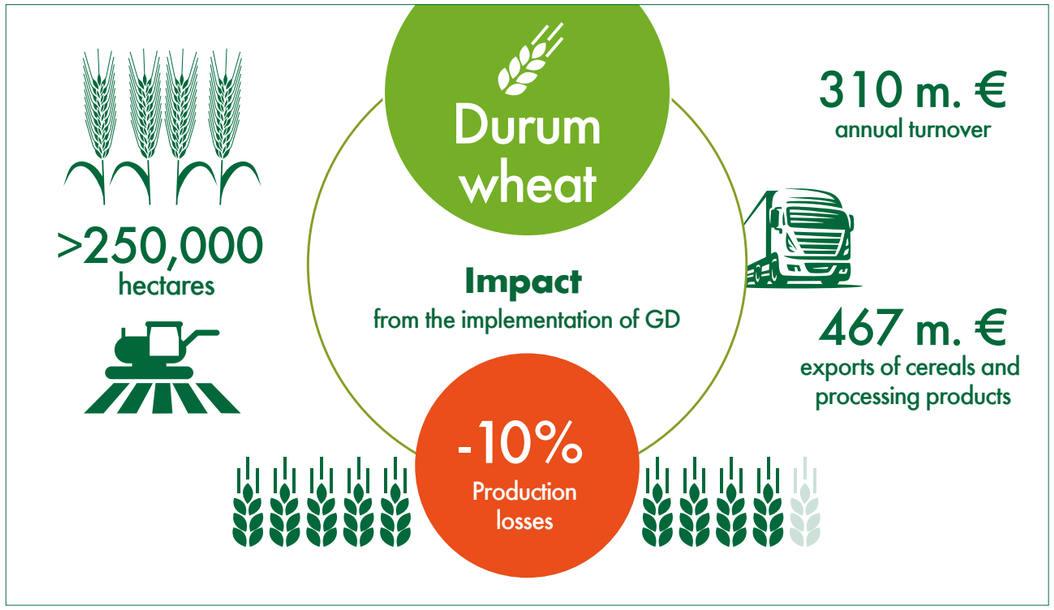


8. European Crop Protection Association, Low Yield II, Cumulative impact of hazard-based legislation on crop protection products in Europe, 2020

Wheat

Durum wheat is a traditional and profitable crop in the country with a strong export orientation and special value in the European market, as its quality characteristics make it sought after mainly in the processing industry of Greece and Italy. Its contribution to the exports of cereals and processing products of € 467m is very important.

It is estimated that **the cultivation of Durum Wheat,** with a total area of 253,877 ha (data of the Directorate of Agricultural Policy 2019), will not be significantly affected by the withdrawal of active substances and the implementation of the Green Deal. Therefore, the messages are positive for this traditional, strategic cultivation for our country, which holds also social value.



Grapes

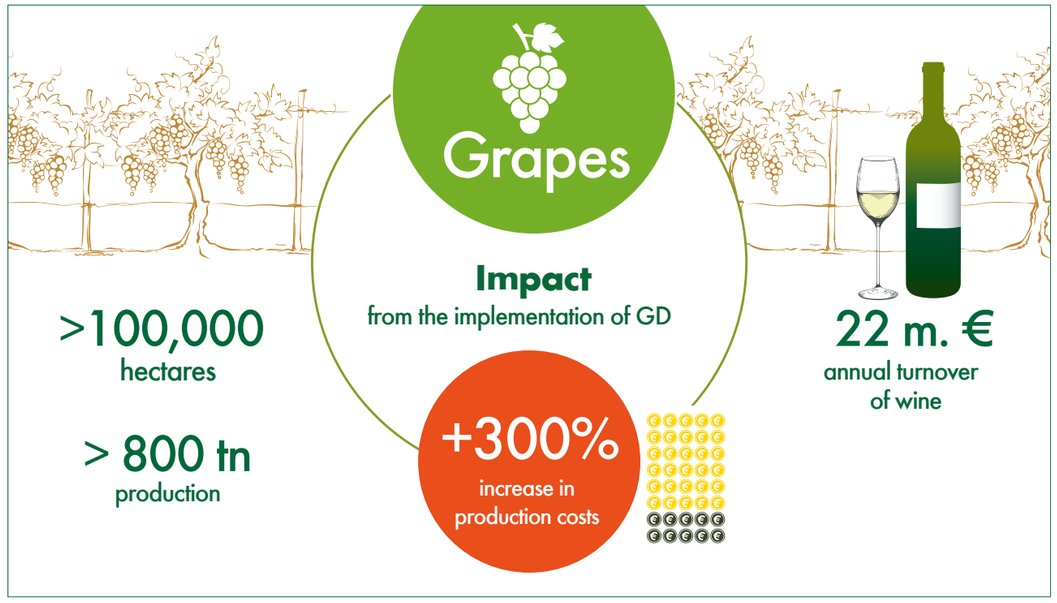
Covering over 100th ha and production over 800tn, the Greek vine sector is very significant for the country. In addition to the production of table grapes, raisins which are a PDO product are and also the raw material for wine is provided. With an annual turnover of 22m €, Greek wine is increasingly improving its position in the international markets both because of the quality improvement and the consolidation of several PDO and PGI products. The effort to use Greek traditional varieties of grapes in wine making, shows that this sector has significant commercial dynamics.

