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TOPPLANT

Intellectual Output 1
Methodological curriculum on organic plant protection

ipCENTER room for learning
BIOTEHNIŠKI CENTER NAKLO
MATE MAGYAR AGRÁR- ÉS ÉLETTUDOMÁNYI EGYETEM
biohelp

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Project title: Trainers for Plant Protection in Organic Farming – TOPPlant
Agreement number: 2020-1-AT01-KA202-078107

1. GENERAL PART

Training course name:
Basic Training for Facilitators for Plant Protection in Organic Farming

EQF level: 5

Training course description:

The goal of the training course is to obtain general knowledge and skills in the pedagogical methodology for non-formal adult education for facilitators and specific knowledge and skills on special topics of organic plant protection.

Participants obtain competences to manage and organize specialized courses concerning plant protection in an organic farming participatory approach, develop, manage and fine-tune curriculum with participants, and evolving activities throughout the growing season in reaction to real time events in the field and group dynamic. The training course provides participants with competences to plan a plant protection strategy for different crop species through basic principles of organic agriculture and EU regulation, create favorable conditions for regulation and perform monitoring of pests, diseases and weeds in organic production and determine suitable organic plant protection. In specialized Modules 3, 4, and 5 (Tools to manage PESTS, DISEASES, and WEEDS) participants gain competences in predicting the effect of the implementation of different agro-technical methods on the pest, plant pathogens, and weed population, planning and implementing techniques to preserve and conserve natural enemies in specific agricultural production, organizing the monitoring of the pests, diseases, selecting and recommending the appropriate methods and products to be applied to keep pest, pathogens and weeds population below the economic threshold.

Training course should last 5 days (each module 6 hours) during the vegetation of a specific plant or the life cycle of a pest or pathogen.

General objectives at the level of the training course to which the module contributes:

- Plan, organize and apply the basic principles of learner-centered, participatory model of education of farmers which relies on an experiential learning for plant protection in organic agriculture.
- Plan and implement the training programme on plant protection strategy for different crop species in accordance with basic principles of organic agriculture and EU regulation.
- Implement appropriate training methodology and train farmers to manage pests, diseases and weeds in organic production for specific crops species, using appropriate practice.
- Create field studies and exercises to facilitate monitoring of pest, disease and weed population and determine direct implementation measures when needed.
- Determine relevant needs for plant protection products, dosage, application method and application time for regulation of pests and diseases in organic production.

- Develop communication skills, critical thinking, self-reflection skills, observation and monitoring skills.

Duration: 30 hours

Target groups:

- Teachers/Lecturers/Trainers
- Educational professional workers
- Science professors
- Employees from agricultural advisory service

Participant's enrolment criteria and preliminary knowledge required:

Future facilitators should have specialization in agriculture topics with an EQF level 5 formal education, or an EQF level 4 formal education plus 5 years of practical experience in organic agriculture production.

Course coordinator capacities required (Who can teach the course):

Trainers/teachers for facilitators should have specialization in agriculture topics with a minimum EQF level 6 in formal education, or they should have specialization in agriculture topics with an EQF level 5 formal education plus 5 years of practical experience in the agriculture topics.

Methods of grading:

Obligatory grading elements	**Share (minimum)**
Classroom/Field attendance	90%
Individual assignment	100%
Online sessions	100%
Self-correcting quiz	60%
Final exam	60%

List of modules:

1. Module 1: Basic principles of a participatory learning model for farmer education based on experiential learning
2. Module 2: General approach to pests, diseases and weed management in biological agriculture
3. Module 3: Methods and tools to manage pests
4. Module 4: Methods and tools to manage diseases
5. Module 5: Methods and tools to manage weeds

2. SPECIFIC PART

2.1. MODULE 1

Basic principles of a participatory learning model for farmer education based on experiential learning

Module description:

1. GENERAL INFORMATION			
1.1. Name of the module	Basic principles of a participatory learning model for farmer education based on experiential learning	1.2. Hours	6 hours
1.3. Training course	Basic Training for Facilitators for Plant Protection in Organic Farming	1.4. Credits (ECVET)	/
2. OBJECTIVES AND LEARNING OUTCOMES			
2.1. Objectives	2.1.1. Plan, organize and apply the basic principles of participatory learning model of education of farmers which relies on an experiential learning for plant protection in organic agriculture.		
2.2. Learning outcomes expected at the level of the module			
2.2.1. Knowledge At the end of the module the participant will be able to:	2.2.1.1. Describe participatory approach paradigm and explain basic principles of participatory learning and Farmer Field School (FFS) learning principles. 2.2.1.2. Distinguish between the role of a teacher and the role of a facilitator. 2.2.1.3. Integrate and apply learning cycle for specialized courses in the field of organic plant protection (Question, Hypothesis, Design, Observation, Analysis, Evaluation) and basic domains of learning (technical, practical, empowerment) within learning activities. 2.2.1.4. Describe four major activities in FFS learning sessions (Field studies, Special topics, Agro Ecosystem Analysis (AESA), Group dynamics) 2.2.1.5. Explain elements of the curriculum for specialized courses: aim and objectives, content, experience, evaluation		

