Erasmus+

EMWOFA

Empowering Women Farmers With Agricultural Business Management Training

"EMPOWERING WOMEN FARMERS WITH AGRICULTURAL BUSINESS MANAGEMENT TRAINING"

ERASMUS+ KA2 STRATEGICPARTNERSHIP PROJECT

EDUCATIONAL PROGRAMME

Akdeniz University/ Turkey

Rutgers, the State University of New Jersey/ USA

Technical University of Munich/ Germany

STUCOM Studies Centre/ Spain

VisMedNet Association/ Malta

Antalya Directorate of Provincial Food Agriculture and Livestock/ Turkey

Antalya Muratpaşa Chamber of Agriculture/ Turkey

July, 2017

"Empowering Women Farmers with Agricultural Business Management Training" Erasmus+ KA2 Strategic Partnership Project Educational Programme

July, 2017

Project Coordinator:

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Antalya Muratpaşa Chamber of Agriculture/ Turkey

Address: Dumlupinar Boulvard Rectorate Campus 07058, Antalya

(0 242) 310 64 92

http://en.akdeniz.edu.tr/

e-mail: erasmus@akdeniz.edu.tr

bozkan@akdeniz.edu.tr

rabiavezne@akdeniz.edu.tr

Editors:

Prof. Dr. Burhan Ozkan

Rabia Vezne

"Funded by the Erasmus+ Program of the European Union. However, European Commission and Turkish National Agency cannot be held responsible for any use which may be made of the information contained therein".

FOREWORD

"Empowering Women Farmers through Agricultural Business Management Training" (EMWOFA) Erasmus+ KA2 Strategic Partnership Project, coordinated by the Akdeniz University Faculty of Agriculture and International Relations Office with funding from the Turkish National Agency, was carried out between 2015 and 2017.

The EMWOFA partnership is made up of 3 universities, one public body, one vocational school, one chamber of commerce and one NGO from 5 countries including Turkey, the USA, Germany, Spain and Malta. The project aims to provide a comprehensive educational programme designed to develop technical, entrepreneurial and managerial skills for extension educators in agriculture. These trained extension educators gave trainings to women farmers who have low standards of education, are not part of the vocational education system, have very limited knowledge of business management of farms, and who are currently working on farms.

Another aim of EMWOFA Project is to help women farmers to know their potential and network with other women farmers in theri local area.

Within the scope of the Project, this educational programme was prepared in English, Turkish, German and Spanish languages and E-Learning Videos to help extension educators‘ vocational development. We hope this workbook will be useful for all extension educators and we would like to thank all writes.

Prof. Dr. Burhan ÖZKAN — Project Coordinator

Rabia VEZNE — Assistant Project Coordinator

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Rabia Vezne[1]

1.1. Background Information

Farming is the principal economic activity in most rural areas of the EU. About half of the population of the EU lives in rural areas. Without farming, there would be little to keep many communities alive and hold them together. If farming were to disappear, in many areas there would be a problem of land abandonment. Therefore, EU's Common Agricultural Policy supports farmers in many aspects.

Many farmers are over the age of 55 and will retire from active farming at some point in the future or are women who are less educated and do not have entrepreneurship skills. Women represent a substantial share of the total agricultural labour force, and their contributions are mostly invisible. They are not seen as "productive" since they are generally expected to work without payment. This invisibility at the intersection of markets, state and society has suppressed the whole potential of women farmers worldwide. Helping women farmers get started and thrive are policy 'musts' if Europe's rural areas are successfully to meet the many challenges that face them.

Women farmers generally do not have formal vocational education; they are less educated and they learn farming informally while working on farms. Therefore, they need vocational training and guidance in their work places. Unfortunately, there is no formal or non-formal vocational training service for them. Besides, women farmers do not have access to many agricultural resources including credit, production inputs, and productive assets as their male counterparts do. This restricts their progress in developing professional skills and improving societal status.

Moreover, women in the agricultural sector are not equal in terms of economic return and employment. These women are less literate than men and they are also paid less in agricultural jobs compared to men. Because of that, they need training in this field to not

[1] Rabia Vezne, Akdeniz University International Relations Office, rabiavezne@akdeniz.edu.tr

onlysurvive but to thrive in this sector. To actualize this, women farmers, mostly small and new farmers, should get vocational training and support.

1.2. Project Aim

According to EU 2020 Strategy, some of the EU goals are to modernise labour markets and empower people by:

- developing their skills throughout their lifecycle
- increasing labour participation
- matching labour supply and demand better
- improving the business environment, notably for SMEs
- supporting the development of a strong and sustainable industrial base able to compete globally.

The "Empowering Women farmers with Agricultural Business Management Training (EMWOFA)" Project will promote these goals.

- Provide a comprehensive training program for women farmers.
- Develop technical, entrepreneurial and managerial skills of women farmers through specialized training.
- Help women farmers realize their fullpotential to operate and sustain profitable farms as small businesses and gain self-confidence as businesswomen.
- Support networks for women farmers;
- Help them learn to understand and manage their farm businesses and network with other women who are involved in agriculture, both in their geographical area and in the other EU countries.

1.3. Project Partners

The EMWOFA partnership is made up of 3 universities, one public body, one vocational school, one Chamber and one NGO from 5 countries. Thisproject should be carried out transnationally since each partner has a specific expertise in a field. The universities and vocational school have academic research and field experience in agricultural economics and vocational education. They will prepare the content of the trainings and train the trainers and women. A public body responsible for agriculture and a chamber of agriculture will be responsible for the dissemination of the project. One NGO which is an expert in video

production and web portal will be responsible for the production of E-Learning Videos and Web Portal of the project which will be used for blended learning.

Project partners are as follows:
P1: Akdeniz University-Turkey,
P2: Rutgers, The State University of New Jersey-USA,
P3: Technical University of Munich-Germany,
P4: STUCOM Studies Centre-Spain,
P5: VisMedNet Association- Malta,
P6: Antalya Directorate of Provincial FoodAgriculture and Livestock- Turkey,
P7: Antalya Muratpaşa Chamber of Agriculture -Turkey.

1.4. Project Activities

EMWOFA Projects will provide "Trainings of Trainers" to train educators who will help women farmers to improve their business skills and farms. This will have a multiplier effect and we will reach more women farmers in the EU with these trainers.

EMWOFA Project will provide trainings for women farmers to improve their business skills and farms and develop technical, entrepreneurial and managerial skills.

EMWOFA E-Learning Videos will be an importanti ntellectualoutput of this project. Women farmers who are less literate and can not have an opportunity to attend the trainings can be trained through these E-Learning Videos.

EMWOFA Web portal will give online support to women farmers who benefitted from face-to-face trainings or E-Learning Videos via forums. With this online support and forums, we will carry out face-to-face trainings to virtual platform and benefit from Blended Learning.

The Project activities are as follows:

- "Training of Trainers": 5-day training sessions in Germany and Spain.
- Training for women farmers: 10-day local training sessions for women farmers in Germany, Spain, and Turkey.
- EMWOFA E-Learning Videos.
- EMWOFA Web portal.

1.5. Intellectual Outputs (IO)

IO1 called "Agricultural Business Management" Educational Programme will be prepared in four languages including Turkish, English, German, and Spanish.

IO2 called "Agricultural Business Management" Workbook in four languages including Turkish, English, German, and Spanish, will be prepared for 10-day local trainings of women farmers. The book will be prepared according to the educational program and will contain the details of the headlines mentioned above. While preparing the workbook, the project team will pay attention to the education and literacy level of women farmers.

IO3 called E-Learning Videos are a series of videos about "Agricultural Business Management" for women farmers. Less educated and less literate women farmers will mostly benefit from these videos which are easy to follow. The content of the videos will be developed according to "Agricultural Business Management" the educational program and workbook. These videos are tagged one to each other so that the user wants to follow rather than watching one and stopping. At the same time, this gives structure without too much formal information that could discouragesuch women farmers. After finalizing the videos, theywill be shared with extension educators, revised according to their feedback, and published on the website of the project. They will also be shared with national extension bodies whichcan reach women farmers and want to give similar trainings in partner countries. This will guarantee both dissemination and the sustainability of EMWOFA project. It will be prepared in four languages including Turkish, English, German, and Spanish.

IO4 are Questionnaires and Analyses which will be conducted to extension educators and women farmers toevaluate the improvement in agricultural business management before and after the trainings.

IO5 is an Article and will be prepared in Turkish and English to be presented in the National Conference in Turkey at the end of the Project. In this article and presentation, project rationale, objectives, target groups, current situation of women farmers and their agricultural managerial skillsinpartner countries, project activities will be explained in detail andproject outputs will be presented.

1.6. Multiplier Events

The project will have three multiplier events. The first one will be “Empowering Women farmers with Agricultural Business Management Training" Seminar I in Germany, and the second one will be in Barcelona. The third one is a conference called “Empowering Women farmers with Agricultural Business Management Training" National Conference in Turkey. The purpose of these multiplier events is to share the knowledge we gained from the EMWOFA Project and training curriculum with other agricultural entities to encourage the establishment of more training sessions for women around the world, further spreading our impact.

“Empowering Women farmers with Agricultural Business Management Training" Seminar I will be organised by Technical University of Munich (TUM) immediatelyafter the training of extension educators. The timing will ensure best use of resources and ample effect of the event. The presence of the strong partnership during the event will givean international dimension to the local agricultural extension organizations in attendance.

This seminar will be held for extension organizations in agriculture which can reach women farmers, students studying agriculture, farmers, and related organizations. They will be informed about Agricultural Business Management and ongoing project activities.

The event will convey to the public the importance of women farmers in agricultural industry and how EU emphasizes supporting agriculture and women farmers. IO1 (EducationalProgramme) and IO2 (Workbook) will be disseminated during this seminar.

“Empowering Women farmers with Agricultural Business Management Training" Seminar II will be organised by STUCOM, and it will have the same agenda.

“Empowering Women farmers with Agricultural Business Management Training" National Conference will be held in Antalya/Turkey at the end of the project. It aims to disseminate the project outputs and results, and will serve as a closing conference for the project. At this conference, extension organizations in agriculture who can reach women farmers, students of agriculture, farmers and related organizations will be informed about the EMWOFA Project, project activities, results, outputs, and specifically about Agricultural Business Management. This event will enhance the sustainability activities and project visibility. All 5

IntellectualOutputsincluding IO1 (EducationalProgramme), IO2 (Workbook), IO3 (E-Learning Videos), IO4 (QuestionnarieandAnalyses), and IO5 (Articleand Presentation) will be disseminated during this conference.It is ourhopeTthatparticipants in all 3 multiplier events will use our insight and materials to deliver similar woman's training programmes (see1.8) in their own localities.

1.7. Training Sessions

We will hold 2 trainings workshops of extension educators on agricultural business management, which are of vital to the success of the project since the project.

The first one will be held in Weihenstephan, Germany. At this training, 9 participants from Turkey, 3 participants from Spain, and 3 participants from Germany, (15 extension educators total) will get theoretical education. This training will be in English. After the German, Turkish and Spanish extension educators finish this training, they will train women farmers in their home countries with their mother languages.

The second training will be held in Barcelona, Spain. Again, 9 participants from Turkey, 3 participants from Spain, and 3 participants from Germany, will get theoretical education in the same format as the first training. The 30 extension educators who attend these short term trainings will then organize training workshops for 60 women farmers in their home countries (20 women farmers from Turkey, 20 women farmers from Germany and 20 women farmers from Spain). These trainings will be local activities and will accomplish our goals of empowering women farmers in agricultural business management training. They will be one method of dissemination and sustainability for our project, in addition to the multiplier events.

1.8. Training Programmes

Two training programmes will be used for training of extension educators and local trainings of women farmers. The content is similar, but the duration changes. When it is used for "Training of Extension Educators," it will be applied in 5 days, including morning and afternoon sessions. When it is used for women farmers, it will last 10 days in the afternoonsFarming is the principal economic activity in most rural areas of the EU. Without farming, there would be little to keep many communities alive and hold them together. Therefore, EU's Common Agricultural Policy supports farmers in many aspects. A substantial share of the total agricultural labor force is represented by women, yet their contributions are

mostly invisible since they are not seen as "productive". They, women farmers, generally do not have formal vocational education and learn farming informally while working on farms. Therefore, they need vocational training and guidance in their work places, but unfortunately that is missing. In this sense, helping women farmers get started and thrive are policy 'musts' if Europe's rural areas are successfully to meet the many challenges that face them.

Table 1.1. Training Programs for Extension Educators and Women Farmers

EMWOFA TRAINING PROGRAMME FOR EXTENSION EDUCATORS		
1st Day: Agricultural Business Management &Technical Knowledge		
Morning Session: Agricultural Business Management		
1. Lesson	09:00-09:20	Ice Breaker
2. Lesson	09:20-09:40	Introduction of EMWOFA Project
Break	09:40-10:00	Break
3. Lesson	10:00-10:20	Risk Assessment Presentation
4. Lesson	10:20-10:40	Complete Risk Assessment
Break	10:40-10:50	Break
5. Lesson	10:50-11:10	What is a Business Plan, What Should be in It, and Why Should You Have a Business Plan?
6. Lesson	11:10-11:30	Developing a Mission Statement For Your Farm
Lunch Break	11:30-13:00	Lunch Break
Afternoon session: Technical Knowledge		
1. Lesson	13:00-13:40	Alternative Production Systems
Break	13:40-13:50	Break
2. Lesson	13:50-14:30	IPM in Farms
Break	14:30-14:40	Break
3. Lesson	14:40-15:30	Work Calendar and Program in Farms
2nd Day: Technical Knowledge&Agricultural Business Management		
Morning session: Technical Knowledge		
1. Lesson	09:00-09:40	Soil Productivity & Plant Nutrition
Break	09:40-09:50	Break
2. Lesson	09:50-10:30	Soil Productivity & Plant Nutrition
Break	10:30-10:40	Break
3. Lesson	10:40-11:30	Soil Productivity & Plant Nutrition
Lunch Break	11:30-13:00	Lunch Break
Afternoon session: Agricultural Business Management		
1. Lesson	13:00-13:20	Review Mission Statements
2. Lesson	13:20-13:40	Describe Your Business: Where is Your Business Now?
Break	13:40-13:50	Break
3. Lesson	13:50-14:30	SWOT Analysis
Break	14:30-14:40	Break
4. Lesson	14:40-15:00	Estate Planning; Life, Health & Crop Insurance:

		Where Do You Want Your Business to Go?
5. Lesson	15:00-15:30	Develop and Implement a Strategy
3rd Day: Agricultural Business Management&Technical Knowledge		
Morning Session: Agricultural Business Management		
1. Lesson	09:00-09:20	Review Business Description, SWOT Analysis, Estate Plan, Insurance Plan, and Business Strategy
2. Lesson	09:20-09:40	Production Plan
Break	09:40-09:50	Break
3. Lesson	09:50-10:50	Marketing Plan
Break	10:50-11:00	Break
4. Lesson	11:00-11:30	Management Plan
Lunch Break	11:30-13:00	Lunch Break
Afternoon session: Technical Knowledge		
1. Lesson	13:00-13:40	Agriculture &Environment Relationship and Waste-Pollution Management
Break	13:40-13:50	Break
2. Lesson	13:50-14:30	Sustainable Production & Protection of Soil and Water Resources
Break	14:30-14:40	Break
3. Lesson	14:40-15:30	Sustainable Production& Protection of Soil and Water Resources
4th Day: Agricultural Business Management & Computer Skills		
Morning Session: Agricultural Business Management		
1. Lesson	09:00-09:20	Review Production, Marketing, and Management Plans
2. Lesson	09:20-09:50	Financial Plan: Income Statement, Balance Sheet, Cash Flow Statement
Break	09:50-10:00	Break
3. Lesson	10:00-10:40	Management Plans
Break	10:40-10:50	Break
4. Lesson	10:50-11:10	Ratio Analysis and Benchmarks
5. Lesson	11:10-11:30	Capital Requirements and Reviewing Business Plans
Lunch Break	11:30-13:00	Lunch Break
Afternoon session: Computer Skills		
1. Lesson	13:00-13:40	Basic Computer Skills
Break	13:40-13:50	Break
2. Lesson	13:50-14:30	Basic Computer Skills
Break	14:30-14:40	Break
3. Lesson	14:40-15:30	Basic Computer Skills (Communication & Getting Knowledge)
5th Day: Internet and Networking&Technical Knowledge		
Morning Session: Internet and Networking		
1. Lesson	09:00-09:40	What is Internet and Networking?

Break	09:40-09:50	Break
2. Lesson	09:50-10:30	How to use Internet to Improve Business
Break	10:30-10:40	Break
3. Lesson	10:40-11:30	Promotion, Dissemination and Sustainability & Viability
Lunch Break	11:30-13:00	Lunch Break
Afternoon session: Technical Knowledge		
1. Lesson	13:00-13:40	Plant Protection, Biological & Biotechnical Methods
Break	13:40-13:50	Break
2. Lesson	13:50-14:30	Plant Protection, Biological & Biotechnical Methods
Break	14:30-14:40	Break
3. Lesson	14:40-15:30	Plant Protection, Biological & Biotechnical Methods
Break	15:30-15:40	Break
Evaluation	15:40-17:00	General Assessment and Survey

EMWOFA TRAINING PROGRAMME FOR WOMEN FARMERS		
1st Day: Agricultural Business Management		
7. Lesson	13:00-13:20	Ice Breaker
8. Lesson	13:20-13:40	Introduction of EMWOFA Project
Break	13:40-14:00	Break
9. Lesson	14:00-14:20	Risk Assessment Presentation
10. Lesson	14:20-14:40	Complete Risk Assessment
Break	14:40-14:50	Break
11. Lesson	14:50-15:10	What is a Business Plan, What Should be in It, and Why Should You Have a Business Plan?
12. Lesson	15:10-15:30	Developing a Vision/Mission Statement For Your Farm
Homework		Homework-Develop a Vision/Mission Statement for Your Farm
2nd Day: Technical Knowledge		
4. Lesson	13:00-13:40	Alternative Production Systems
Break	13:40-13:50	Break
5. Lesson	13:50-14:30	IPM in Farms
Break	14:30-14:40	Break
6. Lesson	14:40-15:30	Work Calendar and Program in Farms
3rd Day:Technical Knowledge		
4. Lesson	13:00-13:40	Soil Productivity & Plant Nutrition
Break	13:40-13:50	Break
5. Lesson	13:50-14:30	Soil Productivity & Plant Nutrition

Break	14:30-14:40	Break
6. Lesson	14:40-15:30	Soil Productivity & Plant Nutrition
4th Day: Agricultural Business Management		
6. Lesson	13:00-13:20	Review Mission Statements
7. Lesson	13:20-13:40	Describe Your Business: Where is Your Business Now?
Break	13:40-13:50	Break
8. Lesson	13:50-14:30	SWOT Analysis
Break	14:30-14:40	Break
9. Lesson	14:40-15:00	Estate Planning; Life, Health & Crop Insurance: Where Do You Want Your Business to Go?
10. Lesson	15:00-15:30	Develop and Implement a Strategy
Homework		Homework - Complete a Business Description, SWOT Analysis, Estate Plan, Insurance Plan, and Develop a Business Strategy for Your Farm
5th Day: Agricultural Business Management		
5. Lesson	13:00-13:20	Review Business Description, SWOT Analysis, Estate Plan, Insurance Plan, and Business Strategy
6. Lesson	13:20-13:40	Production Plan
Break	13:40-13:50	Break
7. Lesson	13:50-14:50	Marketing Plan
Break	14:50-15:00	Break
8. Lesson	15:00-15:30	Management Plan
Homework		Homework- Develop Production, Marketing, and Management Plans for Your Farm
6th Day:Technical Knowledge		
4. Lesson	13:00-13:40	Agriculture &Environment Relationship and Waste-Pollution Management
Break	13:40-13:50	Break
5. Lesson	13:50-14:30	Sustainable Production& Protection of Soil and Water Resources
Break	14:30-14:40	Break
6. Lesson	14:40-15:30	Sustainable Production& Protection of Soil and Water Resources
7th Day: Agricultural Business Management		
6. Lesson	13:00-13:20	Review Production, Marketing, and Management Plans
7. Lesson	13:20-13:50	Financial Plan: Income Statement, Balance Sheet and Cash Flow Statement
Break	13:50-14:00	Break
8. Lesson	14:00-14:40	Management Plans
Break	14:40-14:50	Break
9. Lesson	14:50-15:10	Ratio Analysis and Benchmarks
10. Lesson	15:10-15:30	Capital Requirements and Reviewing Business Plans
Homework		Homework- Develop a Financial Plan for Your

		Business
8th Day: Business Management-Computer Skills		
4. Lesson	13:00-13:40	Basic Computer Skills
Break	13:40-13:50	Break
5. Lesson	13:50-14:30	Basic Computer Skills
Break	14:30-14:40	Break
6. Lesson	14:40-15:30	Basic Computer Skills (Communication & Getting Knowledge)
9th Day: Business Management-Internet and Networking		
4. Lesson	13:00-13:40	What is Internet and Networking?
Break	13:40-13:50	Break
5. Lesson	13:50-14:30	How to use Internet to Improve Business
Break	14:30-14:40	Break
6. Lesson	14:40-15:30	Promotion, Dissemination and Sustainability & Viability
Homework	Homework	Opening a Facebook and Twitter Account and Sharing Ideas about EMWOFA
10th Day:Technical Knowledge		
4. Lesson	13:00-13:40	Plant Protection, Biological and Biotechnical Methods
Break	13:40-13:50	Break
5. Lesson	13:50-14:30	Plant Protection, Biological and Biotechnical Methods
Break	14:30-14:40	Break
6. Lesson	14:40-15:30	Plant Protection, Biological and Biotechnical Methods
Break	15:30-15:40	Break
Evaluation	15:40-17:00	General Assessment and Survey

2. RISK MANAGEMENT

Robin Brumfield* Burhan Özkan[2]**

Duration	4 Lesson hours
Objectives	Learners demonstrate competence in explaining risk assessment Learners demonstrate competence in defining a business plan Learners demonstrate competence in explaining what should be in a business plan Learners demonstrate competence in explaining why one should have a business plan
09:30-09:40	Trainer gives information about lesson subject to participants and defines objectives of session. Trainees are invited to add in their own objectives and to set priorities for their own learning
10:00-10:20	Trainerexplains risk assessment using large screen
10:20-10:40	Learnerswork in pairs and complete risk assessment for a farm Pairs of trainees briefly share with group how they would teach this to women farmers in the local trainings
10:50-11:10	Trainer explains risk management process Pairs of trainees briefly share with group how they would teach this to women farmersin the local trainings
11:10-11:20	Trainer explains risk management process tools
11:20-11:30	Pairs of trainees do the worksheets

[2] Prof. Dr. Robin Brumfield, Rutgers, the State University of New Jersey, brumfield@aesop.ruthers.edu
Prof. Dr. Burhan Özkan, Akdeniz University, bozkan@akdeniz.edu.tr

Risk Management means confidence in a changing world. By learning about and using a variety of management tools, women farmers can build the confidence they need to deal with the risks and opportunities of the future.

Risk Management is

the process of analyzing and controlling risk, aiming at the reduction of the frequency, the extent and the unpredictability of financial losses.

Risk results from the uncertainty of future incidents. Usually it is accompanied by insufficient information and results in a negative discrepancy from a defined business goal. Entrepreneurship by definition involves uncertainty and regularly requires the assumption of certain risks.

Identifying the personal risk tolerance and assessing individual risks will allow the women farmers to identify and exclude those alternatives which expose them to unacceptable risks and increase the likelihood that they will be able to select the best combination of risk management strategies. Therefore, women farmers should do the following to identify and assess their risks:

- Identify their farm risks
- Communicate these risks with other family members
- Look at their goals in terms of the risks which can keep them from attaining those goals
- Identify which risks are they comfortable retaining/managing with their own, internal, resources
- Identify which risks require taking external measures

Successful entrepreneurship

requires the willingness to bear risk , decisiveness and the acceptance of responsibility

2.1. Sources of Risk

The overall risk, to which the economic success of a company is regularly exposed to, results from a number of operative risks and financial risks.

2.1.1. Production and Technical Risk

In agriculture, most production processes are exposed to a multitude of risks such as weather, insects, weeds, diseases that cannot be predicted with certainty. Consequently, farm revenues show a high variability. Technical risk e.g. resulting from the adoption of new technology or the introduction of new crops to the farm may even increase the risk.

2.1.2. Price and Market Risk

Price and marker risk results from market activities, e.g. varying commodity prices, or in general from unexpected fluctuations of supply and demand in relevant input and product markets. Globalization and changing international trade relationships increase the level of market and price risk.

Examples of market risk are changes in the national economy, within the sector, in the competition or within the companys' own customer base. To some extent, it is possible to prepare yourself for the actual impact of these incidents. Explicitly the existence of a marketing plan helps to stay on target if, for example, competitors surprisingly choose to run a low price strategy. Another measure to be able to react in timely manner is always to stay informed about the overall economic development that directly influences your own market (key market drivers).

Useful links:

https://ec.europa.eu/agriculture/markets_en

https://ec.europa.eu/agriculture/markets-and-prices_en

https://ec.europa.eu/jrc/en/research-topic/agricultural-markets-and-international-trade

2.1.3. Legal Risk

Legal risk includes the choice of the suitable legal form for the enterprise, taxation aspects, contractual law, estate planning, and conclusion of insurance contracts. Food safety, environmental laws and regulations are also gaining in importance. Because of far reaching consequences the case of noncompliance, managers are well advised to seek counselling from competent law and tax advice offices.