It is estimated that viticulture will also face a serious problem from the withdrawal of plant protection products.

Specifically, it is estimated that:

- There will be a significant problem with Downy mildew disease, especially in the case of future withdrawal of available fungicides containing copper as active substance. In this case, an even bigger problem will be faced by Organic Vines which without the availability of copper -based fungicides may become unsustainable for organic growers in the EU, which also contradicts the goal of the Green Deal to increase the land where organic farming is practiced.
- The treatment of mites (especially the family Eriophyidae) will be even more difficult for growers, due to the planned withdrawal of miticides.
- For weeds there are few mechanisms of action left, so for some of the most harmful and spreading weeds there will not be any longer solutions.

These problems are estimated to result in an increase in production costs of approximately 300%, and a reduction in gross profit by 30%[9].



9. European Crop Protection Association, Low Yield II, Cumulative impact of hazard-based legislation on crop protection products in Europe, 2020

Vegetables

Vegetables are of particular importance for Greece now and in the future. In addition to their economic importance and export potential, they support the country's tourism and are a key component of the Greek diet and tourist experience in our country. Vegetables contribute to a large extent to the export potential of the country with 126m€, and quantities of 31,325 tons of tomatoes and 13,000 tons of cucumbers[10].

Specifically, the outdoor tomato is one of the main crops in the country, located in most geographical areas occupying more than 7th ha and characterized by a positive growth trend. It is a basic export product and an important source of income for farmers and processing industries. In addition, the cultivation of cucumber with exports of 17m€ in 2020, is a dynamic and emerging crop which has positive prospects for commercial expansion.

The limitation of available plant protection products will have a significant impact on vegetable crops.

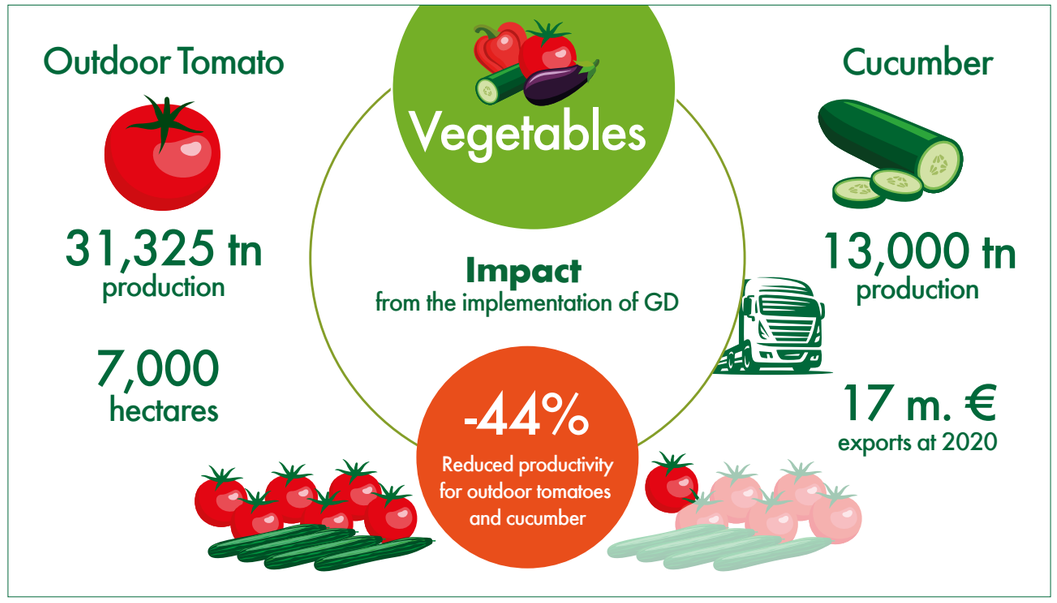
The outdoor tomato is expected to face a serious problem:

