

STUDY

**ON SUSTAINABLE DEVELOPMENT
OF ORGANIC FARMING IN THE EAST
PLANNING REGION**

Stip, October 2010

Proposing party: Council for Development of East Planning Region
Decision no. 0201-2351/1 of 03.09.2009

Ordering party: Council for Development of East Planning Region
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Printing: 2 Avgust, Stip

Financed by: Center for Development of East Planning Region
Decision for allocation of funds for equal regional development in 2008,
Government of The Republic of Macedonia no. 19-6969 of 23.12.2008
(Official Gazette of The Republic of Macedonia 162/2008)

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Foreword

By the end of the 50's of the XX-th century researches throughout the world managed to connect the raising numbers of malignant tumors to the extensive and uncontrolled use of synthetic pesticides. Ever since consumers throughout the world turned to use food produced without the use of such harmful inputs and the number of population that enjoys this food is on a constant grow.

Organic production in The Republic of Macedonia does not have strong tradition as the first Law has been adopted by the National Assembly in 2004 and since then several activities were taken so organic agriculture could reach its potential. On the other hand traditional way of farming was never abandoned for the sake of the intensive one, hence leading to a conclusion that the pesticide residues level in the soil and plants are relatively low. This opens the possibility for swift conversion of the areas which could be proven as residues-free. Such possibility leads to the opportunities for improved economic farm performance and reduced poverty in remote areas.

Strategic development documents are a part which could speed-up the development of certain specific production, region or national development. Work on their design requires a team of high professionals with vast knowledge in the area of their expertise. In order to have applicable document they would need to hold knowledge on what is happening in real life, out of the cabinet walls.

Through the phases that contributed to the document format in front of you Goce Delchev University experts' team worked to their utmost capabilities in order any possibility that could lead to improved and sustainable use of natural resources was taken under consideration. The documents gives directions for further research activities, development of action plans and by our opinion is an excellent resource for possible investment activities.

Yours truly,
Proff. Sasa MITREV, Ph.D
Team leader



Introduction

In order to understand the organic farming and the principles that it is based on, it is necessary to acquire knowledge about the location of the common farming nowadays in the first place. For example, which postulates it considers important, on which principles is it based and which goals it strives to achieve.

Only after the principles and goals are comprehended, the understanding of the basics of organic farming can begin. If common farming uses “tools” as synthetic pesticides and artificial manure, which can “fix” almost everything, that doesn’t happen in the organic farming. Therefore, at the beginning of each production, a whole series of researching activities have to be performed before planning any kind of production. The researching activities consist of providing meteorological data for longer period of time, insight into the agricultural practice of the local population, detailed introduction into the types of soil, hydrology of surface and ground water. All of this is in order to avoid the risk to invest significant financial assets, and later to “realize” that there are too many problems which couldn’t be resolved with the principles on which the farming is based.

Therefore, the people that deal with this kind of farming have to understand several scientific disciplines, in short “to be masters of the profession”. For example, what if a farm that practices common farming is faced with attack of some pests? It will easily resolve the problem with insecticide, which is not the case with the farm that organizes organic farming. The second one have to envisage the problems that could arise in due time, have to organize crop rotation in accordance with the natural climate and pedological conditions, and moreover

everything to be according to the market needs and opportunities.

The beginnings of the organic farming in the western countries are marked with the activity of Sir Albert Howard from England, who began the development of “Method of organic farming” at the beginning of XX century in India.

In the same period, Rudolph Steiner and the student Erenfried Pfeiffer worked on the development on so-called “Biodynamic” method of production, which begins with the supposition that the soil is a living matter that has to be renewed in a natural (organic) way. During the World War II, Jerome Rodale started with experimental application of these methods, while in England, in 1946, the Association for examination and obtaining methods’ information applied in organic farming (Soil Association) was founded. From than on, that Association is a leader in introduction of standards, providing training and promoting organic farming.

On the other side of the world, the Asia’s experiences are closely related to the term “macrobiotics”, “natural production”, “Teikei food system” as well as Chinese medicine. In the beginning of 1929, George Oshawa, the founder of the “Macrobiotic principle”, started a campaign in order to promote a diet using products obtained by this method of production. Interestingly, Oshawa spent his childhood suffering from many illnesses and practiced “simple diet” known as “Shoky-yo” promoted by certain Sagen Ishuzuka at that time. Following the stated guidelines for diet, Oshawa succeeded in complete recuperation. He started a journey afterwards, comprised of 30 countries and more that 7000 lectures on “Macrobiotic principles”, and therefore he began a

promotion of food obtained by the principles of organic farming.

However, the real breakthrough in organic farming is designated with the publication of the Rachel Carson's book in 1962, which lists the risks out of the food produced with application of pesticides for the first time. This book started waking up the awareness of the people and the producers as well, and therefore they began a pursuit for safer methods of production.

With the growth of food demand produced in accordance with these principles, the need for institution/organization that controls the process of production and guarantees that each product is obtained in accordance with previously established rules is growing as well. The practice for simple shaking hands when concluding a contract between the producer and entrepreneur is widely known in Japan and is still a very significant segment of the society (personal acquaintance of the two subjects in the chain of production and sale), but its not sufficient for the markets from the rest of the world.

The certification, a process which is based on establishment of adopted standards, is the thing that replaces handshake between the producer and the entrepreneur in time. Respecting widely accepted standards is confirmed by an annual inspection (more frequent in certain cases) of the producers by inspection bodies.

Furthermore, it is important to point out that the meaning of the organic farming cannot be understood as returning to the old one, returning to the farming that was applied by our grandfathers. On the contrary, the organic farming represents a part of the modern agronomic knowledge for food production. Its trade is based on new knowledge and accomplishments in the agronomic practice and science.