2.2.2. Skills At the end of the module the participant will be able to:	2.2.2.1. Identify farmers' needs, interests and the problems regarding organic plant protection which are representative in the local area and integrate them with local and scientific knowledge. 2.2.2.2. Form the learning group of participants (local farmers, external experts, other relevant stakeholders) and differentiate the role of the participants. 2.2.2.3. Apply participatory methods for joint planning, management, implementation, monitoring and evaluation of activities. 2.2.2.4. Select and use relevant methods and exercises concerning specific context, target group, topic and learning environment. 2.2.2.5. Structure and employ FFS key activities in each FFS session in time of growing/cropping season (cycle): field studies, special topics, agro-ecosystem analysis and group dynamics. 2.2.2.6. Implement group dynamics exercises to provoke observation, discussion, analysis, presentation, collective decision making and action. Use ice breakers and energizers to regulate dynamics of the group and group climate according to participants' experiences. 2.2.2.7. Coordinate monitoring and evaluation: identifying areas/subjects to monitor, selecting the indicators for monitoring and evaluation, designing data collection systems, collating and tabulating data, analyzing and interpreting the results, reporting and using information/data for further planning. 2.2.2.8. Structure the curriculum within four kay elements (aim and objectives, content, experience, evaluation) and components: topic, rationale, learning objective, learning outcome, content, activity, methods, materials, time needed, evaluation indicators.
2.2.3. Competences At the end of the module the participant will have acquired the responsibility and autonomy and will be able to:	2.2.3.1. Develop specialized courses concerning plant protection in organic farming, starting with project awareness at community level, organizing a project group, conducting a participatory approach and reviewing the performance and conducting feedback for further planning at the end of the course. 2.2.3.2. Manage to fine-tune curriculum with participants, reflecting local context and needs and evolving activities through the growing season based on what is happening in the field and in the group. 2.2.3.3. Design and coordinate most suitable field studies/exercises based on local situation and management options. 2.2.3.4. Generate improvement of farmers' knowledge, confidence with problem solving and better decision-making skills, collaboration towards collective action and farmers' empowerment.

2.3. Module content broken down in detail by session schedule (syllabus)

Session	Minutes	Content	Learning outcome (2.2.)	Teaching method	Material

1	45 min	-Participatory approach paradigm and basic principles of the participatory learning -FFS approach and FFS learning principles - Domains of learning: technical, practical, empowerment within learning activities and their application in participatory learning approach -Process of the identification of farmer's needs, problems interest – topic focus	2.2.1.1 2.2.2.1 2.2.3.2	Frontal teaching Plenary session Discussion	Flip-chart Markers
2	40 min	- Identification of the participants: local farmers, external experts, other relevant stakeholders -Group composition and development -Roles of the participants -Role of the facilitator	2.2.1.2 2.2.2.2	Group work Problem solving	Paper sheets Memo pads Markers
3	90 min	-The importance of participants' experiences and knowledge -Dynamics of the group - learning process and activities undertaken collectively by group members with participatory methods: joint planning, management, implementation, monitoring and evaluation of activities -Group dynamics exercises within categories: introduction/icebreakers, energizers, group formation, collective decision making and problem solving, listening/observation, analysis, structured interviewing, diagraming, visualization, ranking, scoring, evaluation	2.2.2.3 2.2.2.4 2.2.3.4	Project and presentation Role-Playing of group dynamics exercises Feedback	Flip-chart Markers Paper sheets Memo pads
4	45 min	- Learning cycle for specialized courses in the field of organic plant protection (Question, Hypothesis, Design, Observation, Analysis, Evaluation) - Importance of provoking discussion, observation, problem solving, analysis, presentation and decision making among the participants	2.2.1.3 2.2.2.5 2.2.2.6 2.2.3.2 2.2.3.3 2.2.3.4	Lecture Plenary session	Flip-chart Markers Paper sheets Memo pads

5	45 min	- Four elements of the curriculum for specialized courses: aim and objectives, content, experience, evaluation -Components of the curriculum for specialized courses: topic, rationale, learning objective, learning outcome, content, activity, methods, materials, time needed, evaluation indicators	2.2.1.5 2.2.2.8 2.2.3.1	Lecture Case study Presentation	Flip-chart Markers Paper sheets Memo pads
6	45 min	-Four major activities in FFS learning sessions (Field studies, Special topics, Agro Ecosystem Analysis (AESA), Group dynamics)	2.2.1.4 2.2.2.5 2.2.3.3 2.2.3.4	Case study Group work Presentation	Internet Flip-chart Paper sheets Markers
7	50 min	- Participatory monitoring and evaluation: identifying areas/subjects to monitor, selecting the indicators for monitoring and evaluation, designing data collection systems, collating and tabulating data, analyzing and interpreting the results, reporting and using information/data for further planning	2.2.2.7 2.2.3.4	Research Report Problem solving	Flip-chart Markers Internet Reading material