- with nematodes, and fusarium fungi, resulting in the problematic establishment of the crop and
- Tuta absoluta, with implications for expected production that may reach levels of complete destruction.

For cucumbers in greenhouses:

- A gap is expected in the treatment of bacteria for the cucumber cultivation.
- It is estimated that there will be a serious problem in the treatment of nematodes, which threaten the establishment and development of the crop.
- Lack of solutions will be noted in a number of diseases and infestations by thrips and leafworms.

These problems are estimated to reduce productivity by about 44% for outdoor tomatoes and cucumbers, making crops economically unsustainable for growers[11].



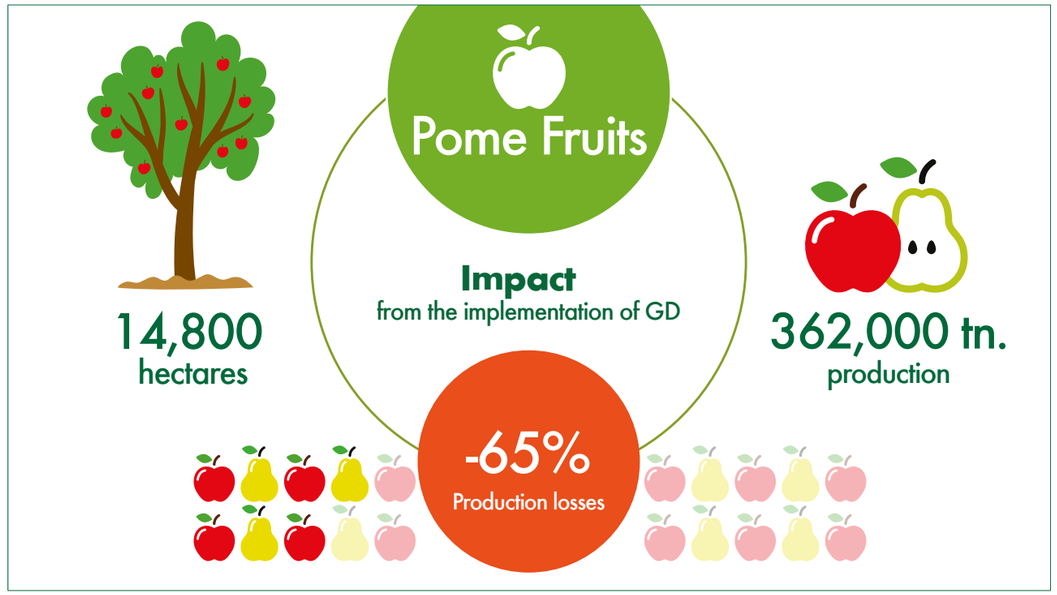
10.Hellenic Statistical Authority, process INCOFRUIT – HELLAS, https://www.ethnos.gr/oikonomia/111130_xefreno-rali-stis-exagoges-froyton-kai-lahanikon
11. European Crop Protection Association, Low Yield IICumulative impact of hazard-based legislation on crop protection products in Europe, 2020

Pome fruits

With 14.8th ha[12], 362,000 tons of production of which about 65,00013 are exported, pome fruits (mainly apples and pears) positively contribute to the export potential of fruits and vegetables amounting to 2.4bn€[13]. The sector remains important for both the rural economy and the eating habits of the population. Not only is the cultivation widespread but it is also located to very important productive prefectures which rely on agriculture for the socio-economic sustainability. (Pella, Imathia, Kozani, Kastoria, Larissa, Magnesia). The investment in land and plant capital is of high economic value and farmers engaged in these crops are considered among the most dynamic in the Greek countryside, running profitable businesses without the aid of direct payments form the CAP until 2015. These crops also contribute significantly to the diversity of the landscape and the touristic upgrade of the specific areas.