The basics of the organic farming are consisted of:

Preserving the soil fertility through:

1. Cultivation of biological nitrogen fixing bacteria – forage legumes;
2. Green manure – sideration;
3. Use of stable manure, compost, lumbri humus etc.;
4. Use of biological substance preparation;
5. Rational method of soil cultivation;
6. Biological prevention from diseases, pests and weeds.

The answer of the question on how to redirect the agricultural producers towards organic method of management should be sought in the establishment of several indicators of the actual state of economy:

- 1. Natural characteristics of the property**
 - climate, soil, latitude and altitude above sea level, relief, the slope of the field;
- 2. Structural characteristics of the economy**
 - the size of the plot, infrastructure, mechanization, sowing structure, livestock possession;
- 3. Organizational characteristics**
 - method of management, livestock nutrition, crop rotation, labor force, distribution of products;
- 4. Socio-economic characteristics**
 - prices, expenses, realized profit, advisory opportunities, approach to information, credits, hierarchy, surrounding-neighbors;
- 5. Aesthetic characteristics**
 - buildings' order, economy, aesthetic approach, diversity of landscape – forests, water areas, hedges, ornamentals.

Recommendations and directions for development of agronomy, animal husbandry, gardening, viniculture and pomiculture according to the organic farming criteria in the East planning region are determined by many subjective and objective factors:

- soil-climate conditions, quality of soil above all (the most important thing is to analyze the potential presence of heavy metals and pesticides residues in the soil), average amount of annual rainfalls, minimal and maximal annual temperature, average number of sunny days in the year, frequency, direction and intensity of wind, duration of frost-free period;
- orthographic characteristics, as altitude above sea level, slope and exposition of the field, erosive processes, presence of watercourses and water resources;
- existence of irrigation systems and sources, road infrastructure, proximity of markets for agricultural products, conditions for providing and using professional and technical assistance as well as education on the standards of organic agriculture.

Proper understanding and foreseeing the perspectives of the organic agricultural products by producers is necessary in order to perceive the potential gains, opportunities, problems and blockades of the paths towards accomplishing their goals: successful accomplishing of organic farming and distribution of the products obtained.

The common agricultural practice that is implemented by farmers from extended parts when organizing their own production is not very different from the acknowledged principles of the organic farming.

By presenting their perspective to the producers of organic food, they would be enabled to understand the potential growth and sustainability of production and supply with organic food.

We hope that the preparation of this study will give great contribution to accomplishment of strategic goals envisaged

in the National strategy and Action plan for organic agriculture of the Republic Macedonia 2008-2011 where the part for agricultural production envisages:

1. To increase the areas of soil and the number of animals in the organic farming;
2. To increase the fields for collecting volunteer plants and fruits;
3. To produce sufficient amounts and sufficient choice of different organic products;
4. To improve the availability of the inputs allowed in the organic agriculture.

The fact that the convenient agro ecological conditions in the East planning region, regarding clean environment with number of unpolluted arable agricultural areas and pastures are not sufficiently utilized is undeniable. Huge part of the agricultural areas, pasture lands and meadows are not utilized at all, the livestock is noting total decreasing and restructuring, the price of livestock feed for import contributes to reduced competitiveness of the conventional domestic producers of livestock feed, milk and meat to greater extent. Therefore we understand the opportunity to increase the competitiveness of the products through redirecting the production in accordance with the principles of organic farming.

On agricultural areas and livestock farms in the East planning region, the traditional and recognizable agronomic products and types of livestock have always been cultivated. In order to provide sufficient amount of food, the farmers dispose of unpolluted areas, certain knowledge and tradition for cultivation of some agronomic crops that have been cultivated here for many centuries. The old varieties are adapted well, resistant to many diseases and give stable yield even in bad conditions.

One of the many goals of this part of the study is to give orientation – direction, suggestions and recommendations to the producers for the types of crops and livestock that are adequate for this region and for the suggested method of production. Besides the traditional crops and livestock breeds, our suggestions shall include other alternative crops as well, which are appropriate for the organic method of agricultural production and which are cultivated well in world's regions with similar agro-climatic characteristics. The specifics for cultivation of certain crops in accordance with the organic production criteria shall be explained as well.

Some of the reasons for producers' hesitation in the decision for starting organic method of agricultural production are the following:

- uncertainty of the organic systems' profitability ;
- increased living labor force that could be sought by the organic systems;
- lower yield in comparison with the conventional methods of production;
- difficulties in finding markets for organic products.

Published data for completed scientific and professional analyses on profitability, sustainability and obtained yield of organic agricultural practices are rear in Macedonia, while in the countries where the organic production is more developed there are scientific proven results for sustainability and profitability of organic production.

According to the results obtained by organic farms in England, depending on the soil's fertility, climate conditions, education of producers, organization and type of production, there is notification of farms with yield and profit that is equal to the conventional methods, and in some cases even bigger.

Table 1 lists the production results of one farm in Haughley, Suffolk, England (Soil Association ten years average) divided into three technological units (organic, agronomic-farming and agronomic), and it is chosen because it didn't received subsidies and donation during the analyzed period.

Table 1 comparative results of the yield of agricultural holdings that use conventional and organic agriculture

Production of milk: (non-selected herd)	Annual/ Cow (l)	% milk -fat	% dry matter
Organic cultivation	2.840	4,58	13,71
Conventional cultivation	2.620	4,96	14,23
Production of eggs:	Annual/chicken		
Average of chicken eggs	Organic cultivation: 157		Conventional cultivation: 157
Grain yield (t/ha)	ORGANIC FARM	ARABLE CROPS & ANIMAL HUSBANDRY FARM (NPK+stable manure+pesticides)	ARABLE CROPS FARM
CROP	(only organic manure)		NPK+plough in plant residues+pesticides
Wheat	2,8	3,3	3,0
Oat	2,9	3,0	-
Spring barley	2,5	2,7	2,8
Autumn barley	3,5	3,4	4,0
Bean	1,45	1,33	2,0

Study on sustainable development of organic farming in the East planning region

According to the stated example we can conclude that yields from farming and agronomic products are approximately equal and really attainable in comparison with the organic and conventional production. In

certain territories of the region (Kochani, Vinitsa), with more fertile soil and more wet region are surely expected greater yields than stated.