Useful link:

https://ec.europa.eu/agriculture/policy-perspectives_en

2.1.4. Personal Risk

With farming, being a labor-intensive sector the loss of the manager or other key employees may threaten the existence of the whole enterprise. The prevention of accidents and health protection can reduce the personal risk of the company. Measures to reduce staff turnover and knowledge of relevant employment rights are obligatory. It is also imperative to have an estate plan so that what happens at the death of the owner. Some questions to ask are:

- Do I have a will? When did I last review it?
- Have I sought professional help to guide me through this process?
- Can I find important documents such as wills, titles to property, banking and investment records?
- Is it possible for others to find them as well?
- Have I planned for who will take over my farm when I die?

2.1.5. Financial Risk

Financial risk arises from the payment for the salary of permanent staff and from changing interest rates if money is borrowed to finance production factors. It is also caused by a lender´s willingness to continue lending and by changes in market values of loan collateral. It can also arise from operating costs that must be paid before agricultural enterprises are sold.

2.2. Risk Management Tools

Some of the tools support the softening of the consequences of taking risky actions; others help reduce the impact of an undesirable result. The effective handling of risks is an important

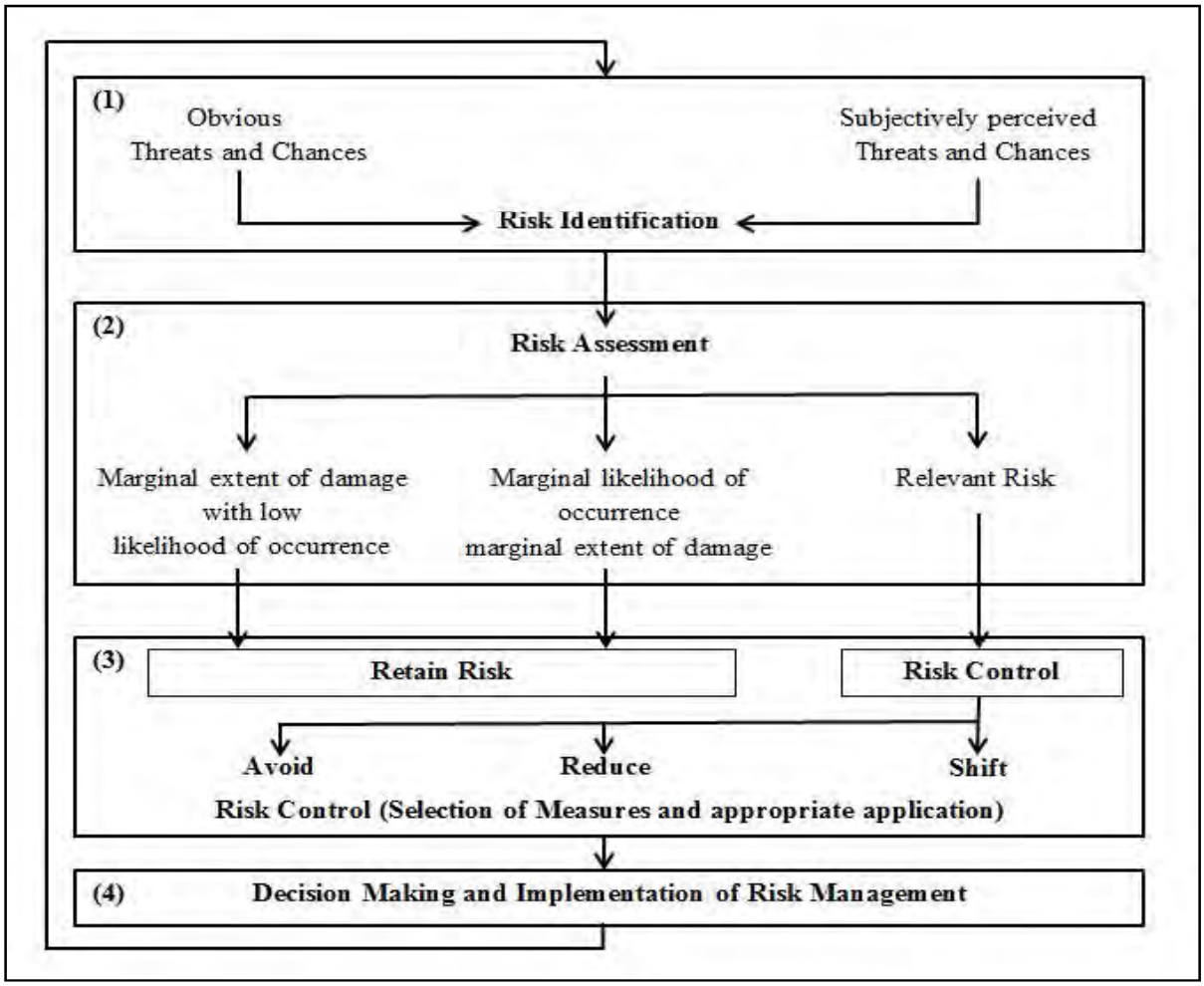
element of running a successful farm business. Recognizing and acting on opportunities as well as trying to minimize losses can help shape agreement on fundamental risk management.

A Risk Management tool

should be applied if its overall performance exeeds its overall costs

Risk management is a circular process starting with the **(1)** identification of risk, followed by **(2)** the assessment of risk, **(3)** risk control, **(4)** decision making (under risk). After (the successful) implementation of risk management tools the process starts a new with risk identification.

Figure 2.1. Risk Management Process



Source: Mußhoff and Hirschauer, 2011

Therefore, women farmers should consider the following risk management strategies:

- Retain: Sell your produce directly at the local farmer's market.
- Shift: A contractual arrangement where someone else takes on some of the chance of a negative occurrence happening. For example: pre-sell your products
- Reduce: Keeping facilities such as greenhouses in good condition to reduce damage from frost and other environmental factors and implementing a marketing plan that locks in some level of guaranteed return.
- Avoid: Not selecting a particular crop with unstable harvest yield and not increasing your debt beyond your comfort level.

Analogous to "Sources of Risk" as specified above, there are corresponding tools for managing the respective risk.

2.2.1. Production Risk Tools

- Diversification: By producing more than one commodity, *diversification* reduces the income variability and the dependency on the thriving of a single crop.
- Irrigation: Getting increasingly independent of rainfall by installing irrigation will produce more *stable crops* and income.
- Property Insurance: A basic *property insurance* protects against the loss of buildings, machinery, livestock and harvested produce from fire, lightning, windstorm and theft. Being rather inexpensive, a minimum coverage on valuable assets is compulsory. In addition, different types of insurance will help to reduce production risk. *Index insurance* is a relatively new but innovative approach to insurance provision that pays out benefits based on a predetermined index (e.g. rainfall level) for loss of assets and investments, resulting from weather and catastrophic events. It also allows the claims settlement processes to be quicker and more objective.
- Insurances against poor crop yields**:** Those have been available for many years. However, income from crop production can be low even when yields are not. A risk management tool known as r*evenue protection insurance* addresses this problem. Revenue protection insurance guarantees a certain level of revenue rather than just production. It protects you from declines in both crop prices and yields. The guarantee is based on market prices and the actual yield on your farm.

- Self-insurance: Last not least think about to self-insure with emergency reserves funded from previous year´s profits.
- Extra production capacity: In case of the failure of vital production factors, keeping *extra production capacity,* excess machinery or labor capacity ensures entire production process and prevents loss.
- Custom Farming: Owners with small acreages can make most of the production and marketing decisions without investing in a full line of machinery by implementing *Custom Farming.* The custom operator agrees to perform all the machine operations on the owner's land in exchange for a set fee or rate. The landowner pays for all seed, chemicals, and other inputs, and keeps all of the crop and commodity payments.

Other things to consider are insect, disease, and week management strategies.

2.2.2. Price and Market Risk Tool

Instead of selling all of a storable crop at one time, *spreading sales* avoids selling the entire crop at an annual low price but also precludes selling it all at the highest price. The resulting average price received should be near the average annual price for the commodity. Signing a contract with a buyer or processer even before planting the crop is called *contract sales*, removes the price risk at planning time, and guarantees the producer will have a market. Usually further conditions like quality standards are part of the contract, conversely raising the production risk. Maintaining management *flexibility* by not investing in long-term means of production allows adjusting production decisions to changing price or weather conditions. Also planting seasonal crops vs. annual or even permanent crops allows short respond time to unforeseen events.

2.2.3. Legal Risk Tools

Careful thought must be given to choice of *business organization*. A farm business can be organized as a sole proprietorship, a partnership, a corporation, a limited liability company, or a cooperative. There are advantages and disadvantages to each form of business organization, depending on the size of the business and the desires of the owners. Having all *contracts in writing* and *preparing a will and estate plan* that provide for the orderly transition of farm business to heirs will also reduce legal problems. *Liability insurance* covers injuries or damage to other people or property for which the insured or employees may be liable.

2.2.4. Personal Risk Tools

Life Insurance provides protection against losses that might result from the unexpected death of the farm operator. The insurance proceeds can be used to meet expenses related to transferring management and ownership of the business. A *backup management (team)* consists of spouses and attorneys who should know the location of tax, financial and legal records and key employees who are able to step in when the main operator is temporarily or permanently unable to continue. *Work safety*, well-maintained machinery and the application of common sense help to avoid accidents and injuries that may cause costly business interruption. Disability insurance of the owner/operator is important to consider since agriculture is a dangerous business and farmers are more likely to become disabled than killed on the farm. An estate plan that defines the future if a divorce of the owner occurs should also be considered.

2.2.5. Financial Risk Tools

Strategies to maintain liquidity and solvency are not only important for the short and long term survival and prosperous development of the enterprise but also reduce the financial risk. A *fixed interest* rate may be higher when the loan is made but prevents cost of the loan from increasing and builds a solid basis for cost calculation. Not borrowing up to the limit imposed by the lender creates a *credit reserve* to be obtained in the event of some unfavorable outcome. Particularly during the early years of the business increasing *owner equity* by retaining profits in the business is often neglected. However, in the final analyses it is the equity or net worth of the business that provides necessary solvency and much of its liquidity. An operating line of credit or other source of operating funds is important to consider because in farming, expenses must usually be paid before income is received from the sales of crops or livestock.

Due to radical changes in various environments of agribusinesses, risk management is gaining in significance enormously:

- greater volume risk caused by climatic change and extreme weather events
- greater market risk
  - liberalization of global markets
  - changing consumer habits
  - raising market power of food retailers
  - political crises (e.g. embargoed Russia)

- food scandals
- structural change

The implementation of risk management tools is usually not free of cost. Insurance premium, maintenance cost or acquisition cost just to name a few. These costs reduce the expected average profit but also narrow the risk.

Useful Link:

https://ec.europa.eu/agriculture/sites/agriculture/files/policy-perspectives/impact-assessment/cap-towards-2020/report/annex6_en.pdf

3. BUSINESS STRATEGY

Robin Brumfield* Burhan Özkan[3]**

Duration	2 hours
Objectives	Learners demonstrate competence in explaining a Business Plan Learners demonstrate competence in explaining a SWOT Analysis Learners demonstrate competence in explaining Business Strategy Learners demonstrate competence in explaining why one should have a Business Strategy and SWOT Analysis Learners demonstrate competence in developing a mission statement for a farm
09:30-09:40	Trainer gives information about lesson subject to participants and defines objectives of session. Trainees are invited to add in their own objectives and to set priorities for their own learning.
10:00-10:20	Trainer explains SWOT Analysis using large screen.
10:20-10:40	Learners work in pairs and complete SWOT analysis for a farm. Pairs of trainees briefly share with group how they would teach this to women farmers in the local trainings
10:50-11:10	Trainer explains what a Strategic Plan is, Pairs of trainees briefly share with group how they would teach this to women farmers in the local trainings
11:10-11:20	Trainer explains what should be in a Strategic Plan, and why farmers should have a Strategic Plan.
11:20-11:30	Pairs of trainees do the worksheets

Deciding "What business are we in?" is the starting point of strategy and the basis for

[3] Prof. Dr. Robin Brumfield, Rutgers, New Jersey Devlet Üniversitesi, brumfield@aesop.ruthers.edu
Prof. Dr. Burhan Özkan, Akdeniz Üniversitesi, bozkan@akdeniz.edu.tr

Special thanks to Stephanie Rossi who developed a business plan as a study abroad student in 2013. Parts of that plan were used for this document.

defining the firm´s identity. Management of a farm can basically be divided into two broad categories: strategic and tactical.

Strategic management consists of charting the overall long-term course of the business.

Tactical management consists of taking short-run actions that keep the business moving along the chosen course until the destination is reached.

3.1.Functions of Management

Farm managers perform many functions. Much of their time is spent doing routine chores. However, the functions that distinguish a manager from a mere worker are those that involve a considerable amount of thought and judgement. To put it in a nutshell, the main function of a manager is to manage! The managerial functions can be summarized under the general categories of planning, implementation, control and adjustment.

3.2.Business Plan

A business plan is a plan of how a business owner intends to organize an entrepreneurial endeavor and implement activities necessary and sufficient for the venture to succeed. Based on the mission statement, it is an essential tool for planning, direction and running a business. It clarifies the operational and financial objectives of a business and contains the detailed plans and budgets showing how the objectives are to be realized. It serves as an evaluation of business´s chances for success. It is a written summary of the business venture, its operational and marketing opportunities and strategy, as well as the skills and abilities of the manager and employees.

Everything done in the business should be guided by the business plan.

So, in essence, if you have a great plan, then the business plan is the business.

3.2.1. Why should women farmers have a business plan?

There are 6 main reasons to have a business plan for their farm:

1. Writing down thoughts forces them to define/refine their farm business.
    - Assess their current situation - Where am I now?
    - Helps them to set objectives for their business – Where am I going?
    - Establish their farm's mission statement
2. A business plan allows them to set goals for their farm.
    - Short and long term planning
    - Evaluate the market conditions
    - Determine the history and direction of their farm
    - Determine the key players in their operation
    - Evaluate their skills, talents, resources, etc.
3. It allows them to effectively share and explain their goals and vision with others.
    - Bankers and investors may require a business plan before lending or investing
    - Before community leaders can help promote and support their farm they have to understand what they are trying to do
    - Nonprofits/granting agencies may require a business plan
    - Prove to anyone/yourself that your vision is realistic
4. A business plan can help to identify potential issues/pitfalls before they begin, such as competition, legal concerns, liability issues, and labor needs.
5. A business plan can protect the future women farmers from proceeding with an idea that doesn't make good "business sense." Moreover, understanding the potential issues beforehand can allow for proper planning.
6. It provides the tools to quantify the success of your business.
    a. Target sales
    b. Growth and expansion
    c. Market share
    d. Profits

A business plan with well-defined goals is a necessity for professional business management. Planning properly for the business is a tool for success, as a good plan maps the course of

action to achieve your business goals and aspirations. Women farmers in agriculture, especially the smallholder farmers, should use a business plan as the operational tool that directs each and every step in the business. Entrepreneurs want to see a return on their investment as they invest time, money and emotional effort into planning the business. A business plan can be used as a powerful sales document for raising money. A business plan is a prerequisite for engaging with a venture capitalist, and/or investors. To raise funds for a start-up business venture or to raise additional capital, your document must fulfil the requirements of a funding institution or sponsor and this will give the reader an insight into what you will be doing in your proposed or existing business. The organizations that lend money to your business also want to get a return on their investment. They want a 'safe' investment with relatively low risk. A thorough business plan can accomplish this.

3.2.2. What should be in a Business Plan?

A business plan should contain a description and definition of who is involved, what consumer need will be met, what the saleable product/service is, and the market environment. It should also contain a plan for producing and marketing the product/service, a list of resources needed to achieve the plan and when they are needed, and a summary of anticipated results. So it is a written summary of the business venture, its operational and financial details, marketing opportunities and strategy, as well as the skills and abilities of the manager and employees.

Most business plans contain the following sections:

- Executive Summary (see below)
- Mission Statement (see section)
- Business Description (see below)
- Management Plan (see section)
- Production Plan (see section)
- Marketing Plan (see section)
- Financial Plan (see section)

Moreover, it should include information that is important in taking the business where it is wanted to go. However, it should not include things that will not help to go where they want to go with the business. It should be noted that every plan is unique. Every single farm plan should relate to and be steered by the respective mission statement. Goals should be kept

realistic. The real value is in the process of creating it. A business plan should serve as a roadmap for the women's farm business.

The *Executive summary* gives a brief overview of the current situation and the aspirations for the future. It is one of the most important chapters of a business plan. On a maximum of two pages all information of crucial importance should be included. Above all, it has to be ensured that the offered services and the resulting customer benefit are stated clearly. A brief description of the market potential, the capital requirement, and the desired profitability should not be missing. Though this chapter is put in the beginning of the business plan, it usually is written last because it summarizes the overall business plan and presents the essentials so that at a glance the reader is able to capture the particular strengths and the most important success factors of the company. In case it is the only thing that a reader will read it needs to give a synopsis of what you want to do or achieve.

Business Description is a brief description of the business and where the business is located and what product or service women farmers are going to give to their clients or customers. This is akin to an extended elevator pitch and can help readers and potential investors quickly understand the goal of the business and its unique proposition. This part needs to relate to the introduction and objectives, here the women farmers need to indicate, for example, if they want to farm, when the planting season will be and when harvesting will take place. Make sure the following topics are covered.

- How is the farm and its products unique?
- Who are the customers?
- Description when and how the farm started.
- Description of farm: size, location, buildings and other facilities.
- Who is the owner? What is the Business Organization/ Ownership structure?
- Who are the other key personnel?
- What are the financial capabilities any special business relationships?
- What are its strengths to build upon, and weaknesses to correct or overcome?
- Summarize future plans, timetables, resources required, and personnel or technical gaps to be filled

These questions have to be answered in the business description:

- What is the current status of your farm business?
- What makes the enterprise unique?
- What are the key qualifications of the owner?

- What are the key qualifications of the employees?
- Which is the long-term competitive advantage?
- What key assets (greenhouses, buildings, trucks, orchards, etc.) are in place?
- What does the farm business need to succeed?
- Regarding business organization, the ownership structure has to be made clear
  - Sole proprietorship
  - Partnership
  - Corporation
  - Limited liability partnership
  - Cooperative

To complete the business description, a final convincing statement makes clear why the author thinks she has a winning business venture and why potential stakeholders should invest in her business.

3.3.Opportunities and Issues Analysis: SWOT

Farms face external opportunities and threats that are beyond their control. Farms also have strengths and weaknesses that are internal to their businesses such as location, skills of family members, and cash flow position. Performing an analysis of the business's internal strengths and weaknesses and the business's external opportunities and threats may uncover overlooked risks. To be effective, a **S**trengths, **W**eaknesses, **O**pportunities, **T**hreats (SWOT) analysis should be a very candid and honest assessment of the business. Always remember, some risks can also be opportunities.

Strengths are attributes of a person or of a business that can contribute to achieving the objectives.

Weaknesses are attributes of a person or of the business that can lead to not achieving the objectives.

Opportunities are external conditions that will contribute to achieving the objectives.

Threats are external conditions that can lead to not achieving the objectives.

Strengths and Weaknesses are factors internal to the business and within management control

- What are the abilities and limitations of the manager and key employees?
- How modern and efficient is the physical facility?

- How is the soil?
- How close are you to the market?
- What can you do better than your competitors?
- What is the cash flow position of the business?

Opportunities and Threats are factors, outside or externally, of the business and beyond management control

- Market trends
- Consumer demands, demographic, lifestyles
- Strong or weak currency
- Interest rates, inflation rate
- Government policies and regulations
- Labor markets

The SWOT Analysis

- Matching the farm's strengths and weaknesses to external opportunities and threats.
- Analyzing the key factors for success and analyze the competition.
- Build a successful business by magnifying strengths, and overcoming weaknesses.

Figure 3.1. SWOT Analyse

The Questions to ask doing a SWOT analyses:

- What production levels do you have now, or do you want to achieve?
- What is the location?
- Does it lend itself to direct marketing or wholesale marketing?
- How much land do you own or have access to?
- What machinery and facilities do you have?
- What is their age and conditions?
- Can they be better used?
- What is your financial condition?
- What is your cash position?
- What are the skills of the owner/manager?
- Do your skills and resources limit the alternatives?
- What are some marketing and production opportunities?
- Do your personal preferences or sense of social responsibility limit the alternatives?
- Can you form alliances with other businesses that could compliment yours?
- What marketing channels are possible?
- Does your strategic plan require greater competence or resources than you currently possess?
- What skills and talents do employees possess?
- What family members will be involved in the business and what are their unique talents and interests?
- Who will be the next generation of management?
- How does the layout of the farming operation impact on production efficiencies?
- Do you have an adequate, cost effective water supply?

The answers to these questions give an indication of the strengths, weaknesses, opportunities and threats that are involved in the new or existing business venture. They also identify the internal and external factors that are favorable or unfavorable to achieve the objectives. It is important to look at ways to build on the positive issues and address negative issues. The 5 W´s (what, how, where, who and when) can assist in drafting a plan.

3.4.Strategy Development

Strategy is the result of managers engaging in deliberate, rational analyses (e.g. SWOT). It´s the pattern of objectives, purposes, or goals and the major policies for achieving these aims, a

method, a set of plans or a series of actions to achieve a specific effect. For smaller businesses parts of their strategy may also emerge through adaption to circumstances.

To develop a business strategy, begin by answering the questions:

- Where do you want to be?
- What do you want your farm business to be in the next five, ten, and twenty years?
- Will your strategy help you "do the right things" to succeed in the future of your industry?

After all the information has been gathered in the previous steps, the firm is now in the position to develop and evaluate alternative strategies that will attain the objectives of the firm. Developing a strategy is mapping out a course to take the company from its current to its desired position.

Hierachy of strategy statements:

The Mission Statement is the basic statement of organizational purpose, it addresses	**"Why we exist."**
A *statement of values* states:	**"What we believe in and how we will behave."**
The *vision statement* projects:	**"What we want to be."**
The *strategy statement* articulates:	**"What our competitive game plan will be."**

It is important to distinguish strategic plan from business plan. The *business plan* focuses on the viability of a company. You must investigate the market and establish realistic financial goals to create a business plan**.**

A *strategic plan* is more conceptual and dynamic, and it serves as a roadmap for a small business to reach its goals. It allows to gauge the company's performance, strengths and weaknesses over time. By revisiting the plan regularly, marketing, sales, product development, operational and revenue goals to achieve your desired results can be analyzed and updated.

Best producers are doing strategic planning; they look at the "Big" picture

- Focus on core competencies that lead to competitive advantages.

- Identify strengths to build on and weaknesses to correct or overcome.
- Consider external forces in the industry – many currently negative.
- Anticipate and takes advantage of business trends.
- Aligning the firms' activities to the market position.
- Listening carefully to what the consumer wants

They develop strategic alternatives

- Evaluate alternative strategies that will attain the objectives of the farm business.
- Match strengths and weaknesses to external opportunities and threats.
- Focus on core competencies that give them a competitive advantage.
- Reducing costs is an important consideration no matter what type of competitive strategy is choose.

As result most companies will come up with 8 to 15 *key results areas* (KRAs), areas in which the organization must achieve success to grow and prosper. The company's objectives and tactics can be grouped into these key areas, making it easier to process and prioritize objectives, allocate resources and coordinate with other areas.

Some examples of KRAs are

- Increase revenues.
- Improve financial condition (profitability, liquidity, solvency, credit and collections policies, etc.).
- Keep pace with or out distance the competition.
- Improve efficiency and productivity.
- Achieve and maintain superior customer service.
- Capitalize on emerging trends.
- Increase utilization of technology to improve operations.
- Improve labor relations, human resource development and training (personnel issues: salary administration, job descriptions, benefits, personnel manuals, etc.).
- Improve internal communications.
- Improve distributor and/or supplier relationships.
- Improve public relations, advertising, promotions, etc.
- Improve or enhance products and services.
- Capitalize on the physical facilities (location, capacity, layout, parking, etc.).
- Improve or enhance insurance coverage.

- Capitalize on or improve organizational structure.
- Arrange for the orderly retirement and transfer of ownership and control of senior owners to junior owners or potential owners.

Strategy is the link between the firm and its external environment; hence, the *strategic fit* is essential for success. The strategy must be consistent with the firm´s external environment, and with its internal environment – its goals and values, resources and capabilities, and structure and systems. Finding a true strategy—one that really differentiates your business from the competition — may take some energy, it´ll be worth it. Without a clearly defined or closely followed strategy, companies of all sizes tend to lose sight of their direction when they run into temporary difficulties, or when management just gets bored operating "the same old business."