With the restriction of plant protection products, Greek pome fruit producers are in danger of losing 65% of their production[14]. Serious problems are foreseen in dealing with significant entomological and fungal infestations

- There will be a serious problem in dealing with pests such as the Coldling moth and pear psyllid, where there are few active substances belonging to 3-4 different mechanisms of action, resulting in the difficult management of resistance to important pests that require multiple applications,
- the approved solutions for apple aphid and the woolly apple aphid will be reduced to a minimum, making them more difficult to deal with,
- for the treatment of apple scab fungus one of the most important diseases that require many applications per year and belong to the pathogens of high risk for development of resistance, the condition is assessed as borderline for the management of the disease.



12. Data from the Min. Rural Development and Food, Dir. Agricultural Policy, 2019
13. https://www.agrotypos.gr/kalliergeies/miloeidi/afximeni-zitisi-se-ellada-kai-ee-voitha-tin-aporrofisi-paragogis-milon
14. European Crop Protection Association, Low Yield II Cumulative impact of hazard-based legislation on crop protection products in Europe, 2020

Proposed actions to mitigate the effects

The impact of the Green Deal on agricultural practice can be mitigated by measures and actions that, in the condition that they are supported institutionally, can have a satisfactory effect. Considering that:

- The aforementioned crops are major components of Greek crop production and the agricultural economy,
- These products make a significant contribution to exports, and
- The invested capital of Greek farmers in knowledge and specialized equipment is significant,

Measures should be taken to sustain the major crops, both through interventions at the level of policy and European negotiations, as well as advanced technical solutions. In the field of politics and negotiations in the European institutions, every effort should be taken, in order to prevent abandonment of the crops produced by Greek farmers.

Therefore, in order to mitigate the effects and preserve the viability of the Greek countryside, the following actions are proposed, which could be combined to contribute positively to the maintenance of agricultural production in our country:

1 **Preparation of a detailed impact study which will demonstrate the effects of reduced chemical plant protection products on the production of food and other important agricultural products in our country.** This study will be a documentation of our country's arguments during the negotiations and at the same time a guide for action for those involved. It is noted that a similar study has already been done by Spain, Portugal, and other countries. In Greece, the study can be funded by the technical assistance of the Rural Development Program (RDP) and carried out by a partnership of scientific bodies (AUA, BPI, ELGO) and the HCPA under the guidance of the Ministry of Rural Development and Food.

It is noted that HCPA in collaboration with AUA started the pilot applications in demonstration farms. All these practices will be tested in these fields, while at the same time we aspire to demonstrate all the new cultivation techniques but also the agri-enviromental practices to farmers, agronomists and others involved.

2 **Strong and targeted support within the European institutions in order to maintain the crucial plant protection substances that are critical for Greek agriculture.** In this context, HCPA is willing to work closely with the services of the Ministry of Rural Development and Food and other interested stakeholders, in order to form a strong view (based on scientific and socio-economic criteria) on the need to maintain, necessary for the sustainability of Greek agriculture active substances (insecticides olive fruit fly, herbicides for cotton, nematodes for vegetables, etc.).

3 **The incorporation of specific countermeasures in the approval of PPP substances,** which will function as risk mitigation measures, so to continue to use the active substances that are necessary in Greek agriculture. It is noted that these countermeasures often act successfully in combination with agri-environmental actions. In addition, the rapid approval of new formulations compatible with the principles of the Green Deal can function, by strengthening the role of the Benaki Phytopathological Institute and the competent department of the Ministry of Rural Development and Food.

4 **The integration into the CAP strategic plan of environmental practices that will help farmers in the transition to the new situation and will mitigate the impact of the Green Deal.** These actions are summarized in the next section of the memorandum.