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Executive summary

The study on the development of organic farming in the East planning region is a logical result of the activities for the development of agriculture in the East planning region. According to the decision of the state to support the equal regional development¹, many strategic documents are elaborated that shall contribute to its acceleration. In accordance with that decision, medium-term planning document was adopted, that establishes the medium-term goals of the regional development of this Planning region. The programme was preliminary elaborated in 2007-2008 in order to start its adaptation in the beginning of 2010 in accordance with the Rulebook on methodology for elaboration of planning documentation for regional development. With the series of strategic documentation, the adjustment of desires of the population for development in the planning regional is enabled, together with the opportunities of the country, but the elaboration of mutual projects is enabled as well that can be supported by external donators. However, in order to receive that kind of opportunity, it is necessary to precisely define the medium-term goals and priorities, which is the primary goal of that document for development. Its second part consists of SWOT analyses of the sectors that should have priority in receiving support for this planning region, in order to encourage the development of the region and to improve the conditions for living of the population.

The elaboration of the Study on sustainable development of the East planning region, regardless of the scientific approach and methodology of work, is performed in accordance with the generally accepted principles of:

- **Elaboration in accordance with bottom-up principle** - Besides the obvious participation of the scientific component in the Study elaboration, the biggest contribution to defining the areas with specifications for organic farming belongs to farmers and municipalities. Through the two workshops performed for defining the problems that farmers are faced with in the organization of the agricultural production and the goals diagram that shall contribute to its development, and through the polls performed in 983 agricultural holdings of the region, the danger that this document can become an office product and inapplicable to greater extent could be avoided.

- **Joint ownership and direct participation of those that this Study refers to.** The entire process of documentation elaboration, from beginning to submitting to the customer, consists of many factors that participate in the regional development on one way or another. Of course, the goal of this procedure is the following: direct users to get the feeling of managing the development of the documentation, because on top of everything, the documentation is elaborated for the needs of those users.

- **Transparency**, a moment acquired through forehanded delivery of invitations for participation in the above mentioned workshops and reports submitted to the customer and the Council of the region. By application of series of procedures, all participants have insight into all the phases of documentation development within the entire process of Study elaboration.

- **Partnership with the central government** - although the decentralization of the society implies transmission of

¹ Law on Equal Regional Development (Official Gazette Nr. 63/2007)

the competences from the central to the municipal government, there are areas that require mutual adjustment. Considering that the development of agriculture is an important economy branch of the state, and it makes considerable foreign exchange earnings, the Ministry of agriculture, forestry and water management, with its Department for organic farming was actively involved in the entire process of elaboration of this significant document.

- **Coordination of all groups** - the process of activities planning had envisaged tools for overcoming the danger of overlapping the activities and unnecessary lost of time. There was sufficient time for conversation, training for performing the activities and analysis of the results from the undertaken activities with all participants in the procedure that represented their own group.

- **Observing the obtained results and their statistical processing** – all data, documents, knowledge that the team acquired during the elaboration of the document were observed and adjusted in details regarding the sustainability, importance, priority and last but not least – application.

The world organic farming marks a positive growth. From the moment of discovering that the increased proportion of malignant diseases of people is the result of synthesized chemicals that are used for plant protection, the number of people that opt for food that is produced on the basis of the principles of organic farming is growing. Considering the intensive efforts of some municipalities, the potentials of this region to emphasize the clean environment and the potential for tourist destination, the need for providing quality source of food is necessarily imposed. No wonders, if we have in mind the fact that agriculture, animal

husbandry, forestry and collecting volunteer and medicinal plants are ones of the most important economic characteristics of this region.

On the basis of the adopted Programme on development of the East planning region, the Centre for development of East planning region, in its action plan of 2009, has envisaged many priorities including the development of tourism and cultural heritage, agriculture and rural development, human resources and protection of the environment and the renewable sources of energy, that clearly proves the determination of the Regional Council to support the activities that shall contribute to improvement of living conditions and shall make this region more attractive place for living and stay.

In the elaboration of the Study on sustainable organic farming in the East planning region, all studies and other documents are used, which are important for the development of the organic farming on international, national, regional and municipal level. A complete analysis of all moments that can make contribution and those that can slow down the organic farming is performed. A huge number of scenarios and crops are analyzed that can be cultivated in accordance with the principles of organic farming, related to the traditionalism, because one of the basic principle of this production is the relying on the diversity, biological variety and autochthonous plant and animal types. Demographic and sociological analysis is carried out, considering the fact that organic farming requires skills related to the knowledge of biology of the crop that is being cultivated, the cycle of diseases development, pests and weeds and the running of detailed data on everything that takes place in the agricultural holding.

Besides the elements that are in favor of the development, there are elements in the opposite direction, identified as Lower level of knowledge of principles on organic farming, Absence of quality seed and planting material, Undeveloped system of information transmission, Lack of cooperation of the participants, Absence of analyses and data on pedological, climatic and hydrological conditions of the region. On the basis of these elements, several pillars are suggested that support the sustainable development of organic farming:

1. Construction of system for improvement of the knowledge of participants in the organic farming;
2. Elaboration of studies and carrying out researches on the pasture capacities, water quality, pedological characteristics of the region, in order to increase the volume of production;
3. Connecting the producers in horizontal line;
4. Promoting the region as environment where healthy food is being produced;
5. Encouraging joint performance and creating recognizable products from the region.

2. Project region

The East planning region is established in accordance with the Law on equal regional development² in May 2008, and it's one of the eight units of NUTS (Nomenclature of units for territorial statistics) third level,

approved by the act from the Government of Republic of Macedonia for establishment of Nomenclature of territorial units for statistics.