2.4. Participant responsibilities	2.4.1. Presence at the module: classroom, field and on-line sessions attendance followed by mutual learning, exchanges of experiences and cooperation 2.4.2. Self-correcting quiz implementation 2.4.3. Complete individual assignments 2.4.4. Complete on-line survey at the end of the module
2.5. Evaluation methods	2.5.1. Each of learning outcomes (in 2.2.) should be evaluated with at least 1 or 2 relevant questions/tasks/assignment using an on-line Self-correcting quiz (reach the minimum 60 %). 2.5.2. Recommendation: The learning process should comprise exercises, tasks, presentations, reporting etc. during which the facilitator can check the participant's understanding and ability to carry out relevant tasks.
2.6. Quality assurance methods that ensure the acquisition of exit competences	2.6.1. On-line survey at the end of the module -self-evaluation (participants and facilitator) -facilitator evaluation (participants) -learning process evaluation (participants)

3. LITERATURE AND SOURCES		
3.1. Required literature (available in the library and via other media)	**Title**	**Availability**
	Training Manual for Plant Protection in Organic Farming	
3.2 Recommended literature	**Title**	**Availability**
	Participatory methods Toolkit: A practioner's manual	https://archive.unu.edu/hq/library/Collection/PDF_files/CRIS/PMT.pdf
	Global Farmer Field School Platform	http://www.fao.org/farmer-field-schools/overview/en/
	Pretty, J. N., and others (1995). A Trainer's Guide for Participatory Learning in Action, International Institute for Environment and Development, London	https://pubs.iied.org/sites/default/files/pdfs/migrate/6021IIED.pdf
	FAO, (2016). Farmer Field School Guidance Document. Planning for quality programmes, Rome	http://www.fao.org/3/a-i5296e.pdf
	FAO (2001). Facilitating Scientific Method as follow-up for FFS graduates, Community IPM	http://www.fao.org/3/ca8266en/ca8266en.pdf
	FAO, (2018). Integrated management of the Fall Armyworm on maize. A guide for Farmer Field Schools in Africa, Rome	http://www.fao.org/3/I8665EN/i8665en.pdf
	Hagywara, T., and others (2011). Farmer Field School Implementation Guide, Farm forestry and livelihood development, Kenya Forest Service	http://www.fao.org/3/i2561e/i2561e.pdf
	Encouraging Participation	https://gsi.berkeley.edu/gsi-guide-contents/discussion-intro/participation/
	Group Work: Design Guidelines	https://gsi.berkeley.edu/gsi-guide-contents/discussion-intro/group-guidelines/
	Group Work: Techniques	https://gsi.berkeley.edu/gsi-guide-contents/discussion-intro/group-techniques/
	Classroom Activities	https://gsi.berkeley.edu/gsi-guide-contents/discussion-intro/activities/

2.2. MODULE 2

General approach to pests, diseases and weed management in biological agriculture

Module description:

1. GENERAL INFORMATION			
1.1. Name of the module	General approach to pests, diseases and weed management in biological agriculture	1.2. Hours	6 hours
1.3. Training course	Basic Training for Facilitators for Plant Protection in Organic Farming	1.4. Credits (ECVET)	/
2. OBJECTIVES AND LEARNING OUTCOMES			
2.1. Objectives	2.1.1. At the end of the module the learner will have gained the knowledge and skills to be able to apply the basic principles of organic plant protection, which relies on the three-step approach to pest, disease and weed management.		
2.2. Learning outcomes expected at the level of the module			
2.2.1. Knowledge At the end of the module the participant will be able to:	2.2.1.1. Explain the three-step approach to pest, disease and weed management in organic agriculture. 2.2.1.2. Discuss the importance of crop and management practices for pest, disease and weed prevention. 2.2.1.3. Describe monitoring methods and methods for pest and disease forecasting. 2.2.1.4. Compare the use of direct control measures for pest, disease and weed control in organic and conventional agriculture.		
2.2.2. Skills At the end of the module the participant will be able to:	2.2.2.1. Present examples of crop planning and management practices suitable for organic production. 2.2.2.2. Design an annual plan for monitoring pest, disease and weed development. 2.2.2.3. Demonstrate the application of plant protection products considering composition and frequency of treatments and application techniques. 2.2.2.4. Adjust the quality of plant protection product application.		
2.2.3. Competences At the end of the module the participant will have	2.2.3.1. Plan and manage a plant protection strategy for different crop species in accordance with basic principles of organic agriculture and EU regulation. 2.2.3.2. Create favourable conditions for regulation of pests, diseases and weeds in organic production, using appropriate crops and management practice.		

acquired the responsibility and autonomy and will be able to:	2.2.3.3. Coordinate and perform monitoring of pest, disease and weed population and determine the need for direct measures implementation. 2.2.3.4. Determine suitable plant protection products, dosage, application method and application time for regulation of pests and diseases in organic production.