Opportunities and proposed actions in the context of the new CAP and the Strategic Plan

The strategic plan under the new CAP provides an opportunity for actions that will contribute to the environmental dimension of agriculture and at the same time mitigate some of the effects of the Green Deal in order to sustain a healthy, viable and competitive agricultural production.

New agri-environmental practices as well as those of eco-schemes can promote action by encouraging producers to adopt practices to overcome difficulties and remove some of the limitations of the Green Deal for plant protection, while at the same time promoting the environmental compatibility of agricultural production. It is pointed out that the ambitious goals set by the Green Deal for the reduction of chemical PPP will lead to a reduction in agricultural production and an increase in food costs. At the same time, the new products biological or natural origin and low risk (Bio / Low Risk) are promoted, which, however, are currently less effective and require specialized knowledge for their application. It is estimated that we need at least a decade of research and development of these preparations in order to adequately meet the needs of crops for plant protection. The following are proposals of HCPA to the Strategic Plan Training Consultant.

A | Agri-environmental measures and ecological schemes

One of the biggest changes in the CAP is the new configuration of the Greening with the ecological schemes that will be financed by the first pillar of the CAP. However, the ambitious policy planning demands the implementation of new practices that combine environmental benefits and attractiveness for farmers. HCPA utilizing the extensive European know-how in the issues of environmental practices, proposes practices that have been tested in Greece and Europe and relate to crop production:

1 **Implementation of Integrated Plant Protection:**

a. The new Conditionality farmers shall keep a simple calendar, preferably based on a mobile application,

b. the ecological schemes, whereby applying the general principles of integrated plant protection (IPM principles 2,4,5,6,7,8) and completion of a corresponding questionnaire by the farmer or the advisor. The calendar can be electronic even through applications on mobile devices, so that there is a direct interconnection with other entities for evaluation and/or control. In this thematic we can have an extension in agri-environmental measure by applying the special instructions of the Ministry of Rural Development and Food. The questionnaires are listed in the Annex (Objective 5.6). Through these questionnaires the use of the new formulations can be monitored (Bio/Low Risk) in order to have a statistical footprint of the data that will be used in the future. (Objective 9).

2 **Installation of vegetation buffer zones to support pollinating insects** as an ecological scheme and/or agri-environmental measure. The practice relates to the creation and coverage of buffer zones at the margins of the farm plots using specific species of endemic plants that attract pollinating insects and at the same time act as buffer zones that reduce erosion and offer protection. The proposal is based on research work[15] and relates to the reduction of pollution and erosion, to the protection of surface water from run off, the preservation and enhancement of biodiversity with parallel benefits to crop productivity (Objective 4, 5, 6).

3 **Installation of hedgerows on the margins of the farming plots,** as an agri-environmental measure to conserve and enhance biodiversity and reduce pollution, because hedgerows can operate as a buffer zone. This practice is appropriate for an agri-environmental measure due to the length of time required to install the plant hedge. This measure will subsidize the farmer for the installation and the maintenance for 3 to 5 years. (Objective 4, 5, 6).

4 **Use of low drift nozzles** as an eco-scheme. This scheme aims to reduce the diffuse spray pollution with very simple interventions focusing on the use of only special nozzles that are adapted to sprayers (Objective 5, 6).

15. a. Bandes enherbées © ARVALIS - Institut du végétal - Novembre 2007
b. University of Thessaly, Water Protection Best Management Practicies Establishment Emphasizing In Vegetative Buffer Strips: Feasibility Demonstration In Thessaly, Central Greece (Acronym: AgriBMPs), 2017

5 **Spray residue management** as an eco-scheme. With this practice, the excess spray liquid as well as the contaminated water from cleaning of the spray equipment are channeled to special collectors where they are constrained and following natural evaporation, the active substances are collected as a dry residue on membranes which at the end of their life (per year) are transferred to special management facilities. This practice could ideally function as a service. It contributes to the reduction of spot and diffuse pollution. (Objective 5, 6).

6 **Use of precision agriculture to reduce pollution during spraying** as eco-scheme. This practice relates to the use of precision farming equipment with the help of which it is possible to reduce the consumption of spray liquid by high percentages starting from 13% for arable crops and can reach up to 70%[16] for orchards, but also the reduction of diffuse pollution. We propose to configure it in two ways: On the one hand for the farmers who have the ability and the equipment to apply it and on the other hand for the rest farmers to be subsidized for the use of the service provided by other operators (Objectives 5, 6, 10).