The region includes 11 municipalities: Berovo, Vinica, Delcevo, Zrnovci, Karbinci, Kocani, Makedonska Kamenica, Pehcevo, Probistip, Cesinovo-Oblesevo and Stip, it is spread in the territory of 3.537 km², i.e. it covers 14% from the territory of the Republic of Macedonia, and its population amounts 181.858 inhabitants. 217 settlements are registered in this region, 297 from them are characterized as rural settlements. The population density amounts 51 inhabitants/km², but as a result of the permanent process of depopulation, the number of depopulated villages, villages with 100 inhabitants and villages with expressional ageing index is high. This condition leads to concentration of about 66% from the population in the urban settlements. This region has approximately 4 times lesser population growth in comparison with the population growth of the country.

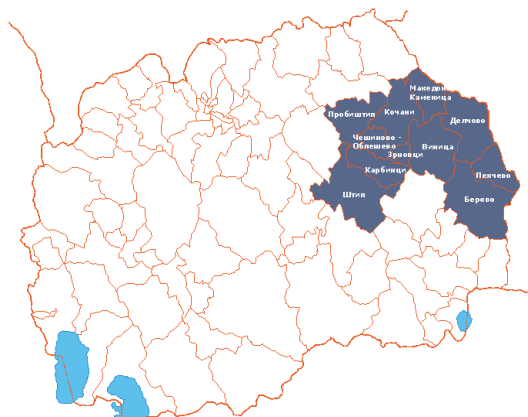


Image Nr. 1, Position of the East planning region

² Official gazette of the Republic of Macedonia Nr. 63/2007

The region borders with the Republic of Bulgaria in the East, where it established open communication for road traffic through the border crossing in Delcevo. Besides the established infrastructure network by Republic of Macedonia, the border crossing Klepalo in Berovo is still far from usage as a result of the total disinterest of Bulgaria for putting this border crossing in operation. The west side borders with Vardar statistical region, the south-east and north side borders with North-east planning region.

Geographically, this region is composed of several subregions:

Malesevo valley

It is located in the upper flow of the river Bregalnica, and it has 700-1140 m altitude above sea level. It is fenced with Malesevski mountain on the east (Kadiica 1932 m, Cengino field 1744 m and Trebolija) that separate the valley of Struma and they are natural obstacle to the breakout of the warm air from Aegean Sea. On the south and partially on the south-east, the massif of Ograzden is spread with 1801 m altitude above sea level. Ograzden separates Malesh from Strumicko field. On the west is Plackovica and Obozna that separate Malesh from Radovisko and Kocansko fields. It can be said that it is half-open. From relief point of view we can make difference between 4 formations: Mountain part that consists of above mentioned mountains and that contains all rivers' springs of that area as well.

Hill part that is mostly a continuation of the mountain part. It is cut with many swollen rivers that flow into Bregalnica.

Downhill part that is spread into small area, it is mostly consisted of alluvial cones from the previous two parts. This part is formed from the local rivers Smojmirska, Umlenska, Robovska, Vladimirska and Golem dol.

Plain part, which is located by the river Bregalnica and it is in form of panhandle with acvial layers.

Kocani valley

It is located in the east part of Macedonia, in the middle drainage-basin of the river Bregalnica, between the mountains Plackovica in the south and Osogovo in the north. East of the valley, the Malesevo and Pijanec are located, that are separated from Kocanska Valley with the moderately high mountains Golak and Obozna, on the west is Kratovsko-Zletovska area, whose border is the low, but long Rajcanski Hill, than Ovce Pole and Stip area that are separated from Kocani area with the hill Sarenkovec, Stateska on the river Bregalnica, by the village Krupiste. Kocanska valley has an area of 1.020km² and it is fenced with mountain massifs in the south, east and north and with low volcanic cones in the west. It is spread in the both sides of river Bregalnica from west –southwest to east-northeast in the length of 26 km. The bottom of the Valley, i.e. its plain part has an area of 115 km². Its lowest point is on the west part where the Zletovska River flows into Bregalnica, with 290 m altitude above sea level. Going to the east and following the flow of river Bregalnica, the plain gradually elevates, and in the place where the river Osojnica flows into Bregalnica, its altitude is 330 m above sea level.

The difference between the lowest and the highest point of the field is 40 m. There are individual parts of the valley with their own names, like Kocansko field-the middle part of the valley, just Kocansko - the southeast part as well as Vinicko, and the west part is Zletovica. The territory around bigger villages is named after the villages as Orizarsko, Istibanjsko, Zrnovsko, Oblesevsko etc.

The territory of municipality of Kocani is spread in the north part of the Kocanska Valley, precisely from the alluvial valley of Bregalnica to the highest points of Osogovo. It is morphologically diverse, i.e. it is consisted of field part, hill terrain is a significant component and mountain area as well. It covers an area of 255 km² and it borders

with 9 neighboring municipalities like Orizari and Makedonska Kamenica in the east, Kriva Palanka in the north, Kratovo, Zletovo, Cesinovo and Oblesovo in the west, Zrnovci in the south and Vinica in the southeast.

Broadly speaking, Kocansko covers an area of 577,6 km², with 44 settlements and 50.029 inhabitants.

The geographical location of the valley is good, regarding the fact that here passes the very important magistral road M-5 that starts from Ohrid, goes through Bitola-Prilep-Veles-Stip and Kocani to Delcevo and then to Blagoevgrad in our neighbor Bulgaria.

On the southeast, there is a quality road to Vinica as well, whose roadbed continues to Berovo.

In the years after Macedonia was liberated, the agriculture was extensive and produced exclusively for personal needs, there was no surplus for the market. In the primitive production, the main tools were the ploughshare and oxcart (rarely harness), while all other operations from sowing to collecting the harvest were performed manually and the yields were insecure and low.