2.3. Module content broken down in detail by session schedule (syllabus)

Session	Minutes	Content	Learning outcome (2.2.)	Teaching method	Material
1	60 min	Basic principles of plant protection in organic agriculture based on a three-step approach. EU regulation on plant protection and weed control in organic agriculture.	2.2.1.1 2.2.3.1. 2.2.3.1.	Lecture Research	Flip-chart Markers Internet
2	60 min	Prevention methods for plant protection in organic agriculture - enhancing resilience and resistance. Influence of crop planning (site selection, cropping system, cultivar selection) and management practices (crop rotation, soil and plant management) on the prevention of pest, disease and weed outbreak and damage reduction.	2.2.1.2. 2.2.2.1. 2.2.3.2.	Lecture Group work	Markers Paper sheets
3	60 min	Importance of biodiversity enhancement for the regulation of pests, diseases and weeds in organic agriculture. Possible strategies for promoting biodiversity in different crops (cover cropping, intercropping, hedgerows, flower strips, insect habitats…).	2.2.1.2. 2.2.2.1. 2.2.3.2.	Lecture Individual tasks	Exemplary video Flip-chart Markers
4	60 min	Typical symptoms of pests and disease attack. Monitoring of pests, diseases and weeds as a tool for making a management decision and checking the success of applied control strategy.	2.2.1.3. 2.2.2.2. 2.2.3.3.	Field work	Magnifier Pest and disease manual
5	60 min	Monitoring tools and techniques. Prognosis methods based on field scouting, climate data and pest/disease biology.	2.2.1.3. 2.2.2.2. 2.2.3.3.	Lecture Group work	Exemplary video Internet Paper sheets
6	60 min	Direct control measures for plant protection and weed control in organic agriculture. Plant protection products in organic agriculture (basic principles and list). Application of PPP. Mechanical methods and suitable mechanisation	2.2.1.4. 2.2.2.3. 2.2.2.4. 2.2.3.4.	Lecture Fild work Individual tasks	Explanatory video Flip-chart Markers

2.4. Participant responsibilities	2.4.1. Presence at the module: classroom, field and on-line sessions attendance followed by mutual learning, exchanges of experiences and cooperation 2.4.2. Self-correcting quiz implementation 2.4.3. Complete individual assignments 2.4.4. Complete on-line survey at the end of the module
2.5. Evaluation methods	2.5.1. Each of learning outcomes (in 2.2.) should be evaluated with at least 1 or 2 relevant questions/tasks/assignment using an on-line Self-correcting quiz (reach the minimum 60 %). 2.5.2. Recommendation: The learning process should comprise exercises, tasks, presentations, reporting etc. during which the facilitator can check the participant's understanding and ability to carry out relevant tasks.
2.6. Quality assurance methods that ensure the acquisition of exit competences	2.6.1. On-line survey at the end of the module -self-evaluation (participants and facilitator) -facilitator evaluation (participants) -learning process evaluation (participants)

3. LITERATURE AND SOURCES

	Title	Availability
3.1. Required literature (available in the library and via other media)	Training Manual for Plant Protection in Organic Farming	
3.2. Recommended literature	**Title**	**Availability**
	Plant protection in ecological farming (oekolandbau.de; german)	https://oekolandbau.de/landwirtschaft/pflanze/spezieller-pflanzenbau/gemuese/pflanzenschutz-und-unkrautregulierung/pflanzenschutz/
	Ökologischer Gemüsebau – „Handbuch für Beratung und Praxis“ - Reyhaneh Eghbal	ISBN 978-3-934239-44-9
	ATLAS DER KRANKHEITEN, SCHÄDLINGE UND NÜTZLINGE IN OBST- UND WEINBAU; Fischer-Colbrie / Groß / Hluchy / Hofmann / Pleininger / Stolz - Österreich	Stocker Verlag ISBN 978-3-7020-1489-6
	Pflanzenschutz im integrierten Obstbau – Friedrich/Rode - Deutschland	ISBN 978-3800155415
	Erfolgreicher Obstbau – Wurm/Lafer/Kickenweiz/Rühmer/Steinbauer - Österreich	ISBN 978-3704023810