Strategy formulation refers to the process of choosing the most appropriate course of action for the realization of organizational goals and objectives and thereby achieving the organizational vision. The process of strategy formulation basically involves five main steps. Though these steps do not follow a rigid chronological order, however they are very rational and can be easily followed in this order.

a) Setting Organizations' Objectives (See Mission statement and Goal Setting): Once the objectives and the factors influencing strategic decisions have been determined, it is easy to take strategic decisions.

b) Evaluating the Organizational Environment: The next step is to evaluate the general economic and industrial environment in which the organization operates. The purpose of such a review is to make sure that the factors important for competitive success in the market can be discovered so that the management can identify their own strengths and weaknesses as well as their competitors' strengths and weaknesses. (See SWOT analyses)

c) Setting Quantitative Targets: In this step, an organization must practically fix the quantitative target values for some of the organizational objectives.

d) Performance Analysis: A critical evaluation of the organizations past performance, present condition and the desired future conditions must be done by the organization. This critical evaluation identifies the degree of gap that persists between the actual reality and the long-term aspirations of the organization.

e) Choice of Strategy: This is the ultimate step in strategy formulation. The best course of action is actually chosen after considering organizational goals, organizational strengths, potential and limitations as well as the external opportunities.

Once alternative strategies have been formulated and selected, they need to be evaluated. This is the stage at which you will want to do some kind of financial analysis (see chapter 8). You will want to follow basic investment criteria.

Here are a few possible strategy variables to consider:

- High quality versus low price
- Narrow versus broad product line
- High-tech versus low-tech products
- Trendy versus conservative products
- Customized versus standard
- Niche market versus mainstream market
- Larger benefits are preferred to smaller ones
- Early benefits are preferred to later ones. This takes into account the time value of money i.e. a EURO today is worth more than a EURO tomorrow.
- Safety is preferred to risk.

3.5.Strategy Implementation

Put simply, strategic implementation is the process that puts plans and strategies into action to reach goals. A strategic plan is a written document that lays out the plans of the business to reach goals, but will sit forgotten without strategic implementation. The implementation makes the company's plans happen. Coming up with a great strategy is only half the challenge. Getting all of the employees to "buy into" it is the other half. What the strategy is going to be can't just be announced to the staff—they´ll forget it until the next day. That's why it's so important to get managers (or other key employees) involved in setting a new strategic course. Have them participate in discussing their vision of the future. Have them create lists of the company's strengths and weaknesses. And most of all, carefully consider their opinions in setting direction. To achieve strategic goals and objectives it is necessary to translate the chosen strategy into organizational action, it has to be made sure that people understand what is they need to do and why.

An organizational control system is also required. This control system equips managers with motivational incentives for employees as well as feedback on employees and organizational performance. Organizational culture refers to the specialized collection of values, attitudes, norms and beliefs shared by organizational members and groups.

Following are the main steps in implementing a strategy:

- Developing an organization having potential of carrying out strategy successfully.
- Creating strategy-encouraging policies.
- Employing best policies and programs for constant improvement.
- Linking reward structure to accomplishment of results.
- Making use of strategic leadership.

It is also important to monitor and adapt the strategy. A strategy must be a living, breathing document. As we all know: if there's one constant in business these days it's change. So our strategies must be adaptable and flexible so they can respond to changes in both our internal and external environments.

Strategy meetings should be held regularly throughout the year, where initiatives and direction are assessed for performance and strategic relevance. At least once a year we should put our strategy under full review to check it against changes in our external and competitive environments as well as our internal environments.

Strategy is not just a document written by executive teams and filed in the CEO's desk. It is a vision for the organization, owned by the organization. And to succeed the whole organization must engage with it and live and breathe it. Strategy should inform our operations, our structure, and how we go about doing what we do. It should be the pillar against which we assess our priorities, our actions and performance.

When execution is brought into strategic planning we find that our strategy is weaved through our organization, and it's from here that great leaps in growth and productivity can be achieved.

4. DEVELOPING A MISSION STATEMENT FOR YOUR FARM

Robin Brumfield* Burhan Özkan**[4]

Duration	2 hours
Objectives	Learners demonstrate competence in explaining a Mission Statement Learners demonstrate competence in defining a Mission Statement Learners demonstrate competence in explaining a Mission Statement Learners demonstrate competence in explaining why one should have a Mission Statement Learners demonstrate competence in developing a Mission Statement for a farm
09:30-09:40	Trainer gives information about lesson subject to participants and defines objectives of session. Trainees are invited to add in their own objectives and to set priorities for their own learning.
10:00-10:20	Trainer explains Risk Management using large screen.
10:20-10:40	Learnerswork in pairs and complete Risk Management for a farm. Pairs of trainees briefly share with group how they would teach this to women farmers in the local trainings
10:50-11:10	Trainer explains what a Business Plan is, what should be in it, and why farmers should have a Business Plan. Pairs of trainees briefly share with group how they would teach this to women farmers in the local trainings
11:10-11:20	Trainer explains developing a mission statement, shows examples of different mission and vision statements from different farms, and gives a worksheet for practice.
11:20-11:30	Pairs of trainees do the worksheets and write sample mission statements for an imaginary farm.

[4] Prof. Dr. Robin Brumfield, Rutgers, the State University of New Jersey, brumfield@aesop.ruthers.edu
Prof. Dr. Burhan Özkan, Akdeniz University, bozkan@akdeniz.edu.tr

A mission statement sets goals and standards. It looks at the future and defines what kind of business you want. It is a source of inspiration. Moreover, it provides clear decision-making criteria.

A farm's mission:

- Is a short concise statement that describes the core purpose of your business
- Is the initial measuring stick for making decisions
- Focuses on the business present
- Lists broad goals
- Identifies the company's products, services, and customers
- Describes what consumer need will be met
- Should be short enough for people to easily remember it

A good mission statement:

- Is focused less on what activities happen on your farm and more on what the business will accomplish for its customers, employees, and owners.
- Highlights the unique philosophy and set of circumstances of your farm such as:
    - A production method, such as organic farming
    - A specific commodity such as greenhouse tomatoes.
    - A target market such as local consumers.
- Uses the unique circumstances of your farm to craft the "who, what, why and how" that ultimately helps develop your farm business plan.

To develop your mission statement, first, you need to identify a market need and then offer products or services that satisfy that need, at a price customers are willing to pay while still returning a profit to the business. A good mission statement should explain what product or service your farm produces and also why consumers would want to buy that product or service.

ASK YOURSELF: Mission Statement

- Why does my farm business exist?
- What is its purpose?
- What does my farm business do?
- Why does it do it?
- For whom does it do it?

Dot's Farm and Greenhouse Mission Statement

Dot's Farm and Greenhouse is committed to the sustainable production of fruits of fresh, sweet, and natural quality. We value our resources and do not apply any hormones to our crops, which protects the land and ensures that customers will receive goods that are long lasting, tasty, and healthy.

Here are examples of mission statements from three actual farms owned by women:

"Jalma Farms is committed to a sustainable native fruits orchard while preserving open space and protecting sensitive fresh and salt water ecosystems."

"B & B Livestock Farm, LLC, is a quaint family owned farm dedicated to recognizing our customers' needs by producing healthy, superior-quality, all natural food for the local consumer. Our high standards and commitment to cleanliness, animal health, and environmental stewardship allow for a relaxed, stress free environment for our animals and visitors alike."

"We grow healthy food for healthy people."

Write down your mission statement

_____

_____

_____

Homework

- Set your priorities and form your business plan
- Write down a more detailed mission statement

5. PRODUCTION PLAN

Robin Brumfield* Burhan Özkan**[5]

Duration	1.5 hours
Objectives	Learners demonstrate competence in explaining a production plan Learners demonstrate competence in preparing a production plan for a farm
09:30-09:40	Trainer reviews the subject of previous day. Trainer gives information about lesson subject to participants and defines objectives of session. Trainees are invited to add in their own objectives and to set priorities for their own learning
10:00-10:20	Trainer explains how to prepare a production plan using large screen.
10:20-10:40	Learners work in pairs and write a production plan for a farm. Pairs of trainees briefly feedback to group to explain how they would teach this to women farmers in the local trainings
10:40-11:00	Pairs of trainees prepare a gantt chart for an imaginary farm.

Your production and operation plan includes a description of what crops you will produce, how you will produce them, and what technology and equipment you will use. It should also list other business activities such as growing other crops; selling production inputs to other producers; selling at the bazar; or starting agri-entertainment ventures.

ASK YOURSELF

What is my production plan?

- **What crops will my farm business produce?**
- How it will produce them?
- What technology and equipment will we use?
- What varieties will we produce?
- What other activities will my business perform, such as a booth at the bazaar, spraying for other farmers, selling agricultural chemicals, etc.

[5] Prof. Dr. Robin Brumfield, Rutgers, the State University of New Jersey, brumfield@aesop.ruthers.edu
Prof. Dr. Burhan Özkan, Akdeniz University, bozkan@akdeniz.edu.tr

My farm activities will be:

5.1 Farm Record-Keeping

Farms require record-keeping to succeed and repeat those successes year after year. Before growing a crop or livestock enterprise, you should decide which records to keep. One set will be financial, including costs of items such as plants, seed, fertilizers, containers, root substrate, labor, and utilities. Cultural and production records are also important to keep.

Cultural Records.You should keep cultural records to: (1) provide a plan for repeating successful crops and (2) figure out what went wrong in unsuccessful crops so you can correct it in the next crop. Long before a crop is planted, you should write a cultural schedule, listing dates and labor budgets for tasks such as planting, fertilization, pesticide application, harvesting, and cleaning up. The cultural schedule record sheet gives you a daily reminder of the various tasks that must be performed.

Production Records. You should also keep a set of production records. You should gather these records throughout the growth of the crop. You should write the condition of each crop and weather conditions weekly. Record visual observations, including things like species, height, maturity, and any disease conditions. This information lets you compare the present crop with previous crops. By looking at a poor crop afterwards, you can identify the stage of growth when trouble started. The production record should also include the yield, the harvest date, and the crop quality. These records are useful for budgeting.

Useful link:

http://ec.europa.eu/agriculture/rica/

Dot's Farm and Greenhouse Record-Keeping Plan

I will keep cultural and production records for each crop. This will include cultural schedule, listing dates and labour hours for each production operation such as root substrate preparation, planting, syringing, fertilization, pesticide application, pinching, pruning, chemical growth regulation, disbudding, harvesting, and cleaning up. This cultural schedule will be recorded in the greenhouse and maintained in the general manager's office. Daily, the grower will assess the condition of each crop and record weather conditions.

After the crops are harvested and reach the market, we make note of the transactions in our records. We also keep record of when chemicals are applied and need to be applied again, and when all of the components of our system must be checked for safety and quality.

ASK YOURSELF

What records will I need to keep?

List the kinds of records you will need to keep:

Ways to reduce Production Risks:

- Enterprise Diversification
- Crop Insurance
- New Technologies

ASK YOURSELF

When I am considering starting a new Enterprise:

- **What new knowledge and management capabilities are needed?**
  - Are they readily available?
- Do I have a serious commitment to a new enterprise?
- How much additional capital investment would I need?
- What are the added labor needs?
- Where are new markets?
- What are the income relationships between this enterprise and the existing enterprises?

ASK YOURSELF

I am considering adopting a new Technology:

- What is the economic benefit of adopting new technology?
- Would it reduce my risk?
- Is this risk management strategy more profitable than an alternative one?
- Would it be better to buy crop insurance, rather than change production practices?

5.2. Gantt Charts: Planning and Scheduling for Labour Needs

Gantt charts can help you figure out in what order tasks need to be completed and identify the resources you need to grow and sell a crop, along with the times when these resources will be needed. When production is under way, Gantt charts help you figure out whether or not the crop is on schedule. If it is not, they tell you the actions you need to put it back on schedule. Here is a Gantt chart with a portion of the production schedule for greenhouse tomatoes showing the tasks required the personnel in charge, and the dates for each task.

Table 5.1. A Gantt Chart for a Tomato Greenhouse

Date	Task	Person/Product	Quantity/Rate	Time
15-Jan	Order Supplies	Owner	5000 plants	30 min.
15-Feb	Disinfect soil	Owner	Drench	2 hours
20-Feb	Plant tomatoes	Owner and 3 workers	5000 plants	8 hours
15-Mar	Apply pesticides	Owner/Merit	10 ml	1 hour

To use a Gantt chart, follow these steps:

1. The first step is to list all of the tasks that need to be completed to produce and sell a crop. For each task, show the earliest start date, how long the task will take, and who is responsible for each task.
2. Make a chart for the year and schedule the labor activities. Plot each task on yearly calendar, showing it starting on the earliest possible date.
3. Make a chart for each of your other crops for the year and schedule the activities.
4. Make a budget for each crop you intend to grow and pay particular attention to which crops look the most profitable and also what crops or activities can extend into slow months.

5. Match the hours of labor you expect to have. This will allow you to look at the big picture to see how much labor you anticipate needing in each month. Can you modify work schedules or crops and other activities to utilize available labor in slack months?

Homework: Make a Gantt chart for one of your crops using the chart below:

Table 5.2. A Gantt Chart for a Crop

Date	Task	Person/Product	Quantity/Rate	Time

Production Plan for Dot's Farm and Greenhouse

We grow tomatoes, watermelons, and honeydew melons. Tomatoes are grown on 1 acre, the watermelons are on 1 acre, and the honeydew melons also grow on 1 acre. They are all planted in our 3 acre greenhouse.

The tomatoes are perennial plants and will not need to be replanted each year, but the watermelons and honeydew melons are annuals, so they will have to be planted again. A tractor will be used to till the ground so that the dirt is sectioned into little rows. Then, it will make it so that an even trench is dug into the centers of each of those rows. In those trenches, the melon seeds will be planted. It will be necessary to use the tractor to mow any place that ever becomes overgrown with grasses and weeds, especially where the storage depot will be built.

The strain of tomato that we grow has an average lifespan of about six years. To control weeds in the greenhouse and surrounding land, herbicides will have to be applied to the ground. We also plan on using insecticides to keep pests off of the crops as well as fungicides so that they do not succumb to root rot. Drip tape irrigation systems are installed in the greenhouse, and that helps to reduce the costs and time it takes to water our crops in other ways. It is efficient and able to water plants over time, and it makes it easier to water the many plants that our farm has. Less water winds up being wasted, as it is only applied where it is needed. It is best to replace the tape each year, and this year, we will lay down a new system.

Chemical and physical safety is important to us. We often test the water that is applied to our crops via the drip irrigation system for impurities and to see whether it contains any harmful chemical compounds. Our land in which the crops grow has its pH tested routinely, and it is also checked for traces of chemicals that should not be there. If any pests, whether they be insects or fungi, are noticed, they are removed as quickly, efficiently, and thoroughly as possible. We keep up to date on the current legal statuses of all the pesticides we use. If they are deemed unsafe, we discontinue the use of them and promptly as possible. We also never apply pesticides that have expired to our plants, nor do we apply them in large quantities. When it is time for our produce to be transported, we use clean crates and package the crops so that they will not be bruised. We inspect each fruit before it goes into the crate and will not sell anything that contains pests or is damaged. After the crops are harvested and reach the market, we make note of the transactions in our records. We also keep record of when chemicals are applied and need to be applied again, and when all of the components of our system must be checked for safety and quality. Furthermore, we communicate all of this to our employees. All of these measures taken help us to ensure that the products that we create are as consumer friendly as possible.

Table 5.3. Five Year Production Projection for Dot's farm and Greenhouse

Items	**Price**	**Number of units produced**				
		Year 1	Year 2	Year 3	Year 4	Year 5
Tomatoes	30 €	40 tons	45 tons	50 tons	45 tons	50 tons
Honeydew Melon	1 €	20 tons	15 tons	20 tons	20 tons	20 tons
Watermelon	1 €	15 tons	20 tons	15 tons	15 tons	15 tons

Homework

Use the following table to develop a projection for your own business:

Table 5.4. Five Year Production Projection for a Business

Items	Price	Number of units produced				
		Year 1	Year 2	Year 3	Year 4	Year 5

6.MARKETING PLAN

Robin Brumfield* Burhan Özkan**[6]

Duration	1.5 hours
Objectives	Learners demonstrate competence in explaining marketing plan Learners demonstrate competence in preparing a marketing plan for a farm
011:00-11:10	Trainer reviews the subject of previous day. Trainer gives information about lesson subject to participants and defines objectives of session. Trainees are invited to add in their own objectives and to set priorities for their own learning
11:10-11:30	Trainer explains how to prepare a production plan using large screen.
11:30-11:50	Trainer explains how to prepare a marketing plan. Pairs of trainees briefly feedback to group to explain how they would teach this to women farmers in the local trainings.

Without customers, your business does not exist. A marketing plan is about defining your customer or target market and tailoring your product, pricing, distribution, and promotion strategies to satisfy your customers. If your farm is product-oriented—you produce what you like without thinking about what your customers want—you risk growing crops won't sell or will not sell at a good price. Instead, most successful farm businesses are customer-oriented—they design marketing plans around their customers' needs.

A marketing plan is very important; it describes what your business will produce and how it is unique (product); how and when you will market the product (distribution and packaging); what distribution channel you will use (place); to whom (target customers), and for how much money (price) the you will sell your products; and how and what the you will communicate to the customers (promotion). These are the four Ps of marketing: *product*, *price*, *place*, and *promotion*. If your farm provides services, you should think of your services as a "product" for the marketing plan.

[6] Prof. Dr. Robin Brumfield, Rutgers, the State University of New Jersey, brumfield@aesop.ruthers.edu
Prof. Dr. Burhan Özkan, Akdeniz University, bozkan@akdeniz.edu.tr

ASK YOURSELF

How will I develop my marketing plan for products and/or services?

- **Markets:** Who are the target customers and what do they value?
- **Product:** What product will be offered and how is it unique?
- **Place:**Where do buyers look for your product or service? Your farm? Online? How can you access the right distribution channels? Do you need to sell to retailers? What do your competitors do, and how can you learn from that and/or make your products different?
- **Competition:** Who are your competitors and how will you position ourselves to compete? Could there be new entrants?
- **Prices:** How will you price our product or service? What is the perceived value of your product or service to the consumer? Is your price in line with the market's perceived value?
- **Promotion:** How and what will you communicate with buyers or customers? Do you have a marketing strategy with good promotional, advertising, and branding strategies in place?
- **Distribution:** How and when will you move your product to market? What market channel will you use?
- **Packaging:** How will you present the product to the customer?

6.1.Markets: Who are the Target Customers and What Do They Value?

To figure out your target market and your marketing strategy, first you should identify the target market segment (who the customers are and what they value) and sales potential (how much those customers are willing to buy). Target markets are usually either individual households (*direct marketing*) or businesses (*wholesale marketing*). Direct marketing is usually more profitable than wholesale marketing. Developing *customer profiles* or segmenting the market can help you decide if a market segment is large enough to be profitable. If you identify and target specific market segments, you can also develop packaging, price, and promotional strategies that will appeal to those customers.

6.2.Market Segments

Markets can be segmented, or divided, in many ways. The most common form of segmentation is by *demographics* (age, gender, income, race, ethnicity, disabilities, travel, education, home ownership, and employment status). A market can also be segmented *geographically*, for example, domestic and international customers, various neighborhoods, or locations of different stores owned by wholesale buyers. It is important to ask yourself, "What are the customers' needs?" This applies whether your product is going directly to the final

consumer or not. Do they need convenience? A particular size? More availability? Unique products? High-value products? Large volumes?

One important way to segment the market is by *age*. You must realize that different generations communicate differently. The younger generations can (and sometimes prefer to) be reached on the Internet- through social media, email, texts, even ads on websites. Other generations may be more receptive to mailings, phone calls, and ads in newspapers or magazines. Consider the values and priorities of each generation that you are trying to reach, and adjust your marketing plan to appeal to each one. A single marketing plan will not appeal to each of your possible customers.

6.3.Size of the Market

To begin a business, you will need to ask, "How many potential customers are there? How often and how much will they buy? What is the total size of the market? Is the market emerging, growing, or shrinking? Will this market provide enough sales?" You can start answering these questions by analyzing government statistics, visiting potential buyers, and attending industry and university educational meetings to learn and network.

If you plan on selling wholesale, your deliveries should be limited to a distance that a truck can deliver and return in one day. New producers should visit potential customers (usually another business) to find out how much product they would be willing to buy. When approaching wholesale buyers, you should be knowledgeable about the market, have a price sheet or website prepared, project a professional image, work out the details of the sale with the buyer, and keep in touch with the buyer.

If you plan on direct marketing, you can estimate the potential size of a market by looking at a map to see how many towns or cities are within travel distance of your farm or market. If you know the population of these areas, you can estimate how many potential customers there are and how much money each customer might spend at your farm based on their demographics and your products.

Outline Your Market Analysis:

Dot's Farm and Greenhouse Market Analysis

Information regarding healthy eating habits is readily available to people throughout Turkey, and more people are aware of the implications of eating healthily today than they ever have been. There are farmers in countries bordering the nation, and if the markets in Turkey would buy the crops from those farmers, keep them in Turkey, and resell them to other countries, farmers and the government would profit. This type of exchange market already exists in the country, but if it were executed on a large scale our business would be doing very well. Because it is possible to grow a great variety of plants in this country, the application of agricultural biotechnology has been successful in creating hardier, healthier strains of plants. If this continues, the crops exported from Turkey may have longer shelf lives, be supplemented with vitamins and nutrients, or just be a better all-around option, and this will cause demand for Turkish produce to rise. Turkish crops are of a very high standing in the world and are wanted by a majority who look for quality produce.

According to a press release given by the ministry of food, agriculture, and livestock for 2016 in Turkey, it was presumed that the production of fruits increased by 6.4%. If demand can compete with the increased output of fruits, then there will be no difficulty selling what we grow. If demand stays the same and the production of fruit continues to increase, then we will have a more difficult time selling our crops.

6.4.Product: What Product Will Be Offered and How Is It Unique?

You should describe the products and services that you will offer in terms of the value they will bring to your customers. What are customers are actually buying? What exactly does the product or service do for the consumer? How long will the product last? How will customers use this product? Will they need special knowledge or service to use it?

ASK YOURSELF

What makes my product truly unique?

- What are the unique benefits the customer will get from using this product?
- What is the real value versus perceived value to the consumer?
- Why would customers prefer my product or service to one produced or offered by the competition? How does it compare in terms of quality, value, appearance, performance, price, versatility, durability, post harvest life, speed of installation, consistency, ease of use, ease of maintenance, knowledge required, and so forth?
- Why would customers prefer my product or service to some other way to spend their money such as dining or entertainment?
- Can it appeal to the environmentally conscious?
- Are there opportunities to add value through processing, packaging, and customer service?
- How might the product line or service package change over time?

Describe your product or service and what makes it unique:

Table 6.1. Six Recommendations for Approaching Buyers

1. BECOME KNOWLEDGEABLE ABOUT THE MARKET
Talk with other growers selling in that market. Try to find out individual buyers' expectations of volumes and prices to see if they match your situation before approaching the buyer.
2. PREPARE AN AVAILABILITY SHEET OR A WEB SITE LISTING PRODUCTS AND PRICES
Make sure that enough product is available to meet possible demand.
3. SEND THE AVAILABILITY SHEET TO BUYERS
Select buyers whose expectations best match what you have to offer. Buyers often prefer to see this sheet before they talk to a producer.
4. PROJECT A PROFESSIONAL IMAGE
Be well informed about production, supply, and quality, and be confident in the business's ability to meet the buyer's needs.
5. WORK OUT THE DETAILS OF THE SALE WITH THE BUYER
This could include volume, size, price, delivery dates, and labelling requirements. Some buyers have a set of written requirements for growers.
6. KEEP IN TOUCH WITH THE BUYER
Growers need to keep the buyer informed about potential problems so that buyers can look elsewhere for a product if there is a supply problem.

6.5.Competitors: Who Are the Competitors and How Will Your Business Position Itself?

Nearly every business or product has competition. It is important to know how you can differentiate your business from others. Finding out what your competitors are offering and how they offer it can help you to find your niche in the market.

A trip to the farm next door, grocery store, bazaar, or even a bit of time on the internet to research what your competition is offering may help you answer these questions. The idea is to find out everything possible about your competitors' business or their buyers. Try talking to

current and potential competitors and their customers.

Useful links:

http://ec.europa.eu/agriculture/index_en

http://ec.europa.eu/agriculture/markets_en

ASK YOURSELF

Who are my competitors?

- Who are the competitors and what do they offer customers?
- Where are they located?
- What is their market share?
- Who are the key "minor players"?

Describe Your Competition:

ASK YOURSELF

How does my business compare to the competition?

- Where does my product have an advantage over the competition? What are the strengths in terms of size, price, quality, speed, location, and service?
- Can the new product be produced with a new twist?
- Does my business have access to markets that competitors cannot reach?
- Is my farm business better at working with people—at attracting and keeping customers/clients?
- Does my farm have better business skills?
- What competitors' weaknesses can be capitalized on? In other words, is there a niche?
- How much market share will my product take away from competitors? How will competitors respond to my product? Will they respond by changing price? Will they change their product?

Describe the Market Share of Your Product or Service:

6.6.Distribution and Packaging

Distribution refers to how and when to move the product from your farm to the customer's home, store display, or wholesaler.

- **Intensive** product distribution means selling your product to many buyers at low prices. Your goal is to saturate the entire market with the product. This strategy can be expensive and very competitive.
- **Selective** product distribution means choosing a few buyers, like retailers, to sell the product. Selective distribution gives the advantages of lower marketing costs and the ability to have better working relationships with customers and intermediaries.
- **Exclusive** distribution is an extreme version of selective distribution where you agree not to sell to another buyer. In exchange, the buyer may agree to buy that product only from you. You would work closely with that retailer to set market prices, develop promotion

strategies, and establish delivery schedules.