For illustration we could mention that according to Babamov, as a result of this manner of production, the rice yields were from 2.000 to 2.200 kg/ha, and the maize and wheat yields were from 1.100-1.200 kg/ha. In the same period in Italy and Spain, the average yield of rice was 6.300 kg/ha and the average yield of wheat was 3.200 - 3.500 kg/ha.

3. Analysis of the constant condition

The total area of the Republic of Macedonia is 25.713 km². The relief is mostly consisted of mountains with a high number of valleys. The mountainous land amounts approximately 80% from the total area of Macedonia, while the plains are around 19% and the natural lakes cover around 2 %.

The soil structure is mostly diverse (over 30 soil types), as a result of different natural conditions under which the soils were created (topography, climate, flora, geological formations and anthropogenic factors).

Probistisko-Zletovski subregion

It is the penultimate of the subregions that compose this planning region. It begins with the flow of Zletovska river into the river Bregalnica and ends with the flow of Bregalnica into the river Vardar, therefore dividing this subregion into two parts: Lakaviski and Ovcepoliski.

The part that belongs to the municipality of Probistip has a different relief. The Osogovski massif continues there from the east, it merges with that part of the massif

that belongs to the municipality of Kocani, on the north it borders the municipality of Kratovo from the Northeast planning region, and on the west are the down hills of Ovce Pole located.

According to the last census in 2002, the municipality of Probistip has 16.193 inhabitants, with 4 urban and 33 rural settlements. The total area of the Municipality covers 325,6 km², and the arable lands cover 11.381 ha, i.e. 36,29% of its area. The arable lands start with the village Buciste, with 400 m altitude above sea level, and go to Zelenigrad with 1130m altitude above sea level. With total 12.199 ha of pastures, the municipality disposes of excellent potential for development of organic animal husbandry, especially regarding the fact that there are 33 waterers, that make it easy to water the livestock during long and hot summer months. According to the data from the municipality, the population in the rural areas disposes of 2.435 heads of big and 17.847 heads of small livestock, 16.308 of those are sheep and 1.539 of those are goats.

Regarding the climate this area is located in the south part of the North temperate zone, where the influence of the Mediterranean climate can be felt (Kocanska Valley and Ovce Pole) and the Osogovski massif where mountain climate dominates. This geographic position determines its climate with elements of temperate continental, altered Mediterranean and mountainous climate.

The first region encompasses the Zlatovsko area of Zletovo i.e. Zletovsko field. With the Valley of Zletovska River, this field is open to Mediterranean influences.

The second climatic region covers the territory between the north of Zletovo to the highest mountain peaks of the area. The mountain area is characterized by cool summer, cold spring and autumn, freezing and snowy winter.

The average annual temperature of the air is around 13°C, while the average temperature in winter months is between 1 to 30°C, and in summer months between 21 to 25°C.

The amount of annual rainfalls is around 600-650 mm.

As we can conclude from the previous analysis, the basic characteristics of the climate in this region, i.e. in Zletovsko field are the following: the winter is not very cold, it doesn't last long; snowfalls are rare, and even if the snow falls, it melts quickly and therefore this period is characterized by green grass.

The spring is temperately hot and less rainy than winter, while the summers are hot and dry, and as a result of the mountain climate, the nights and mornings are cool.

The autumn is long, temperately hot and rather rainy. The vegetation period is rather long and lasts about 10 months, and therefore this climatic characteristics make this region convenient for cultivation of crops, not only in the temperate but in the subtropical climatic zone as well.

Stip subregion

It is the last of the subregions that compose the East planning region. It is administrative centre of the planning region with around 47.798 inhabitants. 42.625 are settled in the town and 5.173 people live in the 34 rural settlements. The municipality of Stip covers 893 km². Regarding the infrastructure the town disposes of 4 primary and 2 regional schools, 5 high schools and 1 University – “Goce Delcev” composed of 13 faculties and one higher school.

The municipality is spread into the lower drainage basin of the river Bregalnica and it borders with several municipalities: Radovis, Konce, Negotino, Gradsko, Lozovo, Sveti Nikole, Probistip and Karbinici.

Stip has principally mountainous and hilly position. It characterizes with temperate-continental climate, with influences of altered Mediterranean climate in certain parts (within the flow of the river Bregalnica). The average annual temperature is 12,9 °C. The highest temperatures are measured in August, and the lowest in January. The wind is a symbol of this town. According to the Hydro-meteorological Directorate, out of 365 days in the years, 270 are days with turbulences in Stip, which mostly contributes to clean air. In the last few years, many international companies have shown interest for utilization of the wind through construction of windmills for production of electrical energy.

Close to Stip, and mostly as a part of municipality of Karbinici, the mountain Plackovica is located. With its pure and unpolluted environment, it is an ideal place for development of mountain tourism. The highest peak of Plackovica is Lisec (1754 m altitude above sea level), which represents a challenge for many mountaineers. This is the reason why Stip has a mountaineering association “Lisec”, and the most common road to access the mountain starts right from Stip. Via the Mountain house Vrteska you can go to higher position, to the monastery of St. Gjorgi.

Plackovica belongs to the order of old fold mountains. The composition of the terrain is usually of granite with crystal schist and younger eruptive rocks. The mountain has a rich flora and fauna with several species that live only here. There are three beautiful canyons in the boson of the mountain: Kamnik, Kozjak and Zrnovska where the wonderful natural beauties like rivers, waterfalls, passes, and high cliffs are located. For many people, the canyon Kamnik, represents a small Colorado, with its beauties. All canyons are provided with necessary infrastructure for easy access (markings, billboards, landmarks, cables, ferrets and resting spots).