	*Bio Kernobst Fibel – LWK Steiermark *Bio Steinobst Fibel – LWK Steiermark	http://www.obstland.at/?id=2500%2C1071833%2C%2C (downloads), http://www.kernteam.at/?id=2500%2C1072698%2C%2C
	*Bioleitfäden vom Südtiroler Beratungsring (Themenschwerpunkte: Apfel, Weinbau, Applikationsechnik, etc…)	https://www.beratungsring.org/info/organisation/broschueren/bioanbau.html
	*Krankheiten und Schädlinge im Obstbau – Eine Sammlung von Merkblättern publiziert in der Schweizerischen Zeitschrift für Obst- und Weinbau – FAW, RAC - Schweiz	https://obstundweinbau.ch/
	*Bestimmungshilfen für Freilandkontrollen im Apfelanbau – Arbeitsgruppe für integrierte Bekämpfung im Obstbau - Schweiz	https://www.agridea.ch/old/de/fachbereiche/fachbereiche/pflanzenbau/obstbau/
	*Fachzeitschriften (Besseres Obst – Österreich, Obstbau*Weinbau – Fachmagazin vom Südtiroler Beratungsring, Zeitschrift für Obst- und Weinbau – Schweiz, Obstbau – Deutschland)	https://www.beratungsring.org/info/organisation/obstbauweinbau.html
	* **Aussendungen, Newsletter:** - Info Obst der LWK Steiermark	-
	- Rundschreiben Apfel vom Südtiroler Beratungsring	https://www.beratungsring.org/info/organisation/nationaler-aktionsplan/2020.html
	- Schweizer Bio-PSM-Bulettin	https://www.bioaktuell.ch/pflanzenbau/obstbau/pflanzenschutz-obst/obstbulletins/bioobstbaubulletin.html
	- Die steirischen Beerengärten der LWK Steiermark	https://stmk.lko.at/anbauempfehlungen-zum-beerenobst-im-oktober+2500+2484654

2.3. MODULE 3

Methods and tools to manage pests

Module description:

1. GENERAL INFORMATION			
1.1. Name of the module	Methods and tools to manage pests	1.2. Hours	6 hours
1.3. Training course	Basic Training for Facilitators for Plant Protection in Organic Farming	1.4. Credits (ECVET)	/
2. OBJECTIVES AND LEARNING OUTCOMES			
2.1. Objectives	2.1.1. At the end of the module the learner will have gained basic skills to be able to apply measures to prevent pest outbreak, to minimize the damage, to identify pest problems and to reduce damage by applying available tools for pest control.		
2.2. Learning outcomes expected at the level of the module			
2.2.1. Knowledge At the end of the module the participant will be able to:	2.2.1.1. Describe the agro-technical practices that contribute to prevention of pest outbreaks. 2.2.1.2. Compare techniques for conservation and enhancing natural enemies. 2.2.1.3. Explain the advantages and disadvantages of different methods and products for pest control. 2.2.1.4. Classify the pests into different groups based on their morphology and damages.		
2.2.2. Skills At the end of the module the participant will be able to:	2.2.2.1. Implement the appropriate agro-technical practice that contributes to the prevention of pest outbreak. 2.2.2.2. Identify the appropriate technique to be applied for conservation of natural enemies under different circumstances. 2.2.2.3. Identify the pest based on their morphological features and the symptoms of damages. 2.2.2.4. Choose the appropriate method and product for pest control in specific conditions of agricultural production.		
2.2.3. Competences	2.2.3.1. Predict the effect of implementation of different agro-technical methods on pest population under specific agro-climatic conditions. 2.2.3.2. Manage techniques to preserve and conserve natural enemies in specific agricultural production.		

At the end of the module the participant will have acquired the responsibility and autonomy and will be able to:	2.2.3.3. Coordinate the monitoring of the pests, identify them and decide on actions that need to be taken in order to preserve yield and prevent economic damages in specific conditions of agricultural production. 2.2.3.4. Select and recommend the appropriate methods and products to be applied in order to keep pest population below economic threshold.

2.3. Module content broken down in detail by session schedule (syllabus)

Session	Minutes	Content	Learning outcome (2.2.)	Teaching method	Material
1	30 min	Measures to prevent pest infestations: – Review of the agro-technical practices that contribute to prevention of pest outbreaks and reduce pest damage – Techniques for conservation and enhancing the natural enemies	2.2.1.1. 2.2.1.2. 2.2.2.1. 2.2.2.2. 2.2.3.1. 2.2.3.2.	Lecture Individual tasks	Internet Flip chart Markers Paper sheets
2	90 min	– Pest identification and classification based on the morphology and on the damages (key skills for fast identification) – Methods and examples of pest monitoring	2.2.1.4. 2.2.2.3. 2.2.3.3	Discussion Case study Presentation	Flip chart Material (insects) prepared by teacher Magnifier (or stereomicroscope) Markers Paper sheets
3	60 min	– Mechanical method of pest control: - examples of available methods for different crops; – Physical methods for pest control: Use of temperature, humidity, odours (feeding attractants, sexual attractants, arrestants, repellents etc.), colours (visual cards or other means), nets… – Strategies for pest control: push-pull strategy, confusion, use of sterile insect technique (SIT)	2.2.1.3. 2.2.2.4. 2.2.3.4.	Lecture Group work	Internet Flip chart Markers Paper sheets