Because agricultural products are perishable, *delivery schedules* are critical. If you market through an intermediary, you could lose their business if you do not keep the agreed delivery schedule. Retail buyers rely on delivery at the promised time so they know how much product they will have on hand to meet demand, and so they can schedule workers to handle delivery and display. Since most farms are seasonal businesses, delivery schedules will vary and will be most crucial for both you and your buyers during peak production periods.

Product packaging can be both functional and promotional—it preserves the product for shipment and advertises the product. Wholesale buyers might require certain packaging and bar codes. Direct market producers have more flexibility in packaging and point-of-purchase advertising materials.

6.7.Pricing: How Is Product Price Determined?

The pricing strategy depends on whether you are selling direct or wholesale. In some markets (especially wholesale markets), you will be price taker. In other words, the market sets the price. In other markets, like retail, you can set your own prices based on what the customer is willing to pay. Even price takers can still do things to obtain a higher price. To have more control over pricing, you will need to differentiate your product.

Prices are usually set by determining how much it costs to produce the product and then adding a fair price for the benefits that the customer will enjoy. The cost of production/operation becomes the price floor, or the lowest price. The price ceiling is how much customers are reasonably willing to pay for the product based on the value it gives them. Most customers will be willing to pay a price somewhere between the price floor and the price ceiling.

To stay in business for the long run, your price has to cover your costs. To begin setting your prices, first you calculate the cost to produce the product or provide the service. The costs include all the fixed and variable costs—including production, marketing, and promotion—then you add a return for your time and investment. You can find out what price customers are willing to pay by researching what others are charging for similar products.

When you know market prices and costs of production, you are ready to begin setting your prices. Common pricing strategies for differentiated products are in the table below. Each has advantages and disadvantages. Depending on the business goals, vision, target market, and product strategy, you may want to consider more than one pricing strategy.

Table 6.2. Eight Product Pricing Strategies

1. COMPETITIVE PRICING
Competitive pricing strategies are common among large companies. Predatory pricing, where a company sets its price below cost to force its competitors out of the market, is a typical competitive pricing strategy. Although these strategies may work well for large commercial companies, they are not recommended for small-scale, independent businesses. Price wars are not easily won.
2. COST-ORIENTED PRICING
The cost-oriented pricing strategy is probably the simplest. Based on production costs, you make a decision about whether to price the product at 10 percent, 50 percent, or 100 percent above current costs. Of course, marketing research should be done to determine whether or not customers are willing to pay the cost-plus price that you choose.
3. FLEXIBLE OR VARIABLE PRICING
Flexible pricing means setting a range of prices for the product. Flexible pricing is common when bargaining takes place. Prices may vary according to the individual buyer, time of year, or time of day. For instance, growers who sell at bazaars often establish one price for their products in early morning and by day-end are willing to lower their prices to get rid of excess product.
4. PENETRATION OR PROMOTIONAL PRICING
Penetration pricing means initially setting the product price lower than the price you want to gain customers. The advantage of penetration pricing is that it will not attract competition. Before using a penetration pricing strategy, you should thoroughly research current market prices and calculate your costs to determine just how long you can sustain a below-cost, penetration price before you lose money.
5. PRODUCTION LINE PRICING
A line of products may be marketed in a range of prices for all of the products in that line. For example, a line of products may be promoted and priced as “affordable” while another line may be a “premium” line with higher prices.
6. RELATIVE PRICING
Relative pricing means setting the price above, below, or at the current market price.
7. PRICE SKIMMING
The price skimming strategy is based on starting with a high price to recover costs quickly before lowering the price to the long-term price. This pricing strategy is only possible when there are few or no competitors. The disadvantage of the skimming strategy is that it attracts competition if prices stay too high for too long. Once competitors enter the market, you may be forced to match their lower prices.
8. CONTRACT PRICING
Contracts are agreements between the buyer and the seller in advance and usually include the price, payment conditions, grower responsibilities, storage, and shipping arrangements. The advantage of pricing on contract is that you know in advance what price will be paid for your product.

6.8.Promotion: How and What Will We Communicate to Our Buyers or Customers?

Promotion is important to to make sure customers recognize your product. You should build promotional strategies around a message or your unique product value. The image you want to send to buyers should be seen in everything you do. This image should be clear on your business cards, invoices, landscaping, building design, signage, brochures, web sites, social media contacts, and vehicles.

You could use a brand or logo to identify your products and to separate yourself from competitors. Although establishing a brand can be expensive, many direct market farm businesses are concentrating their promotional efforts on image advertising—promoting the concept of locally produced, eco-friendly, or quality products.

The best approach to advertising is to think about different media and which media will be most effective in reaching the target market. Advertising media options include the Internet; television; radio; newspapers; magazines; billboards; bench/bus/subway ads; direct mail; newsletters; and cooperative advertising with wholesalers, retailers, or other businesses. You can set aside some of your advertising budget for each medium. Your advertising budget should include the cost of advertising and also estimate how much sales the advertising will bring in. Your business should also include some marketing material such as business cards, brochures, and pamphlets. Another way to promote your business is free publicity, like press releases, product launches, and special events.

6.9.Marketing Strategy

To differentiate your products and receive a higher price, you can (1) find a market niche that local competitors are ignoring, (2) grade according to quality and offer higher-quality products for higher prices, (3) adapt to changes in customer tastes and preferences, (4) add service to the product, or (5) if possible, choose an ideal location to attract customers.

Useful links:

http://ec.europa.eu/food/safety_en

http://ec.europa.eu/agriculture/quality_en

Dot's Farm and Greenhouse Marketing Plan

More than three quarters of our profit is spent on production costs; thus, it is not possible for us to be the low price producer. We promise fair and competitive prices and superior quality.

We sell our crops to wholesale markets and retail outlets. Our business is new, and customers don't yet know the name, "Dot's Farm and Greenhouse." Until we are able to promote our name and earn customers, we will continue to sell wholesale. When we improve the status of the greenhouse, buy more land, have it rezoned, plant on it, and install the storage depot, we will sell directly from our farm. By then, more locals should be familiar with our business. Once we install our storage depot, we can store crops and sell them for the best price possible. To promote our business and maximize sales, we will advertise on free websites and social media sites and through word of mouth. Once we receive enough of a profit independently, we may discontinue selling to wholesale markets, as sales commissions costs us 18.7%.

Marketing Contracts

We currently sell to wholesale markets. We take our products to the market and inspect and label them before they are put on the market. The crops remain our property until they are sold to the retail outlet. Through our marketing contract, we set a specific price for each type of crop before the crops mature.

Strategic Partners

Dot's Farm and Greenhouse plans to partner up with the local agriculture museum to fund an event and promote our business. The agriculture museum has agreed to pay for the expenses associated with this event. We will hold this event and state that it is sponsored by the agriculture museum and will allow them to have a table with some representatives that will give out brochures and information regarding the museum.

To promote Dot's Farm and Greenhouse, we plan to allow visitors to our event to pick tomatoes. We would not normally allow people to walk through our greenhouse and pick any crops. To ensure that our crops are not damaged or picked by the public, we will rope off a section of our tomatoes so that our visitors may pick only some of them. By running the event this way, the public will still feel like it is getting to choose the best of what we have to offer to it, and be permitted to see our greenhouse facility. This event is being held in hopes that we will be recognized by the people, especially in our town, and that they will spread a good word about our business.

Competitive Advantage

The local supermarkets, even the one that we sell our crops to, hold a cost advantage over us. They receive crops from many different farmers and sellers and are able to undersell all of us. However, Dot's Farm and Greenhouse has a differentiation advantage over the supermarket produce. Our product is fresher and of a better quality than what one will see in the supermarkets. Furthermore, our customer service is superior and we treat our visitors with as much respect as we would like to receive in return. Our differentiation advantage is what ultimately makes it possible for us to compete with these well-known companies.

6.10. Managing Marketing Risks

- Marketing is the part of business that transforms production activities into financial success.
- Unanticipated forces can lead to dramatic changes in crop and livestock prices.
- When these forces are understood, they become important considerations for the skilled marketer.
- To be successful, you should take an informed and balanced approach to making marketing decisions.
- Personal Considerations in Marketing: Marketing agricultural products involves information, objectivity, attitude and skill.
- Developing a Marketing Plan: An accurate understanding of production costs is a critical part of a sound marketing plan.
- Marketing Plan Discipline: A marketing plan is of little value if actual decisions deviate from the plan.

Here are three personal factors to consider:

- Know what level of risk you are comfortable with.
- Be willing to increase the number of skills in your marketing toolbox.
- Develop an integrated management approach to managing your business.

To develop your marketing plan:

- Goals and objectives of the business should drive the marketing plan.
- Understand production costs. A break-even price should serve as a well understood reference price, even though it is not usually the pricing objective.
- An analysis of supply and demand is important in developing targets for your marketing plan.
- Know long-term average prices.
- Consider cash flow requirements (family living expenses).
- What works for your neighbor may not work for you.
- What are the potential costs and returns associated with alternative strategies?

ASK YOURSELF

How will I develop my marketing plan for products and/or services?

- **Markets:** Who are my target customers and what do they value?
- **Product:** What product will I offer and how is it unique?
- **Place:**Where do buyers look for my product or service? My farm? Online? How can I access the right distribution channels? Do I need to sell to retailers? What do my competitors do, and how can I learn from that and/or differentiate?
- **Competition:** Who are my competitors and how will I position myself to compete? Are there threats from new entrants?
- **Prices:** How will I price my product or service? What is the perceived value of my product or service to the consumer? Is my price in line with the market's perceived value?
- **Promotion:** How and what will I communicate with buyers or customers? Do I have a marketing strategy with good promotional, advertising, and branding strategies in place?
- **Distribution:** How and when will I move my product to market? What market channel will I use?
- **Packaging:** How will I present the product to the customer?

Outline your Marketing Plan:

7. HUMAN RESOURCE MANAGEMENT PLAN

Robin Brumfield* Burhan Özkan**[7]

Duration	1 hour
Objectives	Learners demonstrate competence in explaining management plan Learners demonstrate competence in preparing a management plans for a farm
13:00-13:10	Trainer reviews the subject of previous lesson. Trainer gives information about lesson subject to participants and defines objectives of session. Trainees are invited to add in their own objectives and to set priorities for their own learning
13:10-13:20	Trainer explains how to prepare a management plan for a farm
13:20-13:30	Pairs of trainees write a management plan for an imaginary farm.
13:30-14:00	**Lunch Break**

Most farm businesses start small with the owner making all of the big decisions, and most communication is done by one-on-one conversations. This is particularly useful for a new business as it enables the owner to control growth and development. As your business grows, you must give more and more responsibilities to others. This can be difficult because you may feel that no one else can run the business as well as you can. While this may be true, if you want your business is to grow, you will have to learn to divide the responsibilities of running the business into many tasks and give these tasks to others.

As more labourers are included, it becomes important to give feedback measuring performance as well as job satisfaction even if it is only you and your family members working on the farm. This effective management of the farm can be possible through division of tasks and description of duties and setting performance.

[7] Prof. Dr. Robin Brumfield, Rutgers, the State University of New Jersey, brumfield@aesop.ruthers.edu
Prof. Dr. Burhan Özkan, Akdeniz University, bozkan@akdeniz.edu.tr

ASK YOURSELF: Management/Personnel Plan

- Who will run the enterprise?
- What are their responsibilities and capabilities? Also include information on key employees.
- How many employees will you have for what functions during which times of the year?
- What are the qualifications for each position?
- How many hours will they work and how much will they be paid?

7.1.Management Team

The size of the management team can range from one person in a small farm business to hundreds or thousands of managers in multinational companies. In large businesses, the board of directors develops the company objectives and the chief executive officer manages the business's resources to meet those objectives.

Dot's Farm and Greenhouse Management Team

My husband, Dominic and I, Dorothy, manage Dot's Farm and Greenhouse together. We have a young son who will begin to help with the business when he is old enough and he may inherit the business when he is grown. We have two permanent employees and two temporary employees.

7.2.Labour Management

You can accomplish much more through leading others than you can through your own single efforts. This means that labour is one of the most valuable resources in your business, and hiring and motivating employees is an important management task.

Management tasks are not limited to managers and supervisors. Every member of your farm business has some management and reporting responsibilities. You should listen to worker feedback and incorporate it into your plans. To be satisfied, your workers need to feel like they are part of the team. The strongest investment a company can make is in its employees.

To set goals, your workers need to know your farm's mission, which tells them why the company exists (the purpose).

Useful links:

http://ec.europa.eu/social/main.jsp?catId=101&langId=en

Table 7.1. Seven Steps to Encourage Top Worker Performance

1. *Set clear standards and goals.* Establish good behaviours and set goals that you will reward.
2. *Expect the best.* If standards and expectations are high but reasonable, people will work hard to meet them. If they are low, people will meet that level of performance too.
3. *Pay attention.* If you see people doing things right, reward them immediately. People want attention and like being told exactly what they are doing well. If you pay attention and reward behaviour, you will get more good work.
4. *Personalize recognition and rewards.* Different things are important to different people. Make your rewards meaningful to the people receiving them. If you don't know, ask!
5. *Tell the story of success.* Turn good examples into stories. Share the stories with other employees and off-farm individuals. People like hearing stories about themselves.
6. *Celebrate.* Recognize and reward people publicly. Host a lunch or dinner. Invite industry people in to hear you boast about employees. Celebrate in some way even small team successes or goals accomplished.
7. *Set the example.* Make recognition part of your job. Don't assume people know their efforts are appreciated. If you are positive and appreciative, others will be too.

Four Key Leadership Traits

1. *Vision*: You must have a sense of what is important.
2. *Energy*: You should be exciting and enjoyable to be around.
3. *Power Source*: This can come from your position, your task, personal power, relationship power, or from knowledge and how to use it.
4. *Direction*: You must have a plan. A vision without a plan is just a dream.

ASK YOURSELF

What is my main philosopy?

- What do I want people to say about me when I am gone?
- What values do I hold that I will not compromise?
- What characteristics do I want to show to people?
- What principles do I stand for?
- How do I want to be seen or thought of when I interact with people?
- What do I want in life?

Describe your Main Philosophy:

The keys to being a good manager are:

- Like what you do
- Be self-motivated
- Look ahead to what needs to be done
- Prioritize
- Get along with people

To motivate people to perform:

- Develop a standard operating procedure and ask for suggestions for improvement
- Give regular, helpful feedback on worker performance
- Make your workers want to stay with you instead of finding a new job
- Encourage workers to be part of the team

Five Stages of Team Building

1. Find and hire the right people.
2. Make sure workers know exactly what to do from the day they are hired.
3. Provide ongoing training.
4. Teach workers how to get higher and higher levels of responsibility.
5. Motivate workers and yourself to continue in case something goes wrong.

Once the right people are in place, take the following steps to get them to perform:

1. Tell them what to do
2. Show them what to do
3. Let them try
4. Watch performance
5. Praise progress or tell them how to do it better.

To increase your farm's efficiency, make sure you hire people who are willing to learn new skills, work as part of a team, and perform as best they can. You need to make sure that workers have the right tools and are doing the right jobs. You need to match the employee's stage of learning with the right leadership style.

Table 7.2. Stages of Learning and Leadership Styles to Use with Employees at Each Stage

Stage of Employee Growth	**Employee Skill Level**	**Leadership Style Needed**	**Manager's Role**
Beginning	Are excited and enthused. The job seems easier than it really is.	**Directive**	Tell what, when, where, and how to do it.
Some Experience	Have little knowledge or skill. Have not mastered the task. Need to know *why*.	**Coaching**	Give direction and support.
More proficient	Have technical capabilities to perform at a high level. Lack confidence.	**Supportive**	Encourage, but give little direction. Say "You have what it takes to get the job done."
Proficient and Self-confident	Have mastered the knowledge or skill. Have confidence to perform consistently and proficiently.	**Delegating**	Turn responsibility over to the employee.

7.3.Working Conditions

Working conditions are also important for encouraging good performance. Consider your own feelings when walking along a street in a town with no trees or plantings and with noisy traffic passing a few feet away versus walking along a nice path landscaped with lawns and planters and overhung by trees. Without realizing it, many farms develop into a harsh, repelling environment that puts workers in a bad mood. How much motivation is there to plant seedlings neatly and correctly when they are surrounded by weeds, trash, and unrepaired buildings?

Facilities: The facilities, sheds, restrooms, and surroundings should be orderly and clean. This is an important part of insect and disease control. It is also important to proper management. A harmonious environment makes the business look good, which can be achieved by workers with a little encouragement by the manager.

A job is not finished until it is cleaned up. Tools, empty containers, and so forth should always be in their proper places. Buildings, driveways, offices, and areas around the farm should be clear. Messes not only look bad, they are also hazards and make it harder to get work done.

All equipment should receive preventative maintenance to make sure that jobs will always be done on schedule. Some paint on a tank before it rusts, grease on a bearing before it freezes, or a tune-up on a rototiller before it stops will prevent breakdowns that could delay other operations.

Work facilities should be respectable. For the sake of human dignity, bathroom facilities should be provided. A pleasant area for eating and taking breaks should also be provided. A break at mid-morning, noon, and mid-afternoon benefits you as well as the worker. A tired worker is not productive. Each human has an internal rhythm. When the pace of his or her work is geared to this rhythm, they can work with less effort and more productivity. Disruptions like confusing orders, needless changes in orders, and equipment breakdown stop the work momentum. This is tiring and depressing to the worker.

Education: Most people take pleasure in learning. It is flattering to a worker when you think enough of him or her to provide an education along with the job. In fact, there is a mutual advantage, since workers who understand the “why” and “what” of their tasks have the potential to be better workers. They are in a position to figure out better ways of doing the job and solving a problem when something goes wrong.

Education on a small farm could be simply you talking with workers as they work. You should help them understand the cultural procedures involved in a crop and how they work together. Workers should be aware of the quality standards required by the market. They should know the problems that can arise from mistakes such as insect or disease establishment, high or low temperatures, incorrect planting depth, nutritional disorders, and overwatering. Good workers welcome this knowledge and use it to improve themselves within the business and to assist you in meeting your responsibilities.

Useful links:

http://ec.europa.eu/social/main.jsp?catId=706

List some things you can do to improve employee performance and ways you can educate employees and customers. Also describe your management style and how you can use it to improve your business:

7.4.Management Plan

Many people go into farming because they like growing plants. You might prefer to focus on the labour tasks of growing plants rather than the management tasks that lead to a profitable business. If you own a small farm, you might find it necessary to be a labourer as well as a manager. Working alongside employees and performing some of the labour tasks can be a good idea to build relationships. It can motivate your workers to pull together in pursuit of the

common purpose of accomplishing the business's goals effectively and efficiently. However, you should never lose sight of the need to manage and try not to spend too much time working on the farm rather than managing.

To develop the management plan, you need to do the following:

1. Define the business operational areas by function (production, technology, merchandizing, marketing, etc.).
2. Determine what skills, education, and experience are needed for each key position on the management team.
3. Describe the experience, skills, education, goals, interests, and wages or salary of each person currently working for you.
4. Identify key people for each management position and describe their management role and their qualifications.
5. Identify areas where skills are lacking and those that depend on one person. Identify people in the business who could be trained as the primary person or as a backup.
6. If additional part-time and/or full-time workers are needed, determine how these people will be found, hired, paid, motivated, and kept.
7. Give job descriptions for managers and workers, salary plans, information on worker handbooks, and training procedures.
8. List expertise that is not available among the owners or the current workers. You may want to hire a consultant for specific tasks, such as a lawyer to prepare releases, wills, and other important documents. It may also contract specific tasks such as pesticide application.
9. Describe any changes in the labour situation expected in the near future either because someone is leaving or because changes in the business will require more people or different skills.
10. Describe any long-term transition plans that may be required for transferring management responsibilities to the next generation, a partner, or a worker.

Dot's Farm and Greenhouse Management Plan

My husband, Dominic and I, manage Dot's Farm and Greenhouse together. Dominic is finishing his degree in business and marketing at the university and will be more available when he is finished studying. He knows how to work with finances and marketing because he has had internships that have taught him to do so. I have a high school diploma, but I grew up on a farm. I have licenses that allow me to drive tractors and use pesticides, and I am very familiar with how a farm operates. I generally train the employees and do more of the hands on work. I own 45% of the business and Dominic owns 55%. Dominic and I are equivalent in our managing capabilities. We will both look at the status of the farm often and consider its needs; however, it is natural that because I do not have another job in addition to this one, I will be able to go on the farm for more hours in one day than he will. This means that I will take care of the weeds, do most of the harvesting, ensure that the irrigation system is properly calibrated, and pollination. I will keep records while I am in the greenhouse so that when Dominic gets home, he is able to look at the books and help me decide which actions we should take regarding our business plan. He takes care of our loans, insurance policies, and bills regarding this undertaking, as he is studying business and marketing. We must agree before making a decision that will affect our business, and neither of us will make one unless we compromise.

Management will remain the same as long as Dominic and I are healthy and able to work. If one of us becomes unable to remain a manager, full management will be handed over to the other partner. If our son, James, would like to inherit our business, we will train him, and he will become manager.

There are two permanent employees working for us right now, and they help us to harvest our crops, stack them into crates, and load the trucks. They are not authorized to spray pesticides or operate the tractor, so they plant, harvest, and weed. The workers are also trained to tell us if a specific crop has a disease or pest so that I can take the measures necessary to prevent the issue from becoming a large scale problem. We pay them minimum wage but insure them so that if there is any injury or accident on the job, they are able to receive the help that they need. We also have two temporary employees in addition, and we call them on days when we are busier than normal. These days include days when there is much to harvest and days when we inspect all of the plants. All four of our workers may be called to work if Dominic and I must go out of town. I train the employees myself, and we pay them minimum wage. In order to keep them satisfied and safe, we also insure them and have worker's compensation, which is an incentive for wanting to work at our farm.

Outline Your Management and Personnel Planning Section:

8. FINANCIAL PLAN

Robin Brumfield* Burhan Özkan**[8]

Duration	4 hours
Objectives	Learners demonstrate competence in explaining Financial Plan, Learners demonstrate competence in explaining Income Statement, Learners demonstrate competence in explaining, Balance Sheet, Learners demonstrate competence in explaining Cash Flow Statement, Learners demonstrate competence in preparing Financial Plans, Learners demonstrate competence in doing Ratio Analysis and developing Enterprise Budgets, Learners demonstrate competence in explaining Capital Requirements and reviewing Business Plans
09:30-09:40	Trainer reviews the subject of previous day. Trainer gives information about lesson subject to Participants and defines objectives of session. Trainees are invited to add in their own objectives and to set priorities for their own learning
10:00-10:20	Trainer explains Financial Plans: Income Statements, Balance Sheets, Cash Flow Statements using large screen.
10:20-10:40	Learners work in pairs and prepare a financial plan for a farm. Pairs of trainees briefly feedback to group to explain how they would teach this to women farmers in the local trainings
10:50-11:10	Trainer explains, ratio analysis and enterprise budgets. Pairs of trainees briefly feedback to group to explain how they would teach this to women farmers in the local trainings
11:10-11:20	Trainer explains capital requirements and reviews financial plans for a farm
11:20-11:30	Pairs of trainees write sample financial plans for an imaginary farm.
11:30-13:00	**Lunch Break**

[8] Prof. Dr. Robin Brumfield, Rutgers, the State University of New Jersey, brumfield@aesop.ruthers.edu
Prof. Dr. Burhan Özkan, Akdeniz University, bozkan@akdeniz.edu.tr

Financial analysis and planning is an important part of describing your business to someone else. Financial projections give some idea of where your business is headed in the next few years and describe the financial consequences of changes you plan for the future. It helps you evaluate alternative business investments. The financial section should also describe the assumptions used in making financial projections. These assumptions might include projected prices that will be received in the future, input costs, or production levels. You should keep these projections and compare them against your actual business performance.

As an owner of a farm or greenhouse, you have several ways of receiving returns:

- If you invest your own money in the business, that money should return interest. After all, if you invested that same money in a bank, you would receive interest.

- You should pay yourself a salary for managing your business and wages for your labor. Think of how much you would have to pay to have someone perform these same functions.

- Profit is what is left after subtracting all of the other costs including opportunity costs (interest) for using your own money in the business and a salary for your labor and any unpaid family labor. Profit is the return for taking the risk of running your business.

8.1. Income Statement

An *income statement* summarizes the earnings and costs of a business for a given period of time (usually one year). The costs can be grouped into two categories: variable costs and overhead costs. *Variable costs* change with the level of production. Examples of variable costs are the costs of seed and fertilizer. *Overhead* or *fixed costs* are spent regardless of the level of production and are common to all crops. These costs include depreciation of the farm structures, equipment, and other facilities and costs like interest, repairs, insurance, taxes, and salaries of overhead personnel (the manager, salespeople, growers, secretaries, bookkeepers, etc.). Your total cost of production is the sum of variable and overhead costs. Net income is earnings minus costs, including depreciation.

The simplest income statement is:

Sales

- Direct Costs - Easily allocated to each crop
- Overhead Costs – Occur no matter what crop is produced

Net Profit or Loss

Some tips for income statements:

- Do not assume that you will sell 100% of crops produced.
- Don't forget to pay yourself. Many new business owners forget about this because income is low. However, the first few years of being in business often are not profitable, you need some source of income. Consider paying yourself what you would pay someone else to operate your business.
- Don't forget to budget for retirement. At some point, you will no longer want to or be able to operate the farm. Start saving as early as possible.
- You also need health insurance, and should consider disability insurance in case an injury prevents you from working as well as life insurance if others are depending on your income.
- If you lack skills in certain areas, budget to hire consultants so that all jobs are done right. Look for professionals who have had experience with your industry.