One of the many beauties of Plackovica are the caves, five of them are examined and are accessible to the visitors. The biggest of them is the Big cave, with 600 m length that is examined. It represents a real pearl with its cave ornaments and a real challenge for the speleologists. The caves: Kjup, Ajducka, Urtel and Ponor are smaller, but rich with cave ornaments as well, and they are easily accessible for the visitors through marked paths.

According to the last census in 2002, a half of the Macedonia area, precisely 1,2

million ha is agricultural land, 527.000 ha (44%) out of it is arable land and 704.000 ha (56%) are permanent pastures. Plateaus and mountains under forest compose 37% of the total area. Regarding the number of the population, it amounts around 2 million, 650.000 of it live in households. The density of the population is 79 inhabitants/km², which is almost a half less than the European average of 115 inhabitants/km². The arrangement of the urban population is rather inconvenient, regarding the fact that over 600.000 inhabitants (around 23%) live in the capital Skopje.

We can distinguish eight climate-vegetation-soil regions with heterogenic climatic, soil and plant characteristics³.

In accordance with the Nomenclature of units for territorial statistics (NUTS) of the Republic of Macedonia, it is classified in the group EU NUTS I and II and it is divided in 8 Statistic regions⁴, and the East planning region is among them. Furthermore, according to the classification of EU NUTS IV, the country is divided into 34 groups of municipalities (that correspond to areas, regions), i.e. in accordance with EU NUTS V it is divided in 84 municipalities and the city of Skopje.

3.1 Agriculture and economics Labor force in agriculture

The agriculture is traditionally one of the most important sectors of the economy and plays the main role in successful implementation of the structural reforms of the country, and it enables food and incomes of the population as well.

During the period of 2003-2009, around 20% of the active working age population in Macedonia was employed in the agricultural sector. In 2009, the percentage was 18,5% and this significant participation of the labor

force in agriculture represents the agricultural character of the country. Around 114.000 people are employed in the agriculture, including those 20.000 people that are registered as temporary famers and a large number of seasonal workers (especially in the sectors of fruits and vegetables) and we don't know the correct data. The closing of many industrial object affected the increasing of the labor force in agriculture. However, certain rural lands, where huge part of the

³ Gj Filipovski, R.Rizovski, P.Ristevski 1996: Characteristics of climate-vegetation-soil zones region) in RM, Macedonian Academy of Sciences and Arts, Skopje

⁴ According to the classification of EU NUTS III

agricultural areas is depopulated, as a result of fleeing from the rural lands, a shortage of qualified labor force can be noticed.

In 2009, the active population in the Republic of Macedonia amounts 928.775 people and regarding 2008 we can notice 2% of increasing. Out of the total labor force, 629.901 people are employed or 67,8%, and 298.873 people or 32,2% are unemployed. According to the Statistical Office of the Republic of Macedonia, the total number of employed in agriculture, hunting and forestry amounts 116.601 people, i.e. 18,5% in 2009.

According to the type of ownership of the business entities in 2009, 111.489 are under private ownership, and 5.112 are under other ownership.

Out of all employed in the agriculture, hunting and forestry, 15.850 are employees, 3.007 are employers, 42.032 are employed for their own profit and 55.712 are non-paid family workers.

The employment in agriculture (together with hunting and forestry) has marked a fall in 2009 for around 1,5% in comparison to 2008, while in 2008 it had marked an increasing of employment in agriculture for 1,8% in comparison to 2007.

Therefore, the conclusion is that the labor force in Macedonia is consisted mostly of labor on individual agricultural level.

On 2009, the gross-salaries of labor force included in the agriculture have reached 19.600,00 denars (approximately 650, 00 denars a day or around € 10,5).

Table Nr. 2. Macroeconomic indicators

Indicator	Measure	2003	2004	2005	2006	2007	2008	2009 ¹
GDP (in mil. Euros)	mil. €	4.105	4.324	4.676	5.081	5.783	6.720	6.776
GDP per capita (in €)	€	2.025	2.128	2.295	2.488	2.827	3.283	3.300
Participation of the agricultural sector in GDP	%	13,3	13,2	12,8	10,8	9,4	10	9,8
Participation of the agricultural sector in employment	%	22,0	16,8	19,5	22,1	18,2	20,0	18,5

Trade policy

The process of trade integration of the Republic of Macedonia can be divided into regional, global and European integration.

The process of regional integration is designated with series of Free Trade Agreements (FTA) with the countries of the region. The global integration is marked with the admission of the Republic of Macedonia into the World Trade Organization (WTO) in 2003, while the process of European

integration is defined with the Stabilization and Association Agreement.

On the negotiations with WTO the Republic of Macedonia agreed to make significant liberalization for most of the products, while some agricultural products as meat, cheese, fresh and processed fruits and vegetables, grape, vine, rice and tobacco, continue to be strongly protected with tariffs and quotas as a result of the importance of agricultural sector. The average customs

⁵ Source: State Statistical Office, NBRM (2010), *estimation of State Statistical Office

rate of the agricultural products is reduced from 24,87% to 13,75% as a result of the negotiations. These reduced customs rates are basis for further liberalization on bilateral and multilateral basis.

The Free Trade Agreement with European Union (EU) is the most significant preferential agreement regarding the scope of trade exchange between the Republic of Macedonia and EU.

As a part of the trade integrations related to the process of accession of the Republic of Macedonia to EU, is the membership to the Central European Free Trade Agreement – CEFTA, as a mean of regional cooperation and a prove for political and organizational maturity of the countries-aspirants for EU entry: Croatia, the Republic of Macedonia, Serbia, Monte Negro, Albania, Bosnia and Herzegovina, Moldavia and Kosovo.

Total trade and trade with agricultural-food and fish products

After reducing the relative participation of the export of agricultural-food and fish products in the total export of the Republic of Macedonia for the period of 2002-2004 (from 19,4% to 16%) in 2005 and 2006 the export of agricultural-food and fish products has a trend of smooth growth with participation of around 17% in the total export. The reasons for this trend of smooth growth of the export are the result of the series of Free Trade Agreement that Macedonia concluded with the countries of the region as well as the Free Trade Agreement with European Union. The data of the export of agricultural-food and fish products show a trend of reducing the participation in the total export with 14,1% in 2007 and 2008 again.