4	60 min	Use of natural enemies - Important tips on how to use of natural enemies: a) Choice the most effective natural enemy for particular condition (pest species, pest density, weather conditions etc.); b) Preparation of the object; c) Handling the beneficial insects and their release; d) How to manage crop if natural enemies are released;	2.2.1.3. 2.2.2.4. 2.2.3.4.	Lecture Field work Individual tasks	Insects (natural enemies) prepared by teacher Paper sheet Magnifier (or stereomicroscope)
5	60 min	– Microbiological insecticides: Available products on the market and their basic properties- how to choose the most effective product; – Botanical insecticides: Available products on the market and their basic properties- how to choose the most effective product; Home-made products and how to prepare them;	2.2.1.3. 2.2.2.4. 2.2.3.4.	Lecture Group work Presentations	Internet Flip chart Markers Paper sheets
6	60 min	Other products available for pest control in organic farming: Available products on the market and their basic properties - how to choose the most effective product;	2.2.1.3. 2.2.2.4. 2.2.3.4.	Lecture Group discussion: Solution conference	Internet Flip chart Markers Paper sheets

2.4. Participant responsibilities	2.4.1. Presence at the module: classroom, field and on-line sessions attendance followed by mutual learning, exchanges of experiences and cooperation 2.4.2. Self-correcting quiz implementation 2.4.3. Complete individual assignments 2.4.4. Complete on-line survey at the end of the module
2.5. Evaluation methods	2.5.1. Each of learning outcomes (in 2.2.) should be evaluated with at least 1 or 2 relevant questions/tasks/assignment using an on-line Self-correcting quiz (reach the minimum 60 %).
2.6. Quality assurance methods that ensure the acquisition of exit competences	2.6.1. On-line survey at the end of the module -self-evaluation (participants and facilitator) -facilitator evaluation (participants)

	-learning process evaluation (participants)	
3. LITERATURE AND SOURCES		
3.1. Required literature (available in the library and via other media)	**Title**	**Availability**
	Training Manual for Plant Protection in Organic Farming	
3.2. Recommended literature	**Title**	**Availability**
	Igrc Barčić, J., Maceljski, M. (2001). Ekološka prihvatljiva zaštita bilja od štetnika, Zrinski, Čakovec	
	El-Shafie, H.A.F (2019). Insect Pest Management in Organic Farming System. InTech Open. DOI: 10.5772/intechopen.84483	https://www.intechopen.com/books/multifunctionality-and-impacts-of-organic-and-conventional-agriculture/insect-pest-management-in-organic-farming-system
	Altieri, M.A., Nicholls, C.I, Fritz, M.A. (2014) .Manage insects on your farm : a guide to ecological strategies. Sustainable Agriculture Research and Education, MD, USA:	https://www.sare.org/wp-content/uploads/Manage-Insects-on-Your-Farm.pdf
	pest identification guide - UK + Europe	https://www.growveg.co.uk/pests/uk-and-europe/
	Encyclopaedia of pests and natural enemies in field crops - Ellis, S & White, S (ADAS), Holland, J & Smith, B (Game & Wildlife Conservation Trust) & Collier, R.	https://www.agricology.co.uk/resources/encyclopaedia-pests-and-natural-enemies-field-crops
	Gemüseschädlinge – Erkennung, Lebensweise, Bekämpfung (A. Kahrer und M. Gross)	ISBN 978-3-7040-1569-3
	Krankheiten & Schädlinge an Zierpflanzen, Obst und Gemüse (Böhmer/Wohanka)	ISBN 978-3-8186-0952-8
	Wichtige Krankheiten und Schädlinge im Gemüsebau (Bedlan, Kahrer, Schönbeck)	ISBN 978-3224164352
	Potatoebeetle – Hortipendium (german)	http://www.hortipendium.de/Kartoffelk%C3%A4fer

2.4. MODULE 4

Methods and tools to manage diseases

Module description:

1. GENERAL INFORMATION			
1.1. Name of the module	Methods and tools to manage diseases	1.2. Hours	6 hours
1.3. Training course	Basic Training for Facilitators for Plant Protection in Organic Farming	1.4. Credits (ECVET)	/
2. OBJECTIVES AND LEARNING OUTCOMES			
2.1. Objectives	2.1.1. At the end of the module the learner will have gained basic skills to be able to apply measures to prevent disease outbreak, to minimize the damage, to identify diseases and to reduce damage by applying available tools for disease control.		
2.2. Learning outcomes expected at the level of the module			
2.2.1. Knowledge At the end of the module the participant will be able to:	2.2.1.1. Classify diseases based on their morphology and damage pattern. 2.2.1.2. Describe cultural engineering measures to prevent disease outbreaks. 2.2.1.3. Present advantages and disadvantages of various methods and products for disease control.		
2.2.2. Skills At the end of the module the participant will be able to:	2.2.2.1. Identify diseases based on their morphological characteristics and symptoms of damage. 2.2.2.2. Implement the appropriate agro technical practice that helps to prevent the outbreak of diseases. 2.2.2.3. Choose appropriate methods and products for disease control under specific conditions of agricultural production.		
2.2.3. Competences At the end of the module the participant will have acquired the responsibility and autonomy and will be able to:	2.2.3.1. Coordinate and organize the monitoring of diseases, identify them and decide on measures to be taken to maintain yield and prevent economic damage under certain conditions of agricultural production. 2.2.3.2. Predict the effect of implementing various agro technical methods on disease progression under specific agro climatic conditions.		