B | Investments (Rural Development, RD)

The transition to the next period of agricultural production as marked by the Green Deal, together with the shift to technologically smart agriculture (including precision agriculture), requires knowledge, change of current practices and investment in equipment that will serve the new practices.

1 **Precision Farming Equipment:** The implementation of some new precision farming applications requires high level technological knowledge, therefore it is wise to apply it on the field as a service by technically and technologically qualified operators and not by each and every single farmer. In this way the equipment will be used to its full potential, without becoming an underutilized asset purchased because of the RD subsidies. Therefore, it is deemed that collective schemes investments will make better use of the equipment, as they have the opportunity to invest in the required knowledge as well. In our opinion, investment support priority through the RD should be given to the following equipment:

1.1 Autonomous driving systems for tractors with connection to the accessories, in order to save time, therefore fuel, as well as the quantities of seeds and spray liquid. At the same time, pollution is reduced. According to farmers who already use the system, the time is reduced by 25% -35%, and the amount of spray liquid by 25%.

1.2 Use of low dispersion spray systems to reduce diffuse pollution. The use of such systems reduces pollution by more than 60%. Such systems can be ground or flying robotic vehicles. The investment cost is relatively small, but training is required for the user.

2 **Closed circuit for spray management.** With this system which fits all existing spraying equipment of the last 20 years, the farmer does not come into contact with chemicals, the mixing of plant protection products is done automatically at the appropriate rate. It offers economical option to the farmer, protects the health of the operator and reduces pollution.

3 **Plant protection products' waste management systems.** These are simple systems with zero maintenance cost by which the excess spray liquid and cleaning water are collected and following natural evaporation, the active substances remain as a dry residue on special membranes which are then transported to special management facilities. The use of such systems eliminates the pollution of soils as well as water and minimize health risks for farmers.

4 **Investments in the network of agricultural supply stores.** Many of the new plant protection products of low risk (Bio/Low Risk) are organically or naturally occurring products that need to be stored under specific conditions of temperature, humidity and shading (such as special storage refrigerators) in order to be effective. So as a next step the retailer stores will need to upgrade their storage equipment, and it is considered legitimate to support them through RD, so that they can meet the new requirements.

16. Precision Agriculture Technologies Positively Contributing to GHG Emissions Mitigation, Farm Productivity and Economics, Athanasios Balafoutis, Bert Beck, Spyros Fountas, Jurgen Vangeyte, Tamme van der Wal, Iria Soto, Manuel Gómez-Barbero, Andrew Barnes and Vera Eory, σελίδα 17.

C | Training

The new CAP provides training actions through AKIS. Within this framework, HCPA in collaboration with institutions such as the Agricultural University of Athens and the Benaki Phytopathological Institute can contribute to the essential promotion of practical issues which have been identified as important training needs of farmers and other stakeholders. In particular, but not exclusively, the following are suggested:

1. **Occupational safety,** which concerns the protection of workers and especially those who use chemicals (protective clothing, etc.).

2. **Operation of machines** with emphasis on spraying equipment to avoid contact of farmer-operator with the chemicals, as well as the pollution.

3. **Management of empty containers:** The empty packaging of chemical and biological preparations must be recycled in the right way to avoid pollution and contamination. HCPA has already established the process and the network for collecting empty packages. Training farmers to this end will contribute to the use of the process and will solve the problem of empty containers.

4. **Precision Agriculture & Plant Protection:** In collaboration with Agriculture University of Athens, HCPA can demonstrate the use of new precision farming tools for spraying. In this way, the products are used more efficiently, the spray solution is managed efficiently, the accidental transport and drift are reduced.

5. **Integrated Pest Management:** This program aims to fully meet the needs of IPM starting from the simple farming calendar that exists within the frame of Conditionality and up to fulfilling the basic principles of integrated pest management, which can also become an eco-scheme.

6. **Agri-environmental practices:** Practices such as spraying with low drift nozzles, buffer zones with covering plant areas that attract insect-pollinators, the installation of plant hedges and the management of residual spraying liquid, are actions that can be included in the strategic plan for the new CAP.