Table 8.1.Projected Income Statement for Dot's Farm and Greenhouse

	Total (Euros)	**% of Sales**
Sales	**37.152**	**100%**
Direct Costs	**3.715**	10,0%
Seeds, cuttings of plants	2.580	6,9%
Chemicals	6.433	17,3%
Sales commissions	9.632	25,9%
Labour	**3.715**	10,0%

	Total (€)	Percent of Sales
Other	688	1,9%
Total Direct Costs	**22.773**	**61,3%**
Gross Margin	**11.627**	**31,3%**
Utilities		
Heating and machinery fuel	860	2,3%
Electricity	688	1,9%
Telephone	69	0,2%
Water	344	0,9%
Total Utilities	**1.961**	**5,3%**
Overhead Costs		
Depreciation	1.376	3,7%
Interest	206	0,6%
Repairs	619	1,7%
Taxes	413	1,1%
Insurance	516	1,4%
Miscellaneous	1.720	4,6%
Total Overhead Expenses	**4.850**	**13,1%**
Total Expenses	**29.584**	**79,6%**
Net returns (profit)	**4.816**	**13,0%**

Profit for any business can be calculated by the simple formula: Profit = Sales – Costs. Farm managers know the profitability of their entire business from their income statement at the end of the year. However, because most farms produce many enterprises (crops, livestock, milk, honey, or other products) they often do not know which enterprises are making money, which ones are losing money, and which are making the most money. To determine the profitability of each enterprise, develop and enterprise budget for each. An enterprise budget is basically the costs and returns for that enterprise.

Table 8.2. Tomato Enterprise Budget

	Euros
Sales	**29.928**
Direct Costs	
Seeds, cuttings of plants	1.520
Chemicals	902
Labour	3.730
Custom Hire	293
Machinery Maintenance	29
Drip Lines	199
Irrigatin Maintenance	9
Other Expenses	265
Sales Commissions	2.295
Transportation	270
Total Direct Costs	**9.511**
Overhead Costs	**16.029**
Total Costs	**25.540**
Profit (Sales - Total Costs)	**6.782**

8.2. Balance Sheet

A balance sheet shows the assets in your business and who owns them. *Assets* are things of value in the business and money in the bank and *liabilities* are the debts you owe. Unlike the income statement, which shows a period of time, the balance sheet shows a single moment in time.It helps you understand your financial situation, especially net worth.

Net Worth measures how much of your business is owned instead of financed (assets minus liabilities). Net worth is important for thinking about how financially safe or risky your business is and for considering future borrowing options. Increasing net worth is usually one of the major goals of a business. A *Balance Sheet* or *Net Worth Statement* is a financial snapshot of business on a specific date. It shows:

- Assets - Valuables The Business Owns
- Liabilities - Claims of Outsiders
- Net Worth - Claims of Owners

A *Balance Sheet* Segregates *Assets* and *Debts* into:

- Current
- Non-Current

Current Assets will become cash within one year and include:

- Cash
- Inventory
- Accounts Receivable
- Prepaid Expenses

Non-Current Assets last longer than one year and include items like:

- Vehicles
- Equipment
- Securities
- Buildings
- Land

Table 8.3. Dot's Farm and Greenhouse Balance Sheet

	Euros
Assets	
Current Assets	
Cash/Checking/Savings	11.795
Accounts Receivable	6.065
Total Current Assets	**17.861**
Non-Current Assets	
Buildings and Improvements (Owned)	461.509
Machinery and Equipment (Owned)	23.525
Total Non-Current Assets	**485.034**
Total Assets	**502.895**
Liabilities	
Current Liabilities	
Accounts Payable	45.555
Operating Debt	2.167
Current Part of this Year's Mortgage	2.823
Total Current Liabilities	**50.545**
Non-Current Liabilities	
Mortgage	70.574
Long Term Loan	52.605
Land	81.000
Total Non-Current Liabilities	**204.179**
Total Liabilities	**254.724**
New Worth (Owner's Equity)	**248.171**

8.3.Cash Flow Statement

A *Cash Flow Statement* shows how much cash will enter and leave the business on a specified basis, such as monthly or quarterly. A cash flow projection is an important tool for evaluating the liquidity of a farm business, the annual operating loan needs, and the ability to repay loans. A cash flow projection can indicate potential financial problems and alert the manager to possible changes that might be made. Profitable businesses can still fail because of cash flow problems. It is important to know when the major inputs and outputs of cash will take place and be prepared for them. Lenders usually want to evaluate the projected cash flow when making loan decisions, and you will want to have a line of credit or operating loan to cover short falls.

Table 8.4. Dot's Farm and Greenhouse Cash Flow Statement

	Beginning Cash	Inflows	Total Cash Outlays	Monthly Earnings	Cash Available	Total Cash to Borrow
	Euros	Euros	Euros	Euros	Euros	Euros
January	2.700	0	7.106	-7.106	-4.406	4.406
February	-4.406	13.500	2.921	10.579	6.174	0
March	6.174	8.100	2.921	5.179	11.353	0
April	11.353	432	3.272	-2.840	8.514	0
May	8.514	4.050	3.677	373	8.887	0
June	8.887	2.700	3.194	-494	8.393	0
July	8.393	2.700	777	1.923	10.317	0
August	10.317	810	2.921	-2.111	8.206	0
September	8.206	540	1.571	-1.031	7.176	0
October	7.176	810	1.976	-1.166	6.010	0
November	6.010	540	2.057	-1.517	4.493	0
December	4.493	2.970	491	2.479	6.973	0
Total		**37.152**	**32.879**			**4.406**

8.4. Ratio Analysis and Benchmarks

Profitability ratios measure the ability of the business to earn a good profit and generate a satisfactory return on investment. These ratios are typically a good indicator of management's overall effectiveness.

The *Net Profit Margin* is the most common. It is a measure of the operating efficiency of the farm business. It measures how effectively the business is controlling expenses relative to its value of output. A high profit margin indicates good cost control.

Interpretation

- Net profit margin = profit per EURO of sales after paying the owner's salary and accounting for opportunity cost of capital invested.
- The *Gross Profit Margin* is another measure of profitability. Gross profit margin is the amount of contribution to the business enterprise, after paying direct costs.

Common Problems with Profit Margin are:

- Wrong pricing system
- Prices have not been increased as costs have increased

- Costs are too high relative to size of the farm
- Not enough sales for the resources allocated
- High overhead costs
- Wasteful spending on inputs
- Poor production

It is important to keep in mind that every dollar saved by cost control equals a EURO of profit.

Table 8.5. Profitability Ratios for Dot's Farm and Greenhouse

Measure	Your Figure	Recommendation	Formula
Profit	4,816 Euros	> 13,500 Euros per family	Sales-Total Costs
Gross Margin	31,3%	30-40%	(sales-Total Direct Costs)/Sales
Profit Margin	13,0%	10-15%	Net Income/Sales

8.5. Capital Requirements and Reviewing Business Plans

Often, the most common reason for developing a business plan is to be able to present your business's ideas for a new or expanded business to investors or lenders. After investors or lenders see the plan, they will want to know how much money is needed and how the money will be used.

You should think about what financial resources are needed for the following list:

1. Equipment and facilities
2. Lease versus purchase
3. Suppliers: delivery schedules, beginning inventories, economic order quantities, cost of storage, and lead times for delivery
4. Start-up costs: overhead components, incidental costs, initial advertising and promotions, utilities installation costs, renovations, working capital start-up, timing and source of investment, insurance, licensing, and accounting fees
5. Typical annual and monthly estimates
6. Desired mix of financing: equity, long-term loans, short-term or working capital loans, equipment or facilities loans, leases or rentals

Describe how you will acquire and manage capital assets. Will you purchase, lease, or custom-hire to meet equipment needs? If you plan to rent land or buildings, describe the lease arrangements. You may want to include a summary of retirement or savings investments.

Dot's Farm and Greenhouse Capital Management Plan

The greenhouse that we manage is owned in full, as it was inherited. Our land is owned in full, but we are looking into purchasing 1.5 hectares of the surrounding land and rezoning it. To do this, we will have to take a loan. We want to purchase the land and rent more land. We own a tractor, but we may consider buying or renting another one soon, because the one tractor that we have is small and suited for a greenhouse. It is also relatively old, and a more modern one would be more efficient. A newer model would be more sustainable and would be helpful on the new 1.5 acres of land that we will have. We rent 465 € worth of our equipment. We have no off farm assets other than the house we live in. We have owned it for four years, but our mortgage will probably take another 26 years to pay off.

Capital Requirements for Dot's Farm and Greenhouse

Table 8.6. Capital Requirements for Dot's Farm and Greenhouse

	Euros
Purchase Land	3.240
Rent Land	270
Rent Tractor	162
Total	**3.672**

A well-prepared plan is the road map to the future of your business. Make the document work you. Skip sections that are not relevant, and add others if their business requires them. A business plan must pass three tests:

1. *The reality test* proves that a market really exists for the products or services, and the business can actually build it for the costs estimated in the plan.

2. *The competitive test* evaluates the business's position relative to its key competitors and management's ability to create a business that will gain an edge over its rivals.

3. *The value test* proves investors or lenders will receive an attractive rate of return or a high probability of repayment.

It is important to periodically your business plan to measure the progress toward meeting your financial, marketing, and other goals. Business managers tend to be overly optimistic, underestimating costs and overestimating returns. Reviewing the plan will help identify deviations from the plan early before they become serious problems. Early reviews will allow for modifications if needed. Several tools are available to determine the profitability. However, profits may not be the only objective of your farm business. Other questions to ask are: is our current strategy consistent with our business and strategic plan? If it is not, should we re-evaluate our plan?

After you decide who your customers are, what consumer needs you will fill, how other business forces will affect the industry, and how your business's individual strengths and weaknesses will be used and improved for business success, you must implement the strategy. Having a strategic plan will help you to be proactive and to anticipate and take advantage of business trends. You will also want to continue to stay informed about its customers' needs and desires. The management team should keep focus on the strategic plan and share the mission and objectives with employees and customers. It is also a good idea to periodically review your mission, goals, and objectives and change or modify them as external and internal situations change. Be sure that the direction in which the business is moving is consistent with the current mission and strategic vision of your business.

Outline Your Financial Planning Section

9. ESTATE PLANNING

Robin Brumfield* Burhan Özkan Stefan Mair***[9]**

Duration	2 hours
Objectives	Learners learn how to plan their future and works.
09:30-09:40	Trainer gives information about lesson subject to participants and defines objectives of session. Trainees are invited to add in their own objectives and to set priorities for their own learning.
10:00-10:20	Trainer explains estate planning using large screen.
10:20-10:40	Learners work in pairs and complete plans for a farm. Pairs of trainees briefly share withgroup how they would teach this to women farmers in the local trainings
10:50-11:10	Trainer explains what an estate plan is, what should be in it, and why farmers should learn it.
11:10-11:20	Pairs of trainees briefly share with group how they would teach this to women farmers in the local trainings
11:20-11:30	Pairs of trainees do the worksheets.

Each of us knows a variety of examples of personal tragedies that leave serious financial consequences and dysfunctional family structures. Quickly the question arises at bystanders and the bereaved, "Why was there so little regulated in case of death"? The idea of sifting and arranging one's own estate to transfer the farm busines to the next generation is repressed by many people. The reasons are manifold and, on closer examination, often comprehensible. However, the transition can be made less emotionally and financially burdensome for the survivors. There are many considerations to be taken in the estate planning process:

[9] Prof. Dr. Robin Brumfield, Rutgers, the State University of New Jersey, brumfield@aesop.ruthers.edu
Prof. Dr. Burhan Özkan, Akdeniz University, bozkan@akdeniz.edu.tr
Stefan Mair, Technical University of Munich, stefan.mair@tum.de

- Securing peace in the family
- The preservation, multiplication and control of one's own assets
- Transfer of assets to the next generation, whether by gift or inheritance
- The reduction / avoidance of tax payments (inheritance tax, income tax payments, etc.)
- The preservation of lifetime achievements, whether in the private or the business sector
- Health care proxy

So we can see that Estate Planning is not a simple act of drawing up a will or trust document rather it is the process of planning the final disposition of your life´s work. It involves the careful consideration and arrangement for the orderly transfer of assets at the time of death. But complete estate planning may include some lifetime decisions that will allow you to retain control of assets but also determine who will make decisions on your behalf should you be unable to do so in the future. Estate planning generally involves the drafting of a portfolio of legal documents intended to accomplish a variety of goals. Your estate plan should not be standardized, but individualized – based on your personal and unique goals and circumstances. Estate planning is for everyone. Whether you are male or female; married, widowed, divorced or single; middle class or wealthy; young or old – each individual and family benefits from the process of estate planning. If you own property, you need an estate plan. Depending on your life circumstances, the plan may be quite simple or very complex. Motivations for estate planning: Most people engage in estate planning for both rational and emotional motivations. Commonly, individuals wish to provide for loved ones after death and ensure that their property is distributed in a timely manner. For many, the minimization of expenses and taxes is an important goal. However, estate planning is often guided by emotional motivations. It gives one a sense of comfort and security knowing that their loved ones will be provided for and that stress for those loved ones will be minimized because of pre-planning. Also, individuals feel a sense of peace when they know that their property will be distributed as desired.

What are estate planning goals?

A goal is a general guideline or statement of what you want to achieve. During your lifetime, you accumulate property, real and personal, tangible and intangible. As you begin the process of estate planning, it is extremely helpful to think about what you would like to have happen to those items of property, both during future stages of your life and after death. More than that, it is useful to think about what kind of legacy you would like to leave, both within and outside of your family. Do you want the farm business to continue after your death? If so,

whol will manage it? Will it be your children? What assets will go to other children? If you have no children who want to continue the business, do you have plans to train someone else to take over or buy the business?

Get started now

Do not be one of those individuals (or families) who fail to complete an estate plan. Start now by setting goals for what you would like to see happen with various items of property both during your lifetime and after death. Think about what you would like to see happen in terms of health care planning, asset planning and your family farm or other business. Consider family relationships and the legacy that you would like to leave within your family.

10. OFFICE IT SKILL

Rasorio Cuart* Atahan Taşyürek[10]

Duration	2 Lesson hours
Objectives	Learners learn about the applications and programs Learners learn how to use the applications and programs
09:30-09:40	Trainer gives information about lesson subject to participants and defines objectives of session. Trainees are invited to add in their own objectives and to set priorities for their own learning.
10:00-10:20	Trainer explains the applications and programs using large screen.
10:20-10:40	Learners will work in pairs and practice the programs. Pairs of trainees briefly share with group how they would teach this to women farmers in the local trainings
10:50-11:10	Trainer explains what these program are and how they will be useful Pairs of trainees briefly share with group how they would teach this to women farmersin the local trainings
11:10-11:20	Trainer explains why farmers should have ITskills.
11:20-11:30	Pairs of trainees do the worksheets.

[10] Rasorio Cuart, STUCOM S.A., rcuart@stucom.com
Atahan Taşyürek, Akdeniz University International Relations Office, atahan@akdeniz.edu.tr

10.1. Microsoft / IOS

	MICROSOFT	IOS
1.Writing a Document: You will need to type your own documents and with the right layout .	**MICROSOFT WORD** **Start Word** https://www.youtube.com/watch?v=SCEfzjTRObA **Use Word** https://www.youtube.com/watch?v=ooieLn6umo	**PAGES** **Use Pages** https://www.youtube.com/watch?v=IHlaQ1OdjzA
2.Making Presentations Learn how to design a presentation of your products or company	**MICROSOFT POWER POINT** **Start ppt** https://www.youtube.com/watch?v=KBTvPpGmNc4 **Use ppt** https://www.youtube.com/watch?v=tQicwstinOA	**KEYNOTE** **Use Keynote** https://www.youtube.com/watch?v=JX9KDsoQfJo
3.Making Database They are useful to collect data and to organise the information you have .	**MICROSOFT EXCEL** **Start Excel** https://www.youtube.com/watch?v=NZprMu5X-BA **Use Excel** https://www.youtube.com/watch?v=NzwQ_BbD2G4	**NUMBERS** **Use Numbers** https://www.youtube.com/watch?v=z3sNrjO7QsE
4.Organising Emails	You will probably receive a lot of emails, so it will be useful to learn how to optimise your time reducing the time you spend reading and sending them.	Some suggestions can be found in this link: http://www.huffingtonpost.com/christine-carter-phd/the-best-wayto-organize-y_b_9572174.html
5.Creating Folders	You will need to create a folder in your computer to keep all your files. It is important to organize the folders, you can do it according to the type of information, the date you are writing the file.	

10.2. TABLETS AND SMART PHONES:

10.2.1 Google Play (Android)

Google Play is the online site where Android users can buy and download their apps

https://www.youtube.com/watch?v=MKffithIy98

10.2.2 Apple Store (IOS)

it is the online site where IOS users can buy and download their apps.

https://www.youtube.com/watch?v=QGriVbwqs4I

10.2.3.Social Media Apps

	**10.3.3.1 Facebook :**It is a free social networking website that allows registered users to create profiles, upload photos and video, send messages and keep in touch with friends, family and colleagues. https://www.youtube.com/watch?v=dojwz--zBWk
	**10.3.3.2 Messenger:** it is a service to send instant messages to FB to be able to chat with your FB contacts https://www.youtube.com/watch?v=Bs1S3-rn_HM
	**10.3.3.3 Twitter**: Twitter is a free social networking service that allows registered members to broadcast short posts called *tweets*. Twitter members can broadcast tweets and follow other users' tweets by using multiple platforms and devices https://www.youtube.com/watch?v=5pkwOU90pos
	**10.3.3.4 Linkedin:** LinkedIn is social site designed for networking in a business community. Members register and contact on the site. https:// www.youtube.com/watch?v=G0wx4mvt5G0

10.2.4.Comunication Apps

	**10.3.4.1 Whatsapp**: Whatsapp is a free to download messenger app for smartphones. WhatsApp uses the internet to send messages, images, audio or videos. https://www.youtube.com/watch?v=0MvDoGG8RxI
	**10.3.4.2 Skype**: Skype is a free program that allows users to make face to face calls , group calls , to share files . https://www.youtube.com/watch?v=sAlEWa_lEfI

10.2.5. Other tools

	**Google Calendar**: Google calendar is an online time-management https://www.youtube.com/watch?v=Zdw3tbeVy9M
To Create Documents Online	
	**Google Docs:** Google docs is an online word processor https://www.youtube.com/watch?v=s6V_h43-BIY
	**Google Sheets:** Google Sheetsis an online data base used to collect an organise data or information and work with other people. https://www.youtube.com/watch?v=QTgvX5MLPC8
	**Google Slides:** Google Slides is an online presentation app that lets you create and format presentations and work with other people. https://www.youtube.com/watch?v=KsUX7Piez-0
To Share And Save	
	**Icloud**: iCloud securely stores your photos, videos, documents, music, apps, and more https://www.youtube.com/watch?v=1Uxw7Jmqdjk
	**Dropbox**: Dropbox is a free service that lets you bring your photos, docs, and videos anywhere and share them easily. https://www.youtube.com/watch?v=sTL4wy0--jg

	**Google Drive:** Get access to files anywhere through secure cloud storage and file backup for your photos, videos, files and more with Google Drive. https://www.youtube.com/watch?v=-HU9Z5gtQVk

10.3. Safety

10.3.1. Safety Data

When we download applications, viruses can infect your PC. Computer viruses are programs that try to change the proper functioning of the computer. It is therefore advisable that you install safety programs to detect and clean the viruses. These type of programs are called antivirus.

Here are two free antivirus you can download:

AVGhttp://www.avg.com/ww-es/free-antivirus-download

AVIRAhttps://www.avira.com/es/index

10.3.2 Privacy

How to protect your privacy in social media

1.-Privacy options

Your profile can be public or private so it is important to decide which information you want to share and to whom.

When you download an application, you should read the privacy terms and create safe passwords.

In case you have a private and a company, profiles remember to separate the private content from the one that refers to the company.

If you publish content on your profiles remember the copyright rules.

11. HOW TO NETWORK

Antoine Gambin*[11]

Duration	2 Lesson hours
Objectives	Learners learn how to make contact face to face and through internet.
09:30-09:40	Trainer gives information about lesson subject to participants and defines objectives of session. Trainees are invited to add in their own objectives and to set priorities for their own learning.
10:00-10:20	Trainer explains how to use social media contacts and how to communicare face to face using large screen.
10:20-10:40	Learners work in pairs and communicate and contact on social media. Pairs of trainees briefly share withgroup how they would teach this to women farmers in the local trainings
10:50-11:10	Trainer explains what a network and communication is, how it should be, and why farmers should be good at it. Pairs of trainees briefly share with group how they would teach this to women farmersin the local trainings
11:10-11:20	Trainer opens social media accounts for their farms.
11:20-11:30	Pairs of trainees do the worksheets.

11.1. Internet Based

11.1.1. Search and contact

In this part we will discuss about how to organize your contacts. This will be useful to send mails easily and fast to a group of people with your common profile. We will also talk about how to search on the internet what you need for your business.

- Organising your emails.

You can organise your emails using Gmail tools. When you start your session on Gmail you can edit diferent labels to classify your contacts.

[11] Antoine Gambin, VisMedNet Association, directorate@vismednet.net

If you click here you can find a step by step tutorial to create a label .

https://support.google.com/mail/answer/118708?co=GENIE.Platform%3DDesktop&hl=en

- Organising your contacts

You can organise your contacts creating mailing lists. This will be useful to send emails to groups of people regularly. If you click here you can find a step by step tutorial about how to create a mailing list .

http://www.wikihow.com/Make-a-Mailing-List-in-Gmail

- Searching the web

Searching on the the web can be easy with these browsers (Google, Yahoo, safari.....) or can use also use : Youtube or Daily Motion.

Keywords will help you to find the best information quickly . You should consider the following points when looking for that info , For example :

- Sort Products.
- Location
- Services you need or want
- Aim : ie, selling, buying

11.1.2. Social Media

In this part we will discuss about how to create a profile in different applications.

- Facebook

Facebook helps you to stay in touch with friends, swap and share photos, and networking.

To create a profile in facebook you must click the following link and you will find a step by step tutorial :

http://www.wikihow.com/Create-a-Facebook-Profile

You can create or join with a group of people with the same points of interest.

http://www.wikihow.com/Create-a-New-Facebook-Group

You can create your company profile. The following link shows you how.

https://blog.hootsuite.com/steps-to-create-a-facebook-business-page/

- Twitter

With Twitter you can start joining the world of micro-blogging in no time at all.

To create a Twitter acount you must click the following link and you will find a step by step tutorial.

http://www.wikihow.com/Make-a-Twitter-Account

- Linkedin

LinkedIn is a social networking site used for professional purposes. You can use it to connect with your existing professional network as well as expand your network to your secondary and tertiary connections through those you already know

To create a Twitter acount you can click the following link and you will find a step by step tutorial.

http://www.wikihow.com/Create-a-LinkedIn-Account

You can create a group of people with the same profile or join with a group that it was created. The following tutorial explains you how to do it:

https://www.linkedin.com/help/linkedin/answer/186/finding-and-joining-a-group?lang=en

- Youtube

YouTube allows users to search and browse millions of video content and comment, upload and share your videos with other users and save your favorite videos to watch and share later.

To create a Youtube acount you can click the following link and you will find a step by step tutorial.

http://www.wikihow.com/Make-a-YouTube-Account

11.1.3. Website.

Not all businesses need to have a website.

It is the trend to think of having a website as soon as one has a business but it is important to think about whether you need one or not.

Today a business can be present in the web through social media in a way that is cost free and easy to maintain.

The first difference is between needing a website or not.

A business must necessarily have a website if this helps it:

- showcase products to potential clients and promotes its business,
- possibly sell products online or
- show track record and background.

A business in the agricultural sector needs to have a website if it foresees a client base that would need to find it on the web or if it offers products and services that require information to help clients make a choice to buy its products.

This is not an argument against having a website but an argument in favour of not taking on costs and responsibilities one might also do well without.

Once one decides to have a website there are a number of considerations to make:

- it is good to choose one that is low cost or free of charge. There are a number of kits that one can find online like Wordpress or Googlepages and that are quite easy to build with some patience and possibly some help,
- it is good to choose one that is easy to maintain so that one does not need a technician every time one needs to change a picture or put a new page for the website,
- it is important to choose what to put on the website in an organised way. It is good to look at websites of other businesses in the same sector and / or in the same region and learn from them and
- it is important to identify someone in the family or friends who can help you start up the website and who can also give you some help when you get stuck.

Link to googlepages: https://sites.google.com/

Link to wordpress: www.wordpress.com

One can pay a technician to build the website but this depends on budget and available resources.

Now that one has decided to have a website it is useful to become familiar with some terms. The process of learning some vocabulary about websites helps understand what structure a website can possibly have:

- home page: the page that is the first page to see when one visits the website
- static pages: those pages that usually are not changed often like the one about the business, contact page etc.
- dynamic pages: those pages that are updated from time to time when one wants to promote new products or update information,
- contact page: where one puts contact details or a form so that visitors can contact the business directly

Content on your website can be:

- text: information in words
- images: pictures that one has the right to publish on your website or
- video: usually one puts video on Youtube and then Youtube lets you share it (embed) in your pages

At times one may need to put information like a price list on the website and this can either be information on the page or one can put it with a link so visitors can download it.