On the other hand, the participation of import of the agricultural-food and fish products in the total import, shows a trend of reducing from 15,2% in 2002 to 11,5% in 2008. The reason for reducing the import is the result of increasing Macedonia's own production of agricultural-food and fish products for satisfying its own needs. This increasing of Macedonia's own production is the consequence of the greater care of the country for agriculture and the increasing of the subsidies for farmers. Having in mind that the trade exchange of agricultural-food and fish products in 2009 was less reduced than the trade of industrial products, the participation of export of agricultural- food

and fish products in the total export of the Republic of Macedonia in 2009 was increased to 18,6%, and the participation of the import of agricultural-food products in the total import in 2009 was increased to 16,4%.

The liberalization of trade exchange after the membership in WTO and in accordance with the Stabilization and Association Agreement with EU resulted in greater trade deficit that reached its peak in 2008 when the trade deficit amounted € 155,9 million. Macedonia is net importer of food products. Abreast with the trade intentions in the period of 2002-2008, the data of export of agricultural and food products show rapid improvement as a result of further trade liberation.

As a result of the global economic crises in 2009, the total trade exchange was significantly reduced in comparison with the previous years. The total export (industrial + agricultural-food products) in 2009, in comparison to 2008 was reduced to 28,4%, the total import (industrial + agricultural-food products) in 2009, in comparison to 2008 was reduced to 22,1%. The import of agricultural-food products in 2009 in comparison to 2008 was reduced for 5,5% (from € 378,5 million to € 357,8 million). The trade deficit in 2009 reached €-142,0 million, as a result of the relatively small increasing of the import and significant increasing of the export.

Table Nr. 3 Total trade and trade with agricultural-food and fish products for the period of 2002-2009 (in million €)

		Total trade (industry and agriculture)	Trade with agricultural products	Participation of the agriculture in the total trade (in %)
2002	Export	1.178,3	228,0	19,3
	Import	2.106,0	319,3	15,2
	Balance	-927,7	-91,3	9,8
2003	Export	1.207,1	214,4	17,8
	Import	2.038,2	298,4	14,6
	Balance	-831,1	-84,0	10,1
2004	Export	1.345,9	213,6	15,9
	Import	2.354,0	338,3	14,4
	Balance	-1.008,1	-124,7	12,4
2005	Export	1.643,5	278,6	17,0
	Import	2.601,0	348,0	13,4
	Balance	-957,5	-69,4	7,3
2006	Export	1.906,2	318,0	16,7
	Import	2.987,7	367,4	12,3
	Balance	-1.081,5	-49,4	4,6
2007	Export	2.446,4	346,6	14,2
	Import	3.795,0	461,5	12,2
	Balance	-1.348,6	-114,9	8,5
2008	Export	2.689,3	378,5	14,1
	Import	4.643,4	534,4	11,5
	Balance	-1.954,1	-155,9	7,9
2009	Export	1.925,6	357,8	18,6
	Import	3.617,2	499,8	13,8
	Balance	-1.691,6	-142,0	8,4

Source: State Statistical Office/Ministry of agriculture, forestry and water management

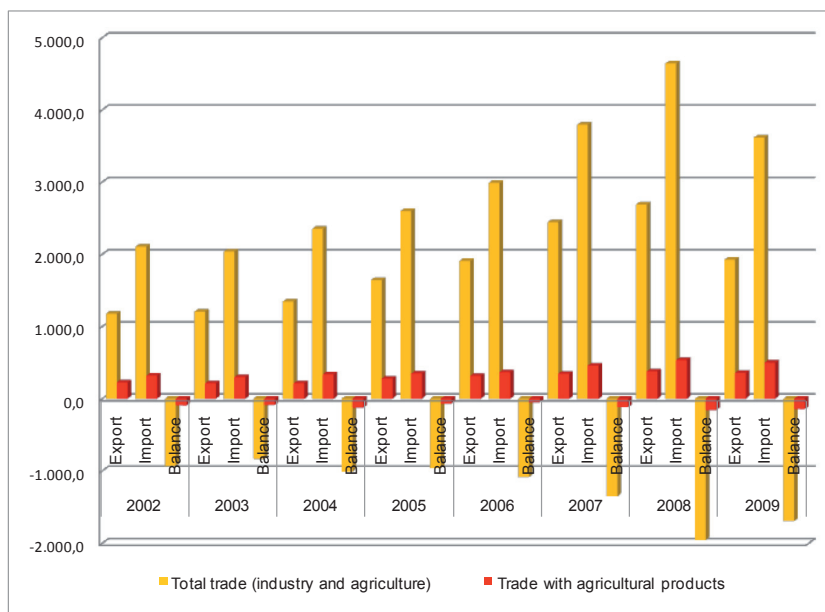


Image Nr. 2. Development of Macedonian trade exchange with agricultural-food and fish products for the period of 2002-2009 (in million €)⁶.

In 2009, EU-27 is the most significant partner of the Republic of Macedonia in the trade with agricultural-food and fish products, with total value of the trade exchange (export-imports) of € 343,5 million.

The participation of the export of agricultural-food and fish products in EU-27 from the total export of these products for 2009 amounts 40,7% and it is on the same level as in 2008. The participation of fish products in 2008 is reduced to 39,6%, in comparison to 2008 when this participation amounted 41,1%.

The most significant trade partners of the Republic of Macedonia from the countries of EU-27 regarding the export and import together are the following: Greece, Bulgaria and Germany.

As a result of the further liberalization of the trade with agricultural-food and fish products between the member-states of CEFTA 2006, the trade exchange with agricultural-food and fish products of the Republic of Macedonia with the member-states of CEFTA 2006 has reached the same level as the one with EU-27.