7. **Equipment demonstration:** In collaboration with the farmers, companies and the Agricultural University of Athens, farmers and operators will be trained in the proper use of plant protection equipment.

8. **New LOW RISK plant protection products:** HCPA and the individual stakeholders have the know-how to provide training services for the new products that are gradually included in the practice of plant protection, as a result of the Green Deal.

Farm demonstration (DEMO farm) from HCPA in collaboration with AUA which become pilot applications and demonstrations of all new farming techniques but also of agri-environmental practices to farmers, agronomists and other stakeholders.

Photo: © Chris Christofilopoulos

ANNEX I

Table I: Active substances and Products expected to be withdrawn according to officially published information*

Product category	Total of approved conventional (No.)		To be withdrawn (no.)		To be maintained (no.)		Change in the number of conventional active substances	Change in the number of conventional plant protection product products
	Active substances	Products	Active substances	Products	Active substances	Products		
Cotton								
herbicides	15	160	7	119	8	41	**-47%**	**-74%**
insecticides	22	151	8	44	14	107	-36%	-29%
acaricides	4	7	3	6	1	1	**-75%**	**-86%**
Olive								
herbicides	15	27	4	9	11	18	-27%	-33%
insecticides	12	129	3	30	9	99	**-25%**	**-23%**
acaricides	12	191	7	168	5	23	**-58%**	**-88%**
Peach								
herbicides	10	97	5	84	5	13	**-50%**	**-87%**
insecticides	27	174	10	52	17	122	-37%	-30%
acaricides	5	8	3	5	2	3	**-60%**	**-63%**
fungicides	30	221	14	151	16	70	**-47%**	**-68%**
Durum Wheat								
herbicides	25	73	5	32	20	41	-20%	-44%
fungicides	16	62	7	29	9	33	-44%	-47%
plant growth regulators	3	4	0	0	3	4	0%	0%
Grapes								
herbicides	14	104	6	84	8	20	-43%	**-81%**
insecticides	25	181	8	71	17	110	**-32%**	-39%
acaricides	8	48	4	32	4	16	**-50%**	**-67%**
fungicides	53	379	15	198	38	181	**-28%**	**-52%**
Pome fruit								
herbicides	10	97	5	84	5	13	**-50%**	**-87%**
insecticides	25	191	8	68	17	123	**-32%**	-36%
fungicides	33	271	16	157	17	114	**-48%**	**-58%**
Vegetables (outdoor tomato)								
insecticides	27	214	7	106	20	108	**-26%**	**-50%**
acaricides	9	15	2	4	7	11	-22%	-27%
fungicides	42	280	17	158	25	122	**-40%**	**-56%**
nematicides	5	16	2	12	3	4	**-40%**	**-75%**

Qualitative Assessment	Of biological origin to be maintained (no.)		Total of approved (no.)	
	Active substances	Products	Active substances	Products
A significant problem is expected to arise in dealing with weeds, mites, and insects, having a serious impact on crop sustainability.	0	0	15	160
	6	14	28	165
	2	3	6	10
A severe problem is expected in dealing with mycological and mostly entomological infestations, including the olive fly, as dealing with the latter involves only 3 different modes of action remaining, thus rendering impossible the already problematic management of resistance.	0	0	15	27
	8	8	20	137
	6	3	18	194
Production loss and plant capital loss is expected due to the withdrawal of fungicides. Severe weed problems are also expected.	0	0	10	97
	14	34	41	208
	10	28	15	36
	7	7	37	228
No crop problems expected.	0	0	25	73
	0	0	16	62
	0	0	3	4
A severe shock is expected in exports, especially of table varieties if copper containing products are withdrawn (on account of downy mildew).	0	0	14	104
	7	16	32	197
	0	0	8	48
	17	16	70	395
Significant problems foreseen in dealing with enemies and diseases which will have a negative impact on production and sustainability of orchards.	0	0	10	97
	12	20	37	211
	7	7	40	278
Significant plant protection problems are expected to arise with a drastic yield reduction, which will affect exports and the processing industry.	11	24	38	238
	0	0	9	15
	16	14	58	294
	4	4	9	20