Some interesting points to think about:

- it is good to share information on the website but not all information is interesting and not all information should be shared. Think before you share.
- it is good that the website has as much information as possible but at times this means that if a person finds everything public on the website there is no reason for that person to make contact. One can invite the visitor to make contact for more information.
- it is good to share information but one is also informing competition. Think before you share.

11.2. Face to Face Networking

In this part we will discuss how one can network and meet people and organisations that can help make the business work better in networking opportunities. We will look at how and why one networks with others in conventional ways.

11.2.1. Exhibitions and Fairs

Regional authorities or organisations organise annual, periodical or one-of events like exhibitions or fairs.

These events are intended to promote products and services and, like the web, they can be an opportunity to find what you are looking for or make it easier for people or organisations to find you and your business.

Events are either sectorial (example : agriculture in the region) or specific (example : citrus or equipment for agriculture).

One can either participate in an exhibition or fair:

- by visiting and use this opportunity to contact people who are or can become your clients or suppliers or
- by taking part as an exhibitor of produce.
- In each case participation can be free or for a fee that one needs to pay to visit or be an exhibitor in an event.
- One can visit a fair to buy products or equipment needed for a business or see what is available on the market or to meet potential clients or buyers of one's products or services.
- There are some questions that one needs to ask oneself before taking part in an event especially if there is a cost for participation and costs for being in the fair like transport and time spent at the event:
- is the fair a first time event or does it happen every year ? How many exhibitors are there usually? How many people go there? What kind of people go there?

- is there a list of exhibitors on the website of the event so that one can possibly contact people one would like to meet at the fair? Sometimes in fairs it is best to have appointments and not just go to the stand. Is one's competition or other operators in the same sector taking part?
- is it just an exhibition or can one buy what one is looking for at the fair? If one is taking part as an exhibitor can one sell one's products to visitors or just show? How much stock should I take to the fair to show or sell?

These and other such considerations help one make the right decision if the exhibition or fair is really a networking opportunity and if the cost of taking part is worth the benefits it could bring.

When considering taking part in such networking opportunities one could consider taking part as an exhibitor on one's own or else maybe together with other operators to reduce effort and cost.

If one takes part as a visitor only one must record and save new contacts made at the event and possibly send them an email after so that in this way ones get into their contacts list in their email box.

If one takes part as an exhibitor:

- one must take time to visit other stalls so that one gets double benefit from one's participation,
- one must send follow up emails or make contact on social media with people who visit one's stall and show interest in one's services or products in the days immediately after the event. At the stall ask if one can include them in the mailing list of the business when it want to promote products,
- one must share photos about the presence in the event in social media and on the social media of the event to make it more visible with as many people as possible.

11.2.2. Association

Working alone is what comes as a first instinctive natural reaction to anyone especially if one is already born or has a background in the business. It is easy for one to think that because in past years the people in the business worked alone things can continue in the same manner.

Joining Consortia

In a world of globalisation it is at times more fruitful to join forces with others who are also competition.

Example:

If one is producing oranges in one region one would consider other sellers of oranges in the region to be competition. This would include other producers or importers of oranges from other regions. It is competition when different businesses are selling the same product to the same people.

It is possible however that competitors can get together to promote their product together in their territory, they can come together to make a collective offer to sell together to a large company that buys oranges in large quantities. It is possible that together they can offer the quantities required by such a large potential buyer and save on transport because of collective transport costs etc. and therefore offer a better price together.

Consortia can also exist with other businesses that are not really 100% competition. One can join consortia with others who also produce fruit but not oranges or products that complement each other.

Joining a consortium does not mean that one has to join with others in all activities. One can have a consortium for one big sale and then all partners are independent in all other business. It would be a joint venture for a specific purpose.

One can either ask to join a consortium because it already exists and one sees that it would be an opportunity to join, be invited to join such a consortium or even be a founder member because partners are coming together into a new partnership.

Such consortia also exist in some regions when they produce a product that gives identity to that area. Together than can do a branding exercise as producers of special products related to their region.

As is the case with any form of business one must not rush into decisions, seek advice and think before one acts. It is a balance between cost and opportunity. One must make sure that one has a say in the consortium so that one does not end up in a position one does not have any say or decision making role in the partnership.

One must check the track record and history of the partners and if the consortium already exists the background of the partnership as well.

Consortia may have several legal forms including cooperatives, partnership agreement etc. It is best to take legal advice before making such a commitment as well as advice from persons experienced in the sector.

Joining Special Interest / Category Groups

There are groups and organisations such as associations for persons and businesses that are intended to:

- protect the interests of the group,

- create opportunities (and training) for the sector and / or
- carry out consultations when major decisions that could affect the sector are made.

At times one joins such groups:

- out of choice,
- by accepting invitation to join and / or
- automatically upon acquisition of licence to operate in the sector.

Joining such organisations is at times free or for an annual / periodical fee and usually one can decide upon the level and frequency of involvement one takes upon oneself. It is a balance between your interest, your work load and time of availability and at times depending on what the association is working on at any time.

Joining mailing lists

This is the most basic of involvement in networking without any commitment.

There may be mailing lists that one can subscribe to without joining any organisation.

Sometimes local / regional authorities can send out information by email to people who subscribe on the website of the organisation.

This is not face to face networking but it can bring to you information for networking events and activities in your region.

UNIT 12. PLANT PRODUCTION

ADPFAL *[12]

Duration	2 Lesson hours
Objectives	Learners demonstrate competence in explaining plant production
09:30-09:40	Trainer gives information about lesson subject to participants and defines objectives of session. Trainees are invited to add in their own objectives and to set priorities for their own learning.
10:00-10:20	Trainer explains plant production using large screen.
10:20-10:40	Learnerswork in pairs and explain plant productions methods. Pairs of trainees briefly share withgroup how they would teach this to women farmers in the local trainings
10:50-11:10	Trainer explains what irrigation is and how to establish drip irrigation system Pairs of trainees briefly share with group how they would teach this to women farmersin the local trainings
11:10-11:20	Trainer explains seedling, pruning, and gives a worksheet for practice.
11:20-11:30	Pairs of trainees do the worksheets.

12.1. Greenhouse Vegetables

Greenhouse cultivation is a definition for vegetable and fruit production in high land and low land areas as abolishing climate factor, providing special environment conditions.

Greenhouse cultivation scope; high structure covered by glass and plastic cover, cultivation being done in low and high tunnel are also considered under protective cultivation scope. Greenhouse cultivation is required more technical information, skill and establishment costs when compared to outside cultivation. Greenhouse production provides 5 – 6 times more productivity and 8 - 10 times more income than oepn field production. Greenhouse production provides fresh vetgetable in every period of year as well as it provides profit and employment.

[12] This chapter is prepared by Antalya Directorate of Provincial Food Agriculture and Livestock. Special thanks to Derya bilgin for her contribution. Special thanks to Laura Kenny and Robin Brumfield who did proofreading.

12.2 Ecological Necessities and Ventilation

Light period must be 10 –14 hours at about 8.000–15.000 lux value for optimal development. Decreasing light density and daylight period limits development and growing. Flow-fledged weaks and flowers grow in long term. Fruit set durability decreases on flowers. 60–70% humidity on air is enough. Usually sandy loamy or loamy sandy, 5% organic ingredients lands are suitable. Water amount in land should not be less than 40%. pH level should be about neutral (6-7).

Table 12.1. Ecological Necessities

Crop	**Seed germination Temperature(°C)**	**Optimum growing temperature (°C)**
Tomato	10-12	20-25
Pepper	8-10	20-30
Aubergine	10-12	25-30
Cucumber	10-12	18-24
Melon	10-12	25-30

- Functions remain up to 5 °C,
- Frost under zero degree
- Developing get slows above 35 °C
- Stops at 45 °C

Ventilation channel for sufficient ventilation should be 25% of total greenhouse area. Building ventilation windows upside of greenhouses is cruical to release temperature and humidity. If greenhouse has roof ventilation but greenhouse height is low then ventilation should be supported by air circulation. Fans decreases humidity in greenhouses. A good ventilation is crucial for preventing fungal and bacterial infection in greenhouses and for adjusting humidity in greenhouse and providing CO_2 circulation.

12.3. Land Preparation Before Cultivation

The most important issues for preparation of land of greenhouses are to support land with fertilisers and to provide land which is free from diseases.

Organic material amount: Micro-organism activity in greenhouse land is much more than outside land conditions due to temperature and humidity. By this reason, organic material for greenhouse land should be provided more due to it is consumed much. High density organic

material in greenhouse material increases stability of plant against diseases.6–10 % organic material inside greenhouse land is suitable. 8 -10 burned farm manure should be given into each decar of greenhouse before cultivation to keep this ratio stable.

Sterilization of greenhouse land: Useful micro-organisms are more effective on outside land than they are on greenhouse due to proper temperature and moist, fungus, bacteria and nematods causing on plant growing in greenhouse are effective also. Increasing and spreading disease factor in case of cultural and health measures are not taken. Disease intense increases year by year in case of alternation is not done much due to obligation of product which is demanded by market.

Tomato kinds which can stand up to diseases and nematods are developed to avoid pesticide application which is costly and hard. But, vegetable like cucumber and eggplant are not still durable. Pesticide or sterilization will long last till spices are developed for pale disease on other vegetable products. Sterilization of land can be done in three ways: Stream, chemical materials and solar power.

Useful links:

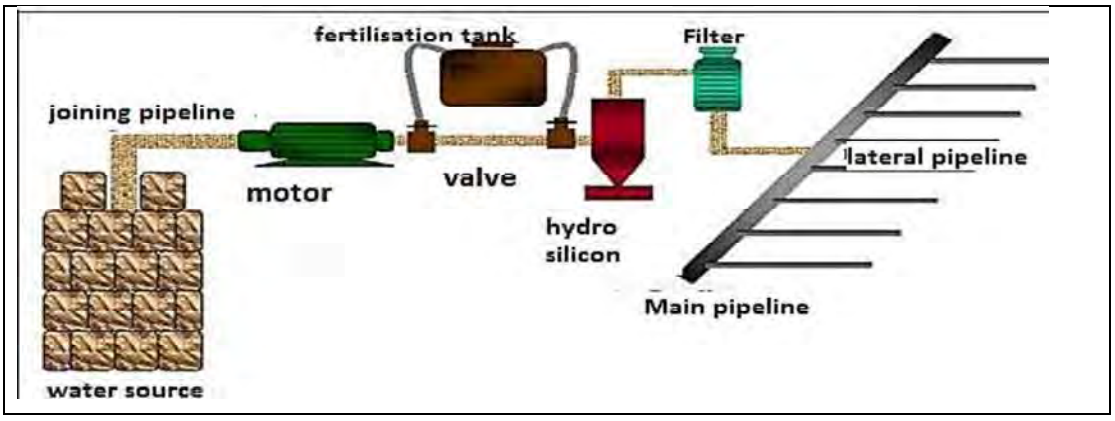
http://ec.europa.eu/environment/water/

http://ec.europa.eu/environment/agriculture/pdf/irrigation.pdf

12.4. Irrigation and Establishing Drip Irrigation System

Drip irrigation system is the most effective irrigation system among irrigation systems in greenhouses. The basic principle for drip irrigation system is to provide always necessary amount of water through often intervals into environment where plant roots grow, without having moist problem. Irrigation may be done everyday sometime, even more than one time in a day. Water purged is, directed into drop caps which are placed around plant, through pipe having pressure, and given into land surface by drop caps through having low pressure.

Figure 12.1. Drip Irrigation System



All of area may not be irrigated usually. A soak lane is occurred and there are dry areas among plants. Thus, irrigation water is used most effectively. Drip irrigation system is a fixed system and system components are kept at the same position during irrigation season. A drip irrigation system is usually composed of water source, pump unit, checking unit and main pipe, lateral pipes, drop caps.

12.5. Seedling

The first step of vegetable production is good seedling to be acquired from quality seed. Production with good seedling will increase productivity and harvest quality of product. Growing in some vegetable production is done planting seeds into production parcel directly and seed is planted into special small areas first and seedling is created then seedlings are planted into land finally in some other plant growing.

Growing of some vegetables like tomato, pepper, eggplant, cabbage, celery, lettuce, leek are done by creating seedling first. Growing of bean, melon, watermelon, cucumber, spinach, parsly, pepperweed, radish are done by planting seed into land directly. Some kind of vegetables are planted into land directly like tomato and pepper are used for industry.

Vegetable seedlings can be produced in tunnels, greenhouses and cradles. Using of cradles are not common due to preparation of cradles and finding fresh fertiliser are hard. Greenhouses and tunnels are used instead of cradles. Easy and cheap building of platic tunnels directed farmer to use this system much. Seed companies are producing seedling, farmers do not produce their own seedling and buy seedlings from those kind of companies. Seedling growing provides some advantages as follows:

- **Earliness:** Plants spend time for growing periods in seedling period so they grow as necessary. At the same time, they can be harvested 30-50 days before in comparison with direct plant seed process.
- **Time and land saving:** Other products can be grown as long as land is empty and four times harvest can be done.
- **Seeds saving:** Seed amount decreases as result of seedling growing. Thus, F1 hybrid seed species which sold so expensive are crucial point of view in terms of saving other species.

- **Homogeneous production:** There may be some empty places in land through direct plant seed processes and those areas can not be used. Seedling growing prevents this situation.
- **Healthy production:** Selection can be done before planting or during planting of seedlings. Weak, disease and unhealthy plants are eliminated and production may be done by healthy plants only.
- **Saving energy:** Seedling planting is done in smaller areas, energy is saved due to heating smaller areas.

A good seedling must have following characteristics;

- All parts of seedling should be healthy and strong
- It should not be so young or adult
- It should have assuredness
- It should not so long but it must thick and strong
- Special layers and colors belonging to types should be checked.
- Root system should be strong
- Seedling should be at the same length and uniform.

Following factors to be considered for species selection:

- Resistant to transportation
- Proper good according to market demand
- Resistant against disease and pests
- Earliness and high productivity
- Proper for production season
- Adoptation according to different climate and land conditions
- Products with certificate and hybrid types should be used.

12.6. Pruning

New suckers in axils of leaf growing from the main body of plant are removed as they are 2-3cm length. It is recomended to do in the morning. New suckers are usually used for growing of tomato, cucumber and similar plants.

Picture 12.1. New Suckers

Pinching is a method being used for big and quality product harvest. Pinching and keeping fruits around root cause fruit grow by bigger size. Two leaves are kept from top point of plant and growing point of plant is cut by thumb and index finger at date determined for topping. Plant is controlled from down to top during topping procedure and all axils are removed.

Flower pruning is kind of pruning which is done according to species and kind. It is process to remove some of flowers to provide high productivity of plants. Thus, fruit quality is increased. In case of flower pruning will be done on bunch then it is started by the last flower grown.

Picture 12.2. Pruning

Picking leaf is and method removing leaf shadowing product and causing vegetative energy loss of product and providing necessary amount of flower as production is fed by plant.

UNIT 13. SOIL PRODUCTIVITY AND PLANT NUTRITION

ADPFAL*[13]

Duration	2 Lesson hours
Objectives	Learners learn how to protect soil and preserve its fertility. Learners learn about plant nutrition.
09:30-09:40	Trainer gives information about lesson subject to participants and defines objectives of session. Trainees are invited to add in their own objectives and to set priorities for their own learning.
10:00-10:20	Trainer explains soil fertility and plant nutrition using large screen.
10:20-10:40	Learners work in pairs and complete soil fertility and plant nutrition for a farm. Pairs of trainees briefly share withgroup how they would teach this to women farmers in the local trainings
10:50-11:10	Trainer explains what soil fertility and plant nutrition is Pairs of trainees briefly share with group how they would teach this to women farmersin the local trainings
11:10-11:20	Trainer explains how soil fertility and plant nutrition should be used, and why farmers should have knowledge about them.
11:20-11:30	Pairs of trainees do the worksheets.

[13] This chapter is prepared by Antalya Directorate of Provincial Food Agriculture and Livestock. Special thanks to Derya bilgin for her contribution. Special thanks to Laura Kenny and Robin Brumfield who did proofreading.

13.1. Fertilization

In order to achieve the desired yield and quality in vegetable production, organic or inorganic compounds containing one or more plant nutrients in combination are given to the soil or directly to the plant. Through fertilization:

- Higher efficiency from the unit area is obtained by raising the yield power of the soil,
- Quality of the products are increased,
- Continuity of the efficiency of soil is ensured and gain becomes sustained,
- Chemical structure of the soil is organized by increasing nutrient content,
- Efficiency of the soil is increased by increasing microorganism activities in the soil,
- A better growing environment is provided to plants,
- Plant nutrients moved away from the soil in various forms are restored to the soil.

Plants, as with all living things, also need nutrition. The nutrient elements available in the soil are not always at the level that meets the needs of the plant. For example, in continuously cultivated soils, nutrients are moved or lost from the soil through either being exploited by the plant, washed away by precipitation or evaporated by gaseous evaporation. In order to increase the yield of the crop, the amount of nutrients in the soil should be restored to the soil. If not given, the gain obtained due to the yield obtained from unit area and product quality will be reduced.

The plants have the different nutrition requirements. Therefore, to identify how much fertilizer is required, issues such as; which plant will be cultivated? how much of nutrients available in the soil? Obtaining maximum yield with low cost in balanced and sufficient fertilization is essential. Therefore, the amount of nutrient elements in the soil and the properties of the soils is required to be known. Depending on the amount of nutrients identified in the soil, the type of plant to be grown in which region should be known and the amount of fertilizer should be determined accordingly.

Essential, sufficient, balanced and timely nutrient supply to the fertilizer should be provided. When fertilization is based on soil analysis and applied in the required amount, fertilizers have no negative effects. However, the fertilizer given in more than necessary amounts causes adverse effects both on the plant and on the soil. It should also be kept in mind that an over-applied fertilizer will block the intake of other nutrients found in the soil. For example, the phosphorous fertilizer given in excess of the plant's need will not increase the yield more. Moreover, the excess phosphorus will prevent the intake of other elements such as iron and

zinc and decreases will be seen in the yields. Because the plant is also in need of these nutrients and if not taken, plant growth is regressed, yield is decreased.

In addition, when excessive nitrogen fertilization is carried out, the resistance of the plants decreases. Resistance to draught, temperature and disease is reduced in plants that are given excessive nitrogen fertilizer. However, too much nitrogen is mixed with groundwater and ponds and causes nitrate pollution. Healthy plants which develop better are obtained with balanced and correct fertilization. Healthy developed plants are resistant to attack by disease and pests. If the plants are grown well by providing the necessary nutrients in a timely and balanced manner, the costs of spraying for diseases will also decrease.

Useful link:

http://ec.europa.eu/environment/soil/index_en.htm

13.2. Soil Analysis and Soil Sample for Fertilization

Finding the amount of nutrients found in the soils that are useful to plant reveals the type and amount of fertilizer required by the plants to be cultivated in those soils. The farmers always have questions about the fertilizer such as; which fertilizer, how much, when and how. The implementing a fertilization program based on soil analyses is the shortest and most correct way to answer these questions. A profitable fertilization can only be done by knowing the type and amount of fertilizer that the plant requires and applying it to the soil at the most appropriate time and form.

The amount of the nutrients in the soil is determined by analyzing a certain amount of the soil to be cultivated in the laboratory. It should not be forgotten that over used fertilizer means more cost. The purpose of vegetable production is to increase the gain from the unit area. By soil analyses, the farmer has the opportunity to form the combination of plant nutrients required for the plant to develop well. This way, the problems that may result from a fertilizing program based on soil analysis are prevented. A nutrient given to soil more than the amount required breaks the balance between the nutrients in the soil.

Soils from different fields contain different amounts of plant nutrients. Therefore every field should be sampled separately. There may be parts showing different properties in the same field. For example, some part of the field may be light colored and another part may be dark colored. This color difference shows the difference with regards to organic matter and iron compounds. Some part of the field may be flat and another sloped, some part barren, another

more fertile. If there are differences in the same field as such, separate soil samples should be taken from these areas. The areas considered objectionable to take soil samples are as follows:

- Places where fertilizer was stacked
- Places where animal manure are found
- Threshing field and animal beds
- Parts where stem, root and weeds are burned
- Parts that are small mounds and where became hollow due to water accumulation
- Under trees
- Row tops where crops are planted in rows
- Parts close to creeks, forest, channel, water ducts, fences and roads

While depending on the season, the soil sample is taken one half or two months before planting or fertilizer use. Samples are not taken in days with frost or mud. Sampling depth depends on the depth of plowing and processing. When taking yield samples, sampling tools should not be plunged into the hard part below. In the samples taken for the purpose of fertilization, this depth is usually 15-20 cm. In this respect it is useful to take the recommendations of the authorized personnel in the laboratory who make fertilization recommendations according to soil analysis.

If the soil is not too wet or too dry, soil probe is preferred in sampling. When there is no soil probe or auger available, the soil sample can also be taken with the garden paddle (digging fork).The soil to be sampled should be dry or tempered enough to not stick to the foot. If the sample is a little wet, it should be dried in its own way in the shade. It is not correct to dry the wet sample on the stove or heater. If the sample is to be placed in a wet bag, some of the plant nutrients can be absorbed by the cloth bag. If the sample is to be dried on the stove or heater, some food items may evaporate. In either case, no correct results may be obtained from the analysis. It is also advisable to take a sample of the soil in order to learn the state of the soil at a depth of 20-40 cm from the average area of the sampled area.

Soil sample for fertilization is the basis of the fertilizer. Errors mostly made in sampling are as follows:

- Soil samples are not taken from a depth of up to 20 cm with a shovel and are taken from the surface of the soil or only from 20 cm.
- The amount of soil is not about 1 kg but sometimes 100-150 gr. Sometimes too much is taken and therefore the soil sent is not enough to analyze in the laboratory or it is far too

much.

- Soil samples taken are placed in unsuitable containers (manure vat or other dirty containers).
- Labels are not written with a pencil and are written with a ball point pen, and when the mouth is closed with nylon, the ink on the label becomes unreadable due to the ink sweating.
- Since the nylon bags are not pierced through a few places after the soil is placed in the nylon bag, the labels placed inside are soaked in the nylon due to the moisture of the soil.
- When the farmer has more than one field at the same site, after the soil samples are taken, it is not specified which soil belongs to which field, and thus the field is mixed by the farmer after the soils are analyzed by the laboratory and the report is sent.
- The small parcels belonging to the same person are evaluated as a single field and sampled as combined, a single sample is sent for all the fields.
- Also, one thing that should not be forgotten is not taking samples from the field with an opinion such as my neighbor has analyzed the field next to my field and because the fields are adjacent.
- Soils are dried on stove, radiator, etc.

13.3. Classification Of Fertilizers

Fertilizers are divided into three groups according to their structure: organic, chemical and microbial fertilizers.

13.3.1. Organic Fertilizers

The most important feature of organic fertilizers is containing high organic matter. Organic material (fertilizer) has great benefits to the soil. In addition to providing nutrients to the soil, it increases the organic matter content of the soil.

Organic fertilizers make the soil's water holding capacity, physical properties such as aeration, heat and permeability suitable for plant growth. At the same time, keeping the plant nutrients in the soil and making the nutrients that are useless turn to useful condition and affect the chemical properties of the soil positively. Organic fertilizers applied to the soil also have a positive effect on microorganism activities that determine the biological properties of soil.

The organic fertilizers are: Barn Fertilizer (Farm Fertilizer), Poultry Manure, Compost,Green Manure and other Organic Fertilizers:

13.3.2.Chemical (Inorganic) Fertilizers

Chemical fertilizers are also known artificial or commercial fertilizers. these fertilizers consist of natural or chemically derived inorganic substances containing nutrients that plants need. the share in the vegetable production increase is the highest among the other inputs. ınorganic fertilizers are treated as single (nitrogen, phosphorous and potassium) fertilizers, secondary plant nutrients and trace elements (boron, copper, iron, etc.) fertilizers. chemical fertilizers contain one or more plant nutrients in their composition. unlike organic fertilizers, they contain a high amount of plant nutrients and are readily soluble in water.

Fertilizers Containing Single Nutrient: Nitrogen fertilizers, ammonium fertilizers, nitrate fertilizers, ammonium and nitrate fertilizers, amidified fertilizers,phosphorus fertilizers,normal superphosphate,triplesuperphosphate, potassium fertilizers,potassium sulphate (K2SO4) and potassium nitrate (KNO3).

Composite (Multi-Nutrient) Fertilizers: These fertilizers chemically obtained directly by mixing of other fertilizers containing N, P and K; plant nutrient content amounts of nitrogen (N), phosphorus (P2O5) and potassium (K2O) quantities are the chemical fertilizers that vary depending on their usage characteristics. Composition of 15-15-15 fertilizer contains basic plant nutrients such as nitrogen, phosphorus and potash. In 100 kg of this fertilizer, there are 15 kilos of pure nitrogen, 15 kilos of phosphorus, 15 kilos potash. Many compound fertilizers are produced in triple and double combinations. These are fertilizers such as diammonium phosphate (DAP) 18-46, 20-20-0, potassium nitrate (13-0-46), 15-15-15 and monoammonium phosphate (MAP) 13-60.

Liquid Fertilizers: These fertilizers contain one or more plant nutrients together and applied in liquid form (clear liquid, suspension) to soil or plant parts of soil.