	2.2.3.3. Select and recommend appropriate methods and products to keep the spread of the disease below the economic threshold.

2.3. Module content broken down in detail by session schedule (syllabus)

Session	Minutes	Content	Learning outcome (2.2.)	Teaching method	Material
1	60 min	Prevention methods for plant protection against diseases in organic agriculture: Enhancing resilience and resistance: choice of location, choice of variety, choice of rootstocks	2.2.1.2. 2.2.2.2. 2.2.3.2. 2.2.3.3.	Lecture Group work Discussion	Powerpoint/ Flip-chart Markers
2	60 min	Prevention methods for plant protection against diseases in organic agriculture: educational systems/measures and soil care, fertilisation leaf/soil, plant strengthening, encouraging natural enemies and avoid intermediate hosts	2.2.1.2. 2.2.1.3. 2.2.2.2. 2.2.3.2. 2.2.3.3.	Lecture Group work Discussion	Powerpoint/ Flip-chart Markers
3	60 min	Monitoring of diseases: prognosis models and general definition of symptoms	2.2.1.1. 2.2.2.1. 2.2.3.1.	Lecture Field work Research	Powerpoint Flip-chart Markers
4	60 min	Selected special symptoms of relevant agricultural crops	2.2.1.1. 2.2.2.1. 2.2.3.1.	Lecture Discussion	Powerpoint
5	60 min	Direct control measures: plant protection products including microorganisms	2.2.1.2. 2.2.1.3. 2.2.2.3. 2.2.3.1. 2.2.3.2. 2.2.3.3.	Lecture Discussion	Powerpoint/
6	60 min	Direct control measures: physical methods, mechanical methods, hygienic measures	2.2.1.2. 2.2.1.3. 2.2.2.3. 2.2.3.1. 2.2.3.2. 2.2.3.3.	Lecture Group work Discussion	Powerpoint/ Flip-chart Markers

2.4. Participant responsibilities	2.4.1. Presence at the module: classroom, field and on-line sessions attendance followed by mutual learning, exchanges of experiences and cooperation 2.4.2. Self-correcting quiz implementation 2.4.3. Complete individual assignments 2.4.4. Complete on-line survey at the end of the module
2.5. Evaluation methods	2.5.1. Each of learning outcomes (in 2.2.) should be evaluated with at least 1 or 2 relevant questions/tasks/assignment using an on-line Self-correcting quiz (reach the minimum 60 %). 2.5.2. Recommendation: The learning process should comprise exercises, tasks, presentations, reporting etc. during which the facilitator can check the participant's understanding and ability to carry out relevant tasks.
2.6. Quality assurance methods that ensure the acquisition of exit competences	2.6.1. On-line survey at the end of the module -self-evaluation (participants and facilitator) -facilitator evaluation (participants) -learning process evaluation (participants)

3. LITERATURE AND SOURCES

	Title	Availability
3.1. Required literature (available in the library and via other media)	Training Manual for Plant Protection in Organic Farming	
3.2. Recommended literature	**Title**	**Availability**
	Plant Disease indentification giude (english)	https://www.growveg.co.uk/plant-diseases/uk-and-europe/
	Britannica - Plant diseases (english)	https://www.britannica.com/science/plant-disease
	Krankheiten & Schädlinge an Zierpflanzen, Obst und Gemüse (Böhmer/Wohanka)	ISBN 978-3-8186-0952-8
	Wichtige Krankheiten und Schädlinge im Gemüsebau (Bedlan, Kahrer, Schönbeck)	ISBN 978-3224164352
	Gemüsekrankheiten (Bedlan)	ISBN 978-3704015655
	Pflanzenkrankheiten und Pflanzenschutz – Börner -	ISBN 978-3-540-49068-5

2.5. MODULE 5

Methods and tools to manage weeds

Module description:

1. GENERAL INFORMATION			
1.1. Name of the module	Methods and tools to manage weeds	1.2. Hours	6 hours
1.3. Training course	Basic Training for Facilitators for Plant Protection in Organic Farming	1.4. Credits (ECVET)	/
2. OBJECTIVES AND LEARNING OUTCOMES			
2.1. Objectives	2.1.1. At the end of the module the learner will have gained basic skills to be able to identify weed problems and to implement the appropriate plant protection practices for preventing yield of crops		
2.2. Learning outcomes expected at the level of the module			
2.2.1. Knowledge At the end of the module the participant will be able to:	2.2.1.1. List and describe principles of weed control in organic farming. 2.2.1.2. Explain the relevant regulations of EU and member states. 2.2.1.3. Describe the plant protection products and mode of action of active substances authorized in organic farming. 2.2.1.4. Describe non-chemical agricultural techniques for weed control.		
2.2.2. Skills At the end of the module the participant will be able to:	2.2.2.1. Choose and apply the appropriate preventive techniques for weed control. 2.2.2.2. Choose and apply the appropriate plant protection product for effective weed preventing and control. 2.2.2.3. Choose and apply the appropriate non-chemical technique for effective weed preventing and control. 2.2.2.4. Implement the appropriate plant protection practices that contribute to the prevention of weed outbreak but prevent or enhance the yield of crops.		
2.2.3. Competences At the end of the module the participant will have acquired	2.2.3.1. Plan and manage the cropping system to minimize weed problems and utilize biological and ecological processes in the field and throughout the farm ecosystem to give crops the advantage over weeds. 2.2.3.2. Organize and coordinate direct and nondirect weed control actions. 2.2.3.3. Advise the appropriate weed control methods/products for prevention and control.		

the responsibility and autonomy and will be able to:	2.2.3.4. Predict the effect of implementation of indirect and direct weed control on weed population under specific agro-climatic conditions.

2.3. Module content broken down in detail by session schedule (syllabus)

Session	Minutes	Content	Learning outcome (2.2.)	Teaching method	Material
1	60 min	- Principle of weed management in organic farming - Knowledge of EU legislation in organic farming, relevant legal background - Knowledge on and importance of positive and negative interaction between crop and weed (background knowledge for further procedures) - Weed management objectives (reduction of weed density, reduction of the damage amount that a given density of weeds inflicts, shift of weed community composition toward less aggressive, easier-to-manage species) - Difference between preventive and control actions	2.2.1.1. 2.2.1.2. 2.2.2.1. 2.2.3.1.	Frontal teaching Plenary session	power point
2	60 min	Plant protection products in organic agriculture: - Non-synthetic, natural originated compounds - Compounds of plant protection products in organic farming regulated by EU and member states - Type of compounds authorized in organic farming: biological active substances produced by plants (species, secondary metabolic compounds, inhibitor or toxic, appropriate donor-acceptor plant combinations), thiophenes, cumarines, mono- and sesquiterpenes, triterpenes, autotoxicity	2.2.1.2. 2.2.1.3. 2.2.2.2. 2.2.3.2.	Frontal teaching	power point
3	60 min	Mechanical, agrotechnical and biological weed management: - burning water weed control (weeds are thermally shocked) - crop rotation - fertilization - mechanical control (principle, equipment, advantages and disadvantages) - cover crops (impact on weed management, how they	2.2.1.4. 2.2.2.3. 2.2.2.4. 2.2.3.2. 2.2.3.2. 2.2.3.4.	Frontal teaching	power point

		suppress weeds, allelopathy, planting and termination date, cover crop species, incorporated residues, surface residues, off-season cover crops, living mulch) - false seed-bed -mulching - biological weed control (application of natural enemies or pathogens that are not harmful for other crops) - intercropping (two or more crops grown together with the goal of maximizing total yield from all intercrop components, one main crop with one or more secondary crops interseeded for weed suppression)			
4	120 min	- discussion - case studies and their presentation	2.2.3.4.	group work	paper sheets

2.4. Participant responsibilities	2.4.1. Presence at the module: classroom, field and on-line sessions attendance followed by mutual learning, exchanges of experiences and cooperation 2.4.2. Self-correcting quiz implementation 2.4.3. Complete individual assignments 2.4.4. Complete on-line survey at the end of the module
2.5. Evaluation methods	2.5.1. Each of learning outcomes (in 2.2.) should be evaluated with at least 1 or 2 relevant questions/tasks/assignment using an on-line Self-correcting quiz (reach the minimum 60 %). 2.5.2. Presentation of case studies prepared during the module in Session 4
2.6. Quality assurance methods that ensure the acquisition of exit competences	2.6.1. On-line survey at the end of the module -self-evaluation (participants and facilitator) -facilitator evaluation (participants) -learning process evaluation (participants)

3. LITERATURE AND SOURCES

	Title	Availability
3.1. Required literature (available in the library and via other media)	Training Manual for Plant Protection in Organic Farming	
	Title	**Availability**
3.2. Recommended literature	Beikrautregulierung im Biolandbau - Bio Austria - Österreich	https://www.bio-austria.at/bio-bauern/beratung/pflanzliche-erzeugung/ackerbau/beikrautregulierung/

	Unkrautregulierung im Ökolandbau - Ökolandbau - Deutschland	https://www.oekolandbau.de/landwirtschaft/pflanze/grundlagen-pflanzenbau/pflanzenschutz/beikrautregulierung-im-oekologischen-landbau/
	Bestimmungshilfe Beikräuter - Ökolandbau - Deutschland	https://www.oekolandbau.de/landwirtschaft/pflanze/grundlagen-pflanzenbau/pflanzenschutz/beikrautregulierung/bestimmungshilfe-fuer-beikraeuter/