▲ Back to «Detailed impact for each crop»

* Criteria used to incorporate an active substance to the list of items to be withdrawn include:
1. Active substances characterized as "Candidates for Substitution" (CfS), as these are cited on the base of the EU Committee,
2. The active substances which are endocrine disruptors, according to the 'COMMISSION STAFF WORKING DOCUMENT SWD(2016) 211 final, page 308 Option 2 &3', cited especially for Greece
3. Special cases: a) active substances for which, while they have been voted as not to be re-approved, the regulation has yet to be published, therefore they do not appear as non-approved on the base of the EU Committee, b) active substances with a published ECHA classification listing them in the cut-off criteria, given that, in order for them to remain approved, Article 4.7 of reg. 1107/2009 will have to be applied, for which there is no agreement between MSs and the EU Commission , c) active substances for which no renewal file has been submitted within the provided closing date, d) existing suggestions by the EU Commission, either for non-re-approvals or with usage limitations in non-edible and/or hothouse approvals, as the case may be. Especially with regard to preparations, in addition to the above, those in circulation in stock for other reasons and of course all that appear approved with a 120-day status.

ANNEX II

1 | Integrated plant protection: Farmer's journal for "conditionality"

Journal of applying plant protection products

DATE & TIME OF APPLICATION	TRADE NAME	OF BIO ORIGIN OR LOW RISK? (Bio/ Low risk)	CROP	LOCATION	EXTENT OF APPLICATION	DOSE OF APPLICATION
		YES ☐ NO ☐				
		YES ☐ NO ☐				

WATER VOLUME - SPRAY LIQUID USED	TYPE OF SPRAY METHOD, SPRAY SYSTEM, NOZZLE, SPRAY PRESSURE	TARGET (enemy, disease, weed, other)	CROP STAGE	LATEST INTERVENTION BEFORE HARVEST	UNSPRAYED ZONE	NAME OF SPRAYER

2 | Integrated plant protection:
Farmers' questionnaires about "eco-schemes"

1. Monitoring of harmful organisms	YES	NO	Non-applicable
Monitoring of crops for enemies/diseases			
Possibility/Knowledge of identifying main plant protection problems			
Monitoring of plant protection by an Agronomist			
Joint decision making with the help of an Agronomist			
Use of systems of farming warnings to assist in making the decision to intervene			
Use of weather forecasts to assist in making the decision to intervene			
Use of traps/sticky patches/bait for monitoring			
Other (please specify)			

2. Use of bio, natural, or other non-chemical methods	YES	NO	Non-applicable
Use of natural enemies / macro-organisms			
Application of methods of conjugation prohibition, mass trapping, attracting and culling, etc.			
Use of bio-protective products			
Other			

3. Use of plant protection products as specialized as possible in the target and with the least unfavorable results	YES	NO	Non-applicable
Applications customarily carried out simultaneously for multiple/ different targets			
Understanding of the plant protection product label content			
Taking measures for preventing resistance development			
Use of plant protection products with different modes of action			
Use of spray reduction nozzles			
Use of protected unsprayed zones			
Use of restrictions for the next crops			
Use of treated seed			
Refraining from using plant protection products which are dangerous to bees during blossoming			
Other (please specify)			

4. Use of plant protection products at the necessary levels	YES	NO	Non-applicable
Use of reduced application doses (target stage, intensity of infestation etc.)			
Use of filming agents/synergistic agents for optimization of the intervention			
Specified application at crop field spots with enemy presence			
Reduction of application frequency (time-specific applications for reducing the number of interventions)			
Other (please specify)			

5. Application of strategies against the development of resistance, in order for produce efficiency to be maintained	YES	NO	Non-applicable
Familiarisation with the labels of plant protection products, concerning resistance management			
Alternation of products with different modes of action			
Use of mixtures with different modes of action			
Other (please specify)			

6. Success of the applied measures of crop protection					
Assessment of plant protection program success					
(1: not successful - 5: very successful)	1	2	3	4	5
Please specify:					

	YES	NO	Non-applicable
Measurement of crop yield			
Discussion of results with Agronomist			
Cost / benefit assessment / of interventions			
Other (please specify)			

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