Microbial Fertilizers: Soil microorganisms play an active role in many chemical changes that take place in the soil. soil microorganisms are responsible for the breakdown of organic matter contained in the soil in any way and therefore for the circulation of nutrient elements.

13.4. Fertilizer Application Methods and Time

13.4.1. Application Method

The application method is very important to get the most out of the fertilizers. Fertilization methods can be listed as application to the surface, band (row) application, application from the leaf and application with irrigation (drip).Application method of fertilizers is affected by factors such as; physical and chemical properties of soil, root systems of the plants to be grown (superficial and deep), physical and chemical properties of fertilizers to be used and cost of fertilizer and the tools/equipment required for application of fertilizer. The application methods are as follows:

Surface spraying method*:* Application of fertilizer by hand or by spreading on the soil surface with fertilizer dispensing tools. Nitrogenous fertilizers in particular are applied by spraying on the surface. It can be applied after planting as well as before or after plant growth. It is preferred on the frequently planted plants because of easy fertilization.

Band application method*:* Application of fertilizers as to 3-5 cm under or next to the seeds or buds. Fertilizer is given near the seed together as the grains and other field crops are planted with seeds. Band application is the most suitable method for the elements that easily become useless in the soil such as phosphorus and zinc.

Application from leaf method*:* Application of chemical fertilizers by dissolving in water in doses not harmful to the plant and by spraying on the upper parts and especially on the leaves. It is not possible to fulfill all the nutrient needs of the plants, especially the macro element needs, with leaf nutrition. It is generally suitable method for fertilizers containing micro elements.

Fertigation method*:* Fertilization by mixing the fertilizer with irrigation water to fertilize with irrigation. This is a very convenient method in terms of time, labor and fuel economy. However, only fertilizers which are easily soluble in water can be applied by this method. Ammonium nitrate, ammonium sulphate, calcium nitrate, urea, ammonium phosphate, potassium chloride, potassium sulphate, mono ammonium phosphate (MAP) and trace element fertilizers can be applied by this method. Fertilizers that do not completely dissolve in water should not be used. The fertilizers to be used in the fertigation should not precipitate and form sediments in water.

13.4.2. Application Time

Application time of fertilizers is also very important to choose the time of fertilization when the plant needs it, in order to ensure that the useful nutrient element it needs is ready in the plant root zone.To increase the effective use of fertilizes and their effect on the yield-quality increase, fertilizer application time should be adjusted according to; climate of the region, characteristics of soil, plant species to be fertilized and seasonal nutrition requirement, the type of the fertilizer to be applied. Otherwise, the benefit expected from the fertilization will not be provided and substantial losses will occur in terms of environmental and economic means.

In rainy and humid climatic conditions, application time of fertilizers should be as close to planting as possible. Because rainfall increases the loss of plant nutrients in the form of washing. In very hot and very arid conditions, losses from the fertilizer occur in the form of evaporation and fixation. The fertilization time should be adjusted in such a way that during the germination of the seed, nutrients should be available in the soil as much as possible. Since the nutrients cannot hold onto the soil in the light textured sandy soil, they are lost from the soil after application by either washing or evaporation. In light textured soils, application of especially nitrogen fertilizers by dividing is suitable in terms of reducing the losses.

Chemical fertilizers should be applied immediately after sowing or planting when planting vegetables. Fertilizers vary with application times when considered in terms of organic and inorganic properties. In general, organic fertilizers (farm fertilizers, composts, etc.) must be applied to the soil in advance (in the autumn). The organic structure breaks down and the plant nutrients turn into forms that plants can take advantage of.

Application time of nitrogen fertilizers*:* A part of the amount of nitrogenous fertilizer required for sowing and planting should be applied as initial fertilizer and the remaining part should be divided into at least a few parts according to growth cycles. The application of the second and third sections of nitrogenous fertilization should not be too late and should be applied during periods when plant growth is rapid. For nitrogen fertilizer applications with drip irrigation, nitrogen fertilizer applications must be completed in the middle of the latest fruit formation period for most cultivated plants. It is important in terms of fulfilling the initial nitrogen need of the plants that the 15-25% of the amount of nitrogen fertilizer to be applied should be applied from the soil before irrigation season. Nitrogen required for vegetative development, while in the form of nitrate, moves towards the bottom of the soil with rainfall and irrigation water and evaporates in gaseous form as ammonia.

Application time of phosphorus fertilizers: Phosphorous fertilizers should be given before sowing or just before planting or during sowing and absolutely buried in soil. Since phosphorus is a very inert nutrition element in the soil and since it is not possible to apply it in later years, especially in annual plants, applying the whole of phosphorus-containing fertilizer together with planting or planting is the basic application. Approximately 1/3 of the phosphorous fertilizer is applied as top fertilizer in the application of fertilizer with drip irrigation, which has become increasingly widespread recently. A large part of the given fertilizer is absorbed by the plant roots in the area of 1 mm in the first ten days. While in the advanced stages of development, the plant roots utilize phosphorus in the vicinity of 5 mm. For this reason, it is appropriate that phosphorus fertilizers should be given to the soil before sowing or with sowing, then to be buried in the soil. However, attention should be paid to the soil reaction during the administration of phosphorus fertilizers.

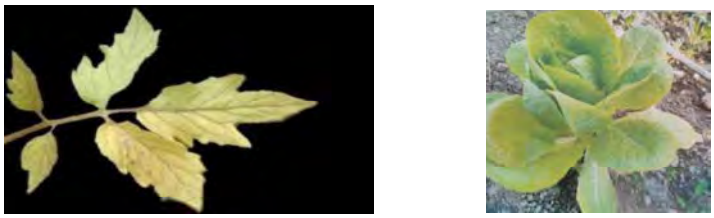
Application time of potassium fertilizers: Potassium fertilizers are also applied as initial fertilizer in the same period, together with sowing or planting, and mostly with phosphorus fertilizers. However, in recent years, potassium fertilizers have been divided into several parts in consideration of the potassium demand due to the development periods of the plants. Although not as much as nitrogen, plants need useful potassium regularly in the later stages of their development. Potassium fertilizers with high solubility can be applied easily to some plants with drip irrigation systems periodically according to need. Since potassium fertilizers are water soluble, there is more danger of washing, so some of them are not applied all at once, but some of them are applied during planting time and the rest of them are applied in a certain period of development. In plants sensitive to chlorine, potassium sulphate fertilizer is used as Potassium fertilizer.

Application time of micro element fertilizers: Micro-element fertilizers should be applied if the micro-element deficiency analysis in the soil or the plant is determined as a result of analyses or if the symptoms of deficiency are indicated in the plant. Elements such as iron, copper, zinc, cobalt, manganese, molybdenum and boron are known to be micro-elemental fertilizers because they are less needed by plants than other plant nutrients. It is of great importance that chelated micro-element fertilizers are applied from soil.

13.5. Nutritional Disorders in Plants

Nitrogen deficiency: In the case of nitrogen deficiency, the plants usually get a pale light green appearance, whereas in the case of advanced deficiencies, the homogeneous yellowing starts from the old leaves. Nitrogen deficiency especially affects plant vegetative growth

negatively. Leaf and trunk system becomes weak, vegetative development period is shortened. The plants mature early, bloom early and age prematurely.



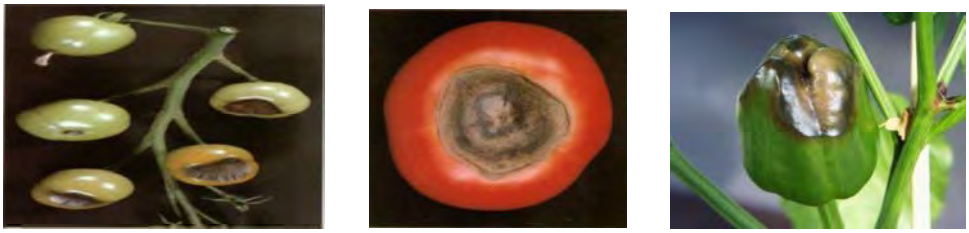
Picture 13.1. Nitrogen Deficiency in Tomato and Lettuce

Phosphorus deficiency: The deficiency symptoms first appear on the old leaves. The most striking symptom of phosphorus deficiency is reduced width and number of leaves. Phosphorus deficiency results in dwarfing, dull-blue green leaf color, purplishness in some parts, decrease in shoots, flower and seed formation, late burst of buds, delay in ripening, decrease in grain and fruit, decrease in product quality. In tomato, the veins of the lower leaves turn purple and reddish violet formations occur along the vein. The leaves curl backwards and fall in the later stages. The trunk becomes thin and fibrous. Flowering and fruit formation is weak, fruits are small and hard, and become yellow before their time.

Potassium deficiency: Since potassium deficiency symptoms do not appear immediately in plants, it is often late when the symptoms occur. The most striking symptoms of potassium deficiency is the edges of the leaves turning to yellow, then to dark brown. Since potassium in plants is active, the deficiency starts first on the edges and tips of old leaves. The seeds of the plants that are lacking potassium are small, have little germination power and are susceptible to diseases. Fruit loses normal color, matures early or late. In potassium deficiency, quality characteristics are greatly affected especially in vegetable, fruit and fiber plants.

Picture 13.2. Potassium Deficiency in Tomato Leaf and Fruit

Calcium Deficiency: Because calcium is inert in plants, the deficiency symptoms first occur in young leaves. As a significant portion of calcium is present on the cell walls, the tissues are damaged primarily in the absence of it. The plant body becomes weak, bending and breaking at the ends of the shoots occur.

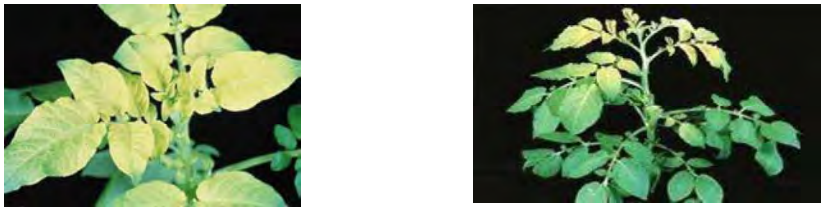


Picture 13.3. Calcium Deficiency in Tomato and Pepper

Magnesium deficiency: In magnesium deficiency, chlorosis occurs in the leaves. Magnesium can be transported from old leaves to young leaves when it is active in plants. So the deficiency symptoms first appear on the old leaves. In the absence of the magnesium, old leaf veins remain green, there is a mottled appearance between the veins and these parts turn yellow. The leaves of the plants that suffer from magnesium deficiency and at the same time fruits fall. Root development is adversely affected, yield and quality are reduced.

Picture 13.4. Magnesium Deficiency in Tomato

Iron Deficiency: Iron deficiency is more prevalent in calcareous soils, sandy acid soils, and excessively phosphorus soils. Iron deficiency symptoms in the plants appear as a general yellowing of the young leaves with iron deficiency and yellow color of the green color between the veins of the leaves. The veins of the leaf are colored green and between the veins are colored yellow. The leaves are completely yellow when the deficiency is increased. Drying occurs in young offshoots.



Picture 13.5. Iron Deficiency in Tomato

Zinc deficiency*:* Zinc deficiency symptoms are indicated in the young leaves of the plant primarily because the zinc has poor activity in the plant. Light green, yellow or white colored areas between the veins of the leaves occur. The trunk and the nodes on the trunk are shortened, so the plant becomes stunted, the leaves shrink and form a badge shape.

13. PLANT PROTECTION, BIOLOGICAL AND BIOTECHNICAL METHODS ADPFAL*[14]

Duration	3 Lesson hours
Objectives	Learners learn about plant protection. Learners learn about integrated pest management techniques.
09:30-09:40	Trainer gives information about lesson subject to participants and defines objectives of session. Trainees are invited to add in their own objectives and to set priorities for their own learning.
10:00-10:20	Trainer explains plant protection and its necessity for the farmers using large screen.
10:20-10:40	Learners work in pairs and learns plant protection in a farm. Pairs of trainees briefly share withgroup how they would teach this to women farmers in the local trainings
10:50-11:10	Trainer explains integrated pest management techniques Pairs of trainees briefly share with group how they would teach this to women farmers in the local trainings
11:10-11:20	Trainer explains how integrated pest management techniques should be implemented, and why farmers should have knowledge about it and its usage.
11:20-11:30	Pairs of trainees do the worksheets.

14.1. Plant Protection

Plant protection is full of activities to protect plant from harmful organisms for providing food security at herbal production (agricultural protection). Today, protection of human life, environment and nature are at the forefront, even it is obligatory while plant protection activities are being done. Solely, it can be actualized through specially biological control and Integrated Control inclduding alternative methods to chemical ways. Integrated Control; is a period for taking decision using all necessary methods to manage diseases/ pests as it is eco-friendly and has lower costs.

[14] This chapter is prepared by Antalya Directorate of Provincial Food Agriculture and Livestock. Special thanks to Derya bilgin for her contribution. Special thanks to Laura Kenny and Robin Brumfield who did proofreading.

Figure 14.1. Plant Protection Steps

Control against plant disease and pests are understood as chemical control usually. Whereas by integrated control, chemical control against disease, pest and weed which can be taken under control is recommended as the last resort. In case of chemical control is obligatory to use eco-friendly, specific, having less side effect on humans, environment, nature and natural enemies. There are some problems arising due to chemical control is at the forefront and increasing demand for drug. These problems may be explained as below:

- Drugs derange natural balance among pests and useful and causes increasing number of pests through endagering natural enemies (useful bugs)
- It causes poisioning of human and hematothermals
- It pollutes environment through leaking soil, air and water
- Disease causes pests and weed becoming stronger against drugs
- It causes ruins on products; it creates problems in domestic market and abroad
- Honeybee, pollinator bee, birds, fishes and other lifes live in water are effected negatively.
- Harmful effect increases as applying intesticides casually and densely.

New ecological and less cost methods were invented to protect environment we live in and to decrease all negative effects. This is called as integrated control by using all of them as they are complimant. Integrated control means application a lot of techniques simultaneously. Those techniques; cultural measures, physical and mechanical control, chemical control and biological and bio-technique methods.

Useful link:

http://www.efsa.europa.eu/de/topics/topic/planthealth

14.2. Integrated Pest Management Techniques

14.2.1.Culturel Measures

Firstly cultural measure are taken to grow plant healthy as considering all control methods against pest under integrated control program. Thus stability of plant is increased against pests and diseases. By this aim;

- Construction greenhouses on direction of south-north way, planting plants on south-north direction,
- Soil cultivation,
- Selection of type according to durability against disease and pests (Graft seedling strong root structure and durability against root-nemato.) using of seed/seedling free of pests and dieases.
- Planting time should be managed well,
- Irrigating and drainage
    - Irrigation amount, methods, and intervals are organized according to plant type. Excess irrigation drowns plants and causes death of plants. Excess irrigation increases possibility of diseases specially Phytophtora spp, stability of plant decrease and are affected easily in case of plant goes without water.
    - Making irrigation water refine from pests and disease (irrigation water may include some spore of some diseases and plug and pupa of some bugs)

- Steady fertilising should be applied for health growing of plants,
- A good ventilation should be provided in greenhouses and (at least 40% of top area) and temperature and balanced humidity increase must be prevented and frequent plantion must be avoided to allow air flow between plants
- Organizing entrances and air channels of greenhouse for protecting from disease and pests (double door system and bug veil).
    - Cleaning inside and outside of greenhouse; following of weeds
    - Alternation
    - Cleaning greenhouse equipment and equipment necessary for producting
    - Detection and monitoring: Providing routin controls in greenhouse (at least one in a week) :
        - Monitoring available harmful organism, if any;
        - Determining failing parts,

- Monitoring increasing and decreasing tendency
- Availability and population of useful bugs must be monitored.

Thus, necessary information may be gathered and proper control should be done on time.

- Disease plant and plant ruins are collected and removed from production area,
- Records should be kept regularly,
- Production season should be compared with previous seasons.

14.2.2. Physical and Mechanical Methods

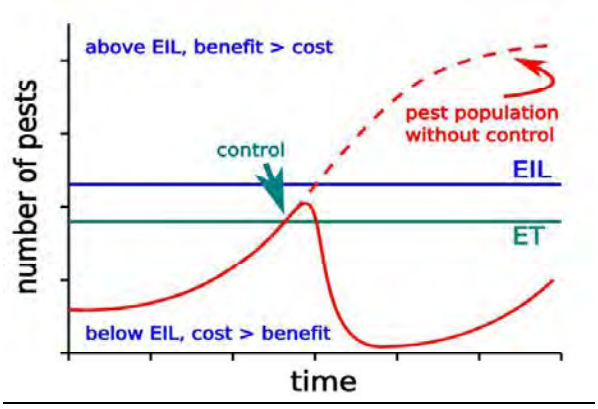
- Control with physical effects
- Solarisation; It is preffered by producer in recent years because of it is easy to apply, less cost and has effective soil disinfection. Solarisation is a method providing killing disease, pests and weeds through increasing land temperature as it land is covered by a pure plastic cover for 6-8 weeks. Solarisation is get started as land is get irrigated up to 40 -50 cm deepness. Land is arranged through clods are broken after land is ploughed by 30–40 cm deepness when consistency is caught. Land is covered with leakless, pure plastic cover having 0,025–0,1mm thickness after drip irrigation pipes are furnished through 40 -50 cm interval. There must not be air bladder between land and cover, cover must be strained and land must not contact with land. Sides of cover should be digged up to 15-20cm deepness through holes prepared before. There must be no soil on solarisation cover. Land should be mousturised during application. Land should not be ploughed not more than 15cm deepness after solarisation process.
- Crushing nits and nit shells
- Preventing weed growing as land is hoed.

14.2.3. Chemical Control

Chemicald control should be the last way among integrated control methods. Chemical control should not be used even if there is no ecological and economical obligation. The aim of integrated control is not to destroy disease factors, pests, weeds but it is arrangement of population of those under economical damage level.

- **Economic Loss Threshold:** Economic loss threshold is density of control to prevent pest population to increae economic loss threshold.
- **Economic Loss Level:** The smallest population density of pests causing economic damage.

Figure 14.2. Economic Loss Level



Before deciding chemical control:

- Type and biology of pest
- Type and phenology of plant,
- Natural enemies
- Climate factor
- Economic Loss Threshold
- Cost/potential benefit ratio should be considered.

In case of chemical control is obligatory:

- **Pesticide selection and usage**:
  - Selective,
  - Eco-friendly,
  - Short-term effective,
  - Must comply with biological control
- **Chemical application,**
  - Suitable equipment (pulverisator, atomizer etc) selection and calibration adjustment
  - Local disinfection at the begining of pest occurrence
  - Must comply with period among recomended dosage and harvest time

By integrated control management, monitoring should be done well as soon as applications are done to consider effect and activity after processes done, taking record must be done definitely in terms of considering plant quality and productivity.

14.2.4.Biological and Biotechnical Control

The main aim of agriculture is to harvest high productivity on unit area, quality and health product through using contemporary agriculture technology considering sustainability. In recent years, increasing problems due to intense chemical usage on agricultural production using intense input and technology usage directed people to use sustainable integrated control system which does not damage human life and environment, does not derange nature balance and uses agriculture technology.

Main matters of integrated control system using all kind of control methods and techniques properly and keeping damages of pests under economic loss level as considering population changes of pests on culture plants and relations with environment are biological and biotechnic control. "Pests" called in this section includes bugs harmful for culture plants, fungus, mite, bacteria, phytoplasm, viruses, viroids, weed, rodents and birds.

a) Biotechnical Control

In this method pests are taken under control as preventing regular level biological and physiological attributes by some techiniques instead of destroying pests directly. Lifes look for food, spouse and shelter during their regular life period. Biotechnic control is to prevent natural life of those pests' natural life period. Biotechic control methods are used for respiration, circulatory and drive chain which are accepted macro-organism. Products used for biotechnic control method and methods are as follows:

i) Traps: Traps may be categorized as food, color, light and sound trap. Traps can be used as color traps (yellow adhesive trap and etc) are used alone and can be used with other traps and pheromoned. Color traps may be used more often for greenhouse cultivation. These traps; are yellow adhesive traps and blue adhesive traps for trips.

Picture 14.1. Colorful Adhesive Plate and Lane Trap

ii) Charming and decractives: Some behaviours of bugs for looking for food and spouse, determining spawning ground are controlled as they are found by their secretion. Those are used for several aims for control as they are acquired by natural and artificial ways. Chemical

structure of silkworm pheromone (smell) was determined by German scientist in 1959 for the first time and it was acquired from bugs. Pheromones of almost 1500 types of bugs which are used for different biological functions, were determined in almost 40 years. Pheromone diffusers were invented as pheromones determined are stored in capsules and fuzes. Pheromones are used in three different ways as they are combined with water traps, plate traps and delta type (roof) adhesives.

iii) Monitoring: It is a way to follow emerging of a bug in determined area and population. Pheromone diffusers are used together with adhesive traps and population and emerging of pests may be followed as counting pests trapped by pheromone. Control period and control method are determined by this way.

Picture 14.2. Colorful Adhesive Plate Trap Delta (Roof) Trap

iv) Preventing coupling: It is a way for preventing coupling and reproduction of pests type in a particular area. Pheromones diffuser including female smell is used thus males are directed into wrong way and prevent males to meet female.

v) Massive catch: It is the way to use pheromones as catching male/female pests in bulk and kill. Thats why pheromones diffusers are used as it is combined with water and adhesive traps. Pests dropped into water and trapped are destroyed. Application dosage of monitoring traps may be increased.

Picture 14.3. Pheromone and Trap For Trips Control

Picture 14.4. Pheromone and Water Trap Tomato Moth Control

vi) Chemical and hormons destroying bug development: This is the most sensitive issue among biotechnical control products. Bugs; have different periods as they are seperated from each other biologically and phsicallynit, larva, nimf and adolescents. Transition among periods are provided by hormon and chemicals secreted or managed by bugs.

Generally larva and nimf periods of bugs are harmful and adolestency period of some bugs may be harmful. The main target is manipulation or destroying transition among period which is important for bug lifes for using control, or some some vital functions by using hormon or chemical necessary for bug development. It is to prevent coupling and reproduction of bugs as preventing bug transition from larva to adoltency or spaying. As those products can be used alone and can be used as integrating into pheromones-trap systems.

Advantages and problems of biotechnical controls: The most important advantage of biotechnic methods is being specific for high level of pests. Also storage and transportation of goods do not need to have special conditions as other products need to and does not have side effect on useful lifes and organism out of target. Complicated equipment and machinery are not needed for biotechnic control and long lasting apllication effects are advantageous for producers. It is another advantageous that another part of trap is used as adding pheromone diffuser in case of ending life of Pheromone diffuser on trap systems. Biotechnic control products have no side effect on using biological control products and it has sinergic effect which inceases biological control effect.

Advantegous of biotehcnic control products are:

- Eco-friendly
- It does not cause ruins.
- Long lasting effect.
- User-friendly due to it does not threat user life
- It can be used for organic agriculture
- It complies with Integrated Control Strategy highly
- Some methods and products can be prepared by simple processes.
- Complicated equipments are not needed for application
- Storage and transportaion is easy
- Re-usable
- Control effect on trap systems can be monitored.

Disadvantegous of biotechnic control products are:

- There is no need detailed information.
- Pheromones used does not have effect on organisms out of target.
- Pheromone-trap systems's risk to pollute environment
- Higher Laborship Cost
- Possible negative effect of colorful traps on pests
- It is hard to use method in case of there are more than one pest organism

b) Biological Control

Biological control can be an important component of IPM programs. It is agricultural protection actualized by taking advantage of using natural enemies, bugs, acarinas, spiders and disease factors instead of chemical drugs causing productivity loss of culture plants. By this system, it is aimed not to destroy harmful factors totally, it is aimed to keep their population under economic loss level. Economic loss level is the lowest density of harmful organisms causing economic loss.

Picture 14.5. Biological Control

In case of considering control against plant disease and pests in terms of agricultural protection then chemical control is thought usually. In fact, in case of intense use and using method out of recommendation eventhough pesticides being used through chemical control providing advantages for preventing productivity loss then it may have negative effect on human and environment life directly and indirectly.

Negative effects of pesticides on human, environment and natural balance are as follows:

- Directly by recipration, contact, exposing to pesticide during chemical control

- Food including ruins and meat, milk and eggs of animals consumpted feed including pesticides.
- Drug ruins draining into dringking water through ground water
- Pesticides drop into out of target area during chemical control and package ruins cause environment pollution as it leaks to land, water and air,
- Negative effect on useful bug and other life in nature and increasing pest population accordingly, and causing emerging of new kinds,
- Resistance developing against pests is seen ineffective.

Biologic control methods are given below:

i) Protecting and supporting natural enemies in nature: The basic principle by this method is avoid to destroy natural enemies, and applications preventing their activities. Biological control actors must be protected from chemical control side effect. Large effective pesticides must be avoided in chemical control if possible. In some cases, chemical control may be obligatory, pesticides hosting must be prefferred instead of using pesticide killing every kind of bug, effective minimum dosage using, rare using of application mean protecting natural enemies.

ii) Releasing natural enemies as coupling them: This mehtod is used when there are not necessary population of natural enemies in case of time problem among biological control factor and emerging of pests, so in case of they are not emerged simultaneously or in need of natural enemies. To support natural enemies living in nature as massive preproductivity is called as natural enemies supporting. It is considered as parallel effective increasing accordingly as increasing number of biological control in nature in period of pests are intense.

iii) Importing natural enemy: It is a method to use a new natural enemy for eco-system. Probably pests are new for eco-system usually in classic biological applications. Thus, pests come into eco-system in absence of natural enemies, and reproduced themselves easily because there is no natural enemy around. Biological control is called to import natural enemies where they are control against pests, to take pests undercontrol. In some cases, natural enemies imported may effective but they can not live in winter where they import to. Because of this reason those natural enemies must be imported from their natural life area and must be released into productivity area.

There are natural enemies of bugs, mites, nematods, fungus, bacterias and weed damaging plants. There are more than 1 million kind of bugs and 1/3 of them are pests and 1/3 of them useful and 1/3 of them are neutral neither useful nor pest. Useful bugs living in nature, calling as natural enemies, live over pests and restrain them. There are a lot of "natural press factorr" preventing increasing population of several organisms in nature. Those preventing factors prevent a lot of organisms or life becoming harmful. The situation is called as "natural biological control".

There are two important factor creating natural biological control. Those are environment factors (abiotic factors) and natural enemies (biotic factors). In case of natural enemies are destroyed as result of mis-treatment or large effective pesticide using then they loss biological control effect and even pests may have epidemic effect. Correction the situation and to recover damaged balance is to bring natural enemies or natural enemies of new emerged pests into the region. Here, all kind of attempts to increase effect of available and effective natural factor on pests by human factor are called as biological control.

The most important specification differing biological control from natural biological control; is to release life or natural enemies which are used for biological control, by human factor. As it is known, biotic factors available in nature stabilize pests. Those biotic factors are natural enemy bugs, useful mites, protozoas, bacteries, viruses, fungus, nematod, birds and mammals.

Agents being used for Biological control are as follows:

- **Parasite bugs:** This kind of agents called as parasitoid as well are usuall very small and even they are invisible, those; grow inside of embryo (ovule) of host (pest) and cause death of host. Adult females of parasite bugs leave its eggs into egg, larva or inside adolescent thus they make way for coupling of themselves and cause death of pests
- **Hunter bugs:** These beneficial insects known as predator and generally kills the the larvas and mature harmful insects. Bugs cause death of pest through eating pests directly or sucking juice sap as they inject their proboscis.
- **Parasite nematods:** Those are microscopic agents growing in visceral organs of several lifes and causing death of those life.

- **Disease factors:** Disease factors known as pathogen as well are micro-organisms like bacteries, fungus and viruses which are being used against several life, causing death of lifes as result of infection in nature.

The advantages of biological control are:

- Avarage effect of a pesticide used in chemical control is 15 days and the effect continues as it decrease gradually. This effect is stable and at the same ratio through biological control
- Pesticides have negative effect on other lifes as well as it has life targeted.
- Pesticides have negative effect on human life as it drains into ground water which we drink and on environment as it leaks to meat, milk and food of animal origin but biological control has not negative effect on human life an environment.
- Disease and pests targeted by chemical control acquire immunity agains pesticides by time and pesticides become ineffective. Immunity of pest targeted can not be devoloped against useful lifes through biological control.
- Useful bugs in nature can be produced in nature because of large specturm pesticides are not used through biological control.

UNIT 15. RELATION OF PESTICIDE WITH ENVIRONMENT AND WASTE MANAGEMENT

ADPFAL*[15]

Duration	3 Lesson hours
Objectives	Learners learn about pesticide. Learners learn about pesticides effect to the nature. Learners learn how to manage waste.
09:30-09:40	Trainer gives information about lesson subject to participants and defines objectives of session. Trainees are invited to add in their own objectives and to set priorities for their own learning.
10:00-10:20	Trainer explains pesticide and its effect to the nature using large screen.
10:20-10:40	Learners work in pairs and learns pesticide research for a farm. Pairs of trainees briefly share withgroup how they would teach this to women farmers in the local trainings
10:50-11:10	Trainer explains waste management. Pairs of trainees briefly share with group how they would teach this to women farmersin the local trainings
11:10-11:20	Trainer explains how to manage waste, and gives a worksheet for practice.
11:20-11:30	Pairs of trainees do the worksheets.

Human being needs living spaces which does not threat clean air, water, nutrition and its health. Already limited resources have to be shared and used by a lot of lifes in our planet. Life of increasing World population in a healthy environment; may be provided through legal regulations for showing awareness and protecting resouces.

Useful link:

https://ec.europa.eu/food/sites/food/files/plant/docs/pesticides_sup_aware_nwp_dir-2009-128-eu_germany_en.pdf

15.1. Effects of Pesticide

Mixture or chemical materials including protecting, bactericiding, removing and detractiving materials are called as plant production product (pesticide). One of the reason of

[15] This chapter is prepared by Antalya Directorate of Provincial Food Agriculture and Livestock. Special thanks to Derya bilgin for her contribution. Special thanks to Laura Kenny and Robin Brumfield who did proofreading.

environmental pollution is to apply insensible pesticides which are out of target, are in pollutant group and may harmful. Advantages of pesticides may be removed due to carelessness and miss-use. Users of pesticides must check harmful pollutant of pesticides and protect environment from possible harmful pesticide applications.

Knowledge of there is pesticides which is outlasting on environment and polluting ground waters is primary subject to prevent pollution based on pesticides. Endamaging capacity of pesticide; depends on toxity of pesticide, exposure time, dosage amount and permanence on environment. Even some pesticides have more toxic but some of them are nontoxic. Lethal dose (LD_{50}) or lethal concentration (LC_{50}) are used for toxicity dosage measurument. The particular dosage or concentration are pesticide dosage or concentration killing 50% of animals usually in 24- 96 hours.

Exposure means contacting time of animal with pesticide. Short term exposure with pesticides have less effects on fishes but long term exposure with pesticides effects fishes more than short them exposure effect. Dosage means pesticide amount of animal exposure through mouth, leather or breathing. Even small amount of pesticides having high toxicity may more harmful ones having less toxicity.

Persistency means outlasting period of pesticides on environment. It depends on chemical structure and disintegration rate of pesticide under environment conditions. Persistency is called as “half of pesticide life” (T/12). Half of life is time period which is necessary for decreasing pesticide amount. Half of life of pesticide may change up to hours, days and even years. Disintegration of pesticides may be done by sunlight (photodecomposition), high weather temperature or high water temperature (thermal degradation), humidity conditions, biological affect (microbial corrosion) and soil conditions (pH).

The effects of pesticides are as follows:

i)Phototoxicity: It is called as blighted, deformation and blods on body and leaves of plant as depending on formulation and usage dose of agricultural pesticides, equipment used and external factors. Agricultural pesticides do not cause phototoxicity in case of doses recommended through usual condition. Solely, defective pesticide, using high dosage, irregular spraying or intense pesticide using with equipments, high weather temperature while applying, sunlight, baked plants may cause phototoxicity. Also, in case of phototoxicity, other effects have to be searched before pesticide applying.

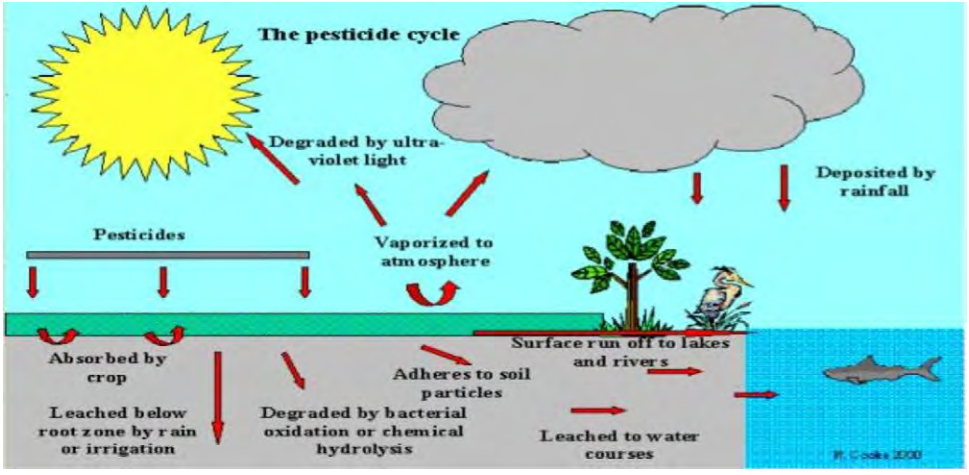
ii) Decrease of product quality: Pesticides may disrupt the taste, smell, colour and form of products. The best way to prevent those kind of undesirable is to use recomenned pesticides through recomenned dosage.

iii) Air and pesticides: Air has function to take particles away. Because of this function of air, dislodging of sediment may occur during applying pesticides. In case of pesticides are dragged; pesticides reach into waterways, homes and green spaces. Thus, pesticides may harm humans, pets, wildlife and sensitive plants. Matters to prevent draggin of pesticides are as following;

- Selection of compound of non-volatile pesticide formulation
- Using of presevative material preventing dragging
- Applying of the most useful drop diameter
- Selection of the most useful pressure
- Selection of nozzles involving a lot of big particle
- Putting nozzles into air flow
- Applying into target through the most usefull distance
- Applying when suitable wind, temperature, humidity conditions.

Careful using of pesticide is the subject touches everyone. A lots of factor effecting distance of target may cause draggin in target area. Even if in case of using sufficient sensitiveness and a good applying technology then dragging problem may continue. Air application system in many countries is prevented or not recommended due to controlling of dragging is not easy.

Figure 15.1. Pesticide Cycle



iv)Water and pesticides: Water is one of the basic sources and base of life. Clean water is necessary for irrigating and feed animals. Ground waters are basic fresh water sources of the earth. Pesticides may drain into ground water in particular conditions. Pesticides continue to decay when they drain into ground water. But their decaying ratio will be less due to less light, temprature and oxygen. Water courses, rivers and lakes are polluted when ground water is polluted. Refining of ground water is costly and hard.

Chemicals being used for plant and bugs inside or side of water courses may drain into water directly; irrigating soil and plant disinfected; draining chemical industry waste into water courses or slack waters; washing application equipments and empty packages through water sources. Insecticide residues in water can not be usually dissolved, but adsorbed on organic materials, sediments, mud, dissolution wastes and planktons as suspension. Thus, it participates into food chain and gathers at aquatic invertebrates and fishes. Insecticide density of fishes may 1000 – 10000 time more than it has in water. Insecticide adsorbing on planktons and bacterias in water gets the maximum density in fishes.

Crucial steps to prevent pesticides reaching water sources are as follows:

- Considering places where pesticide application is done regarding to ground water and surface waters, knowledge about permeability and deepness of geologic layers among ground water and surface water, considering former wells and water holes,
- Not to prepare pesticides and use around water sources, avoiding dispose of pesticides,
- Making storage of pesticide away from wells, water pools and water sources,
- Knowledge of drain potential of pesticide being used and speicification of soil

v) **Soil and pesticides:** Agricultural pesticides are applied on soil surface or inside of soil, on plant or on seed.

The most of drug applied on plant drops into soil. Crucial problems may be seen in case of pesticide persistency. Probles arising pesticide waste persistency on soil;

- Soil micro organisms are dissolved partly or totally: These micro organisms regulate physical and chemical structure. Ecological balance of soil is deregulated in case of micro organisms are removed from soil.
- They cause deaths of worms which has crucial role to increase fertility of soil
- Products grew in these soil can be problem due to pesticide wastes in those product may reach into humans by foods and animals by feeds.

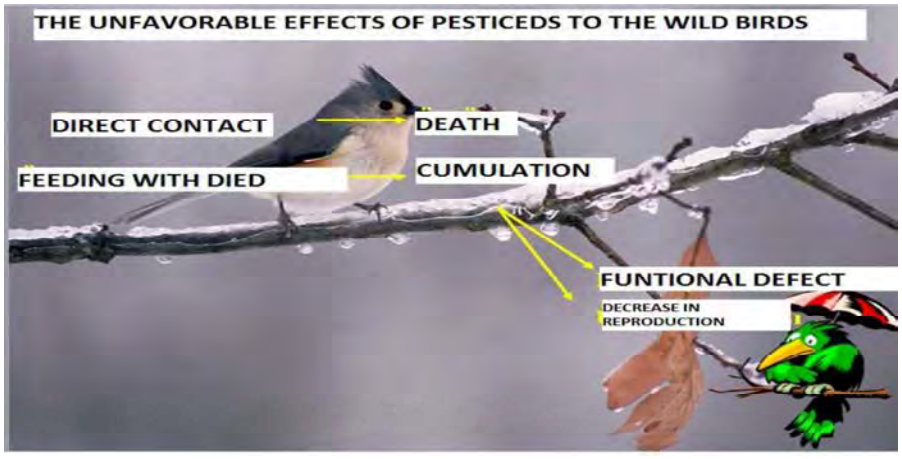
- It may be problem due to pesticides may reach into ground waters by draining into soil or reaches into atmosphere by evaporating.

vi) Effects of pesticides on bees: Some pesticides have mortal effect on bees. Decreasing fertility can be seen on some products because of bees die as bees ara beneficial to inseminate. Problems may be solved as adjusting time to use pestidices, adjusting pesticide time as bees are not effected much (for example before büst out or in midnight), informing apiarists about pestidice and selecting pesticide having less effects on bees.

vii) Effects of pesticides on natural enemies: Parazitoid and predators which are fed by pest on agricultural products and known as beneficial bugs, are damaged because of insensible applying intesticide. Beneficial bugs may prevent pest to damage products in case of necessary number beneficial bugs are provided. Because of this reason, selective chemicals must be selected in case of chemical intesticide is needed.

viii) Effects of pesticides on birds: Pesticides are harmful for birds as much as they are harmful for other lifes. Damage can be occured when direct contact or feeding herbal or food of animal origin affected by drug waste. Intesticides can be carried by wind, water and reached into environment by herbal or animal organisms, thus wild life can be affected.

Pesticides may have chronic effect as well as it has acut effect on wild animals and birds. Chemical waste on tissues, according to amount; may distrup or damage liver, kidney, reproductive organ and other organs as well as it has mortal effect. As result of pesticide cumulation, capability life or reproductive function of life may decrease. The situation is also problem for pets like chicken, turkey, goose which lives around pesticide area. It is said that pesticides have role to endanger life of bald ibis.



Picture 15.1. Effects of Pesticides to the Wild Birds

Wild birds can be poisoned in case of birds having not fatal drug waste are hunted by wild birds. Birds, eating worms or other bugs inside soil, may have drug wastes into their body. Also birds, eating fish, may have drug waste in fishes into their bodies. Seed insecticides have negative effect on birds since they eat seeds.

ix)Effect of pesticide on livestock: Pets are effected by pesticides in several ways. Pesticide wastes on foods are absorbed in intestine. Another infection way is to disinfect animals with insecticides. Pesticides may come into animal body through breathing or leather way. The research results showed that pesticides may come into meat, milk and eggs of livestocks. Humans eating those kind of animals may get pesticides into their body indirectly. Therefore livestocks must be removed infection applying areas and kept away from the area till effect of drug is totally cleaned. Infected animal feeds must be given to animal after a period. During infection application, cribs must be removed from the area under infection or closed well.

Useful links:

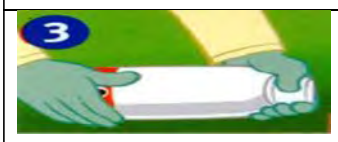
http://ec.europa.eu/food/plant/pesticides_en
http://www.efsa.europa.eu/en/topics/topic/pesticides
http://ec.europa.eu/dgs/health_food-safety/information_sources/docs/plant/factsheet_pesticides_en.pdf
http://ec.europa.eu/environment/chemicals/index_en.htm

15.2 Waste Management

The aim of waste management is to determine general principles to manage without harming human and environment as of their occurrence till disposal. Waste is combined of collecting, transportation, recycling, disposal and every kind of mainanance, inspection, observation and monitoring of areas where waste are disposed.

Empty packages must be removed from all kind of dangerous specifications of physical, chemical or mechanical due to those kind of packages may include all dangerous specifications. In this context, empty pesticides packages may be called as dangerless in condition of applying triple washing system by consumers. Empty pesticides packages used by World Health Organization and United Nation Nutrition and Agricultural Organization are cleaned by triple washing system and called as dangerless waste.

Table 15.1. Triple Washing System

	1- Plant protection product should be drained totally into pulvarizator tank.
	2- Putting water at the rate of ¼ into empty package after plant protecting product is drained totaly.
	3- Shaing for 30 seconds plant protection product package after its lid is closed well.
	4- Water after shaking will be drained into pulvizator tank and repeat the process for three times.
	5- Packages are strored after their lids are closed well after triple washing system is done.

Useful link:

http://ec.europa.eu/eurostat/statistics-explained/index.php/Agri-environmental_indicator_-_pesticide_pollution_of_water

15.3. Soil and Water Conservation

The world is under threat of scarcity and starvation and the most important strategical sources; are soil and water sources. Sustanibility of agricultural production depends on soil and water pollution firstly. Protect-Use balance is crucial for each country's socio-economic conditions and it is very hard duty in frame of specially using our main natural sources under protection and sustainable development.

Soley, unfortunately agricultural pollutive materials, industry wastes, home-made wastes and unplanned water usage, exceed in usage are making hard to protect current sources and sustainable solutions of eco-system.

There was no soil pollution as well as existence of other pollutions due to insufficient power and energy sources used in previous centuries, less population, undeveloped industry. Soil pollution begans to increase as fast population increase, fast developing technology and industry at agriculture and other fields specialy in the mid of 20 century. Soil pollution is getting one of the most serious environment problem day by day.

Preventing environment pollution and protecting sources in agriculture sector is one of the crucial subjects getting serious day by day. It should be considered that unconscious irrigating and fertilizing are most important factors increase in salt level in soil and decreasing soil quality and protection of natural sources.

i)Soil conservation: Soil is a scarce source which occures in long times but can be lost in short time, can not be substituted, unique, necessary for life and valuable and productive only in where it occures.

Factors causing soil pollution are home-made waste and sewags, industrial wastes which disposed into soil without refinement, inconsicous using of agricultural treatment drugs and artificial fertilises, acid rains, destruction of forestsin inconsicous using of forage and lableland and cadge. These factors are briefly explained as follows:

- **Stubble burning:** Damages of stubble burning; temperature on 3cm thickness of soil surface may increase up to 750C during stubble burnign. 70% of lifes can be damaged on and in soil. As result of organic materials can not be turned into humus. Physical, chemical and biological specification of soil are damaged. Fertility decreases.
- **Erosion:** The soils are lost due to "Erosion". Serial artificial effect done by human being as well as natural erosion occured as result of interaction of land slope, weather condition, plant cover and soil specification make erosion kind of disaster.

ii)Water conservation*:* Water is vitally important for lifes. Water sustain all biological life from minimum micro-organism to the biggest life and all human activities. Because of fast increasing population as well as water sources remain stable, need for water increase day by day. 70% of earth is covered by water. 98% of the ratio is composed of oceans and inland seas, it is not suitable for drinking and industrial usage due to salt ratio of water. Almost 0.3% of water on earth can be usable and drinkable. 80 countries including 40% of world population are under water-scarce.

Serious problems arise due to issues like increasing world population, climate change depends on global warming and distribution of water on earth and using type of water. Productive using and protecting scarce clean water source is vitally important. Protecting water means protecting ground water as well as surface waters. Pollution occurence on earth may pollute ground water through leaking in lands or pollute surface waters directly and cause decreasing water quality.

Factors causing water pollution are:

- Waste of industrial institutions
- Increasing pollution and insufficient infrastructure
- Pesticides, fertilisers
- Acid rains,
- Home-made wastes.

Agricultural fertilisers pollute water sources. Agricultural organic fertilisers, animal fertilisers and water solutions of those fertilisers, waste waters arising due to cleaning dairy farms, mushroom compostes and chemical fertilisers including nitrogen arise as main polluters in case of mis-use.

Excessive animal fertiliser or insuitable animal fertiliser applicantions are the main reason of euthrophication occurence on surface waters. Euthrophication arise from phosphor added into water systems. Nitre leaks arising from animal fertilisers application on lands causes pollution of ground water.

Draining compound of nitrogen based on agriculture into life sources, water products, water eco-systems and other legal water usage directly or indirectly pollutes water. The best way to prevent organic and chemical fertilisers becoming pollutive factor is to apply banning period to use. The most important ones are to determine banning period of agricultural and chemical fertilisers.

15.4.Good Agricultural Practices (GAP)

Good agricultural application; making agricultural production system livable in terms of social life, profitable and productive in terms of economy, protecting human life, useful for animal life and welfare, friendly for environment, protecting natural sources, monitoring agriculture and making agriculture sustainable for food security. General Rules of Good Agricultural Practices (GAP) are given below:

i) Risk assessment must be applied while taking decision: GAP cover all production and marketing process from field to fork. Previous food planted or agricultural activity must be known before taking decision, effects for human life and environment has to be observed, in case of risks out of control then those informations must be used for good agricultural applications.

Producers must assest risks before taking decision about production. Risk Assessment has to be done by considering land type, erosion, ground water level and quality, existence of sustainable water sources, the first time using of land, contaminated of parasite and parasiticals and effects on combined lands. Alternate production must be done for protecting land health, decreasing addictiveness on agricultural pesticides and providing maximum level of plant health.

ii) Authorizations must be applied before production begins: The first process to do as soon as decision taken about performing GAP is to apply authorization who are auhorized about GAP and take process under record.

Monitoring, recording are obligatory for certification of products: All process during production has to be recorded by farmers and to be kept for all further controls. In this records; product range, geographic region where product is planted, fertiliser appliation period, application reason, technical permission, commercial name and amount of chemical used, application equipment, name of operatör and how many days are required for harvesting, irrigation time, method and amounts must be included.

iii)Basic matters to be considered about production

- Techniques must be used for ploughing land, decreasing erosion and protecting physical structure of land.
- Types selected must free of virus, disease and must be durable against diseases.
- Quality seed, seedling, bush must be used.
- At least one time land analyze must be done for using fertiliser at the suitable time and suitable amount, leaf analyze must be done in case of need. Fertilising must be done through suitable amount and at the suitable fertilise type according to land structure.
- Irrigating, fertilising, disinfection, pesticide using and all other applications must be recorded.
- Water sources should be evaluated at the best way and water need of plant should be determined and water systems must be built. Waste water channels (sewage) must not be used for irrigation. As considering basis of risk assessments; irrigation water sources must be analyzed in terms of microbial, chemical and mineral pollutive materials at least one time in a year.

- Cultural measures, mechanical control, biological contol or biotechnical measures must be applied in terms of “integrated control technical directions” for disease and particles. The last application must be chemical control.
- All pesticide application records must be kept. Interval of pesticide ruins analyzes must be done according to risk assessments. There must be a emergency action plant in case of exceeding maximum ruins limits.
- Waste products and pollutive sources must determined in company. All probable waste products in agricultural company (paper, cartoon, plastic, product ruins, oil, rock wool and etc.) and probable pollutive sources (chemicals, oil, fuel, voice, light ruins, package ruins) must be determined.
- Harvest must be done in hygienic environment.
- Staff using, carrying and applying agricultural chemicals must be trained; there must be staff knows first aid rules.

The product is certificated with GAP Certifiate by institutions which are authorized. Products produced under good agriculture product are safe products which should be consumed by consumers. Do not forget that GAP Certificate will be your product’s brand.

Consumers want to know all process from field to fork. There is a concept arising from this requirement that effects all agriculture and export sector. The concept including minimum agricultural production criteria is good agricultural applications. Retailers dominating crucial part of fresh vegetable and fruit market in Europe are gathered under EUREP in 1997 for fresh vegetable and fruits they provide through aiming to minimize risks threathing human life. They created EUREGAP standards which is basis of good agricultural applications. EUREGAP standards was adopted by all World countries and called as GLOBALGAP as soon as it was revised.

GAP composed of all process of certificated agricultural product before planting to fork. Also; it covers food security, animal welfare, environment protection and worker health and security. Products having good agriculture practice certificate; assures that products do not have chemical, physical and microbacterial ruins. The products are produced without any effect polluting environment and natural balance; human, workers and other lifes are not effected negatively; and products are produced comply with agricultural regulations of countries where it is produced.

Additional Links:

http://www.eea.europa.eu/soer/synthesis/synthesis/chapter5.xhtml#anchor-54-anchor

http://www.efsa.europa.eu/en/topics/topic/beehealth

http://ec.europa.eu/eurostat/statistics-explained/index.php/Agri- environmental_indicator_-_population_trends_of_farmland_birds

http://ec.europa.eu/environment/nature/legislation/birdsdirective/index_en.htm

http://ec.europa.eu/environment/nature/conservation/wildbirds/index_en.htm

http://cordis.europa.eu/project/rcn/98869_en.html

Organic Farming in the EU:

https://ec.europa.eu/agriculture/organic/index_en

Common agricultural policy (CAP):

https://ec.europa.eu/agriculture/cap-overview_en

http://eurlex.europa.eu/summary/chapter/agriculture.html?root_default=SUM_1_CODED=03

EU Science Hub for Agriculture (The European Commission's science and knowledge service):

https://ec.europa.eu/jrc/en/science-area/agriculture-and-food-security

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"Funded by the Erasmus+ Program of the European Union. However, European Commission and Turkish National Agency cannot be held responsible for any use which may be made of the information contained therein".