The most significant trade partners of the Republic of Macedonia from the member-states of CEFTA regarding the agricultural—food products are the following: Serbia, Kosovo, Bosnia and Herzegovina and Croatia, while regarding the import most important are: Serbia, Croatia and Bosnia and Herzegovina.

⁶ Source: State Statistical Office/Ministry of agriculture, forestry and water management

Table Nr. 4, Overview of the trade with agricultural-food and fish product regarding the countries in 2008 and 2009 (in million €)

Country	Export				Import				Trade balance	
	2008		2009		2008		2009		2008	2009
	Value	%	Value	%	Value	%	Value	%		
Albania	15.0	4.0%	12.4	3.5%	1.0	0.2%	0.99	0.2%	13.9	11.4
Bosnia and Herzegovina	25.2	6.7%	30.0	8.4%	7.5	1.4%	12.03	2.4%	17.7	18.0
Croatia	29.1	7.7%	29.3	8.2%	29.8	5.6%	28.88	5.8%	-0.7	0.4
Serbia	125.9	33.3%	78.9	22.1%			105.97	21.2%		-27.0
Kosovo			35.5	9.9%	118.9	22.2%	2.44	0.5%	7.0	33.1
Monte Negro	8.5	2.3%	9.0	2.5%	0.2	0.0%	0.30	0.1%	8.3	8.7
Moldova	0.02	0.0%	0.0	0.0%	0.02	0.0%	0.23	0.0%	0.0	-0.2
CEFTA-total	203.7	53.8%	195.1	54.5%	157.4	29.5%	150.85	30.2%	46.3	44.3
EU-27-total	154.7	40.9%	145.7	40.7%	219.5	41.1%	197.7	39.6%	-64.8	-52.0
Turkey	3.2	0.8%	2.7	0.7%	16.0	3.0%	18.03	3.6%	-12.8	-15.4
Brazil	0.0	0.0%	0.0	0.0%	54.3	10.2%	42.16	8.4%	-54.3	-42.2
Rest of the countries	16.9	4.5%	14.3	4.0%	87.2	16.3%	90.98	18.2%	-70.3	-76.7
Total, whole world	378.5	100.0%	357.8	100.0%	534.4	100.0%	499.8	100.0%	-155.9	-142.0

Source: State Statistical Office

The structure of export and import of agricultural-food products in 2009

The export of agricultural-food products in 2009, in comparison to 2008, is reduced for 5,4 %, i.e. from € 378,5 million in 2008 to € 357,8 million in 2009. On the other hand, the import of agricultural-food products in 2009, in comparison to 2008, is reduced for 6,5 %, i.e. from € 534,4 million in 2008 to € 499,8 million in 2009.

The reduced export is the result of the reduced export of tobacco for 4,6 % (from € 66 million in 2008 to € 62,9 million in 2009), the reduced export of tomatoes for 17,3% (from € 21,3 million in 2008 to € 17,6 million in 2009), the reduced export of grape for 27,6 % (from € 9,4 million in 2008 to € 6,8 million in 2009), the reduced export of apple for 21,9 % (from € 8,2 million in 2008 to €

6,4 million in 2009), the reduced export of cabbage for 29,1 % (from € 7,9 million in 2008 to € 5,6 million in 2009), the reduced export of fizzy drinks for 9,8% (from € 21,3 million in 2008 to € 19,2 million in 2009) and some other products.

On the other hand, increasing of the export of following products can be noticed , increased export of preserved vegetables for 10,1% (from € 21,6 million in 2008 to € 23,8 million in 2009), increased export of sausages for 96,4% (from € 2,8 million in 2008 to € 5,5 million in 2009), increased export of lamb meat for 3,6 % (from € 13,6 million in 2008 to € 14,1 million in 2009), increased export of biscuits and waffles for 5,9% (from € 25,1 million in 2008 to € 26,6

million in 2009), increased export of dried vegetables for 37,5 % (from €3,2 million in 2008 to € 4,4 million in 2009) increased export of live pigs (from € 0,4 million in 2008 to € 2 million in 2009) and other products as well.

The reduced import value is the result of the reduced import of sunflower oil for 31,5 % (from € 32,3 million in 2008 to € 22,1 million in 2009), the reduced import of wheat for 41,3% (from € 13,8 million in 2008 to € 8,1 million in 2009), the reduced import of maize for 45,8 % (from € 13,3 million in 2008 to € 7,2 million in 2009), the reduced import of butter for 23,6 % (from € 5,5 million in 2008 to € 4,2 million in 2009), the reduced import of wheat flour for 20,3 % (from € 14,3 million in 2008 to € 11,4 million in 2009), the reduced import of fruit juice for 31,1% (from € 6,1 million in 2008 to € 4,2 million in 2009) and some other products.

It should be mentioned that the reduced value of import is not just the result of the reduced amount of import, but regarding the most significant imported products, the

reduction is the result of their exclusively reduced average import price, and even though the amount of import is increased, a drastic reduction of the import can be noticed regarding the value, that contributes to reduction of the deficit and to imbalance in the market of these products as well. This is especially relevant to wheat flour, wheat and sunflower oil.

On the other hand, increasing of the import of following products can be noticed: increased import of poultry meat for 7,2% (from € 29 million in 2008 to € 31,1 million in 2009), increased import of pork for 21,2% (from € 17,9 million in 2008 to € 21,7 million in 2009), increased import of beef for 3,9 % (from € 17,9 million in 2008 to 18,6 million in 2009), increased import of milk for 48,3% (from € 6,2 million in 2008 to € 9,2 million in 2009), increased import of fizzy drinks for 7% (from € 11,4 million in 2008 to € 12,2 million in 2009), increased import of tropical fruits – oranges, mandarins, lemons for 17,8% (from € 8,4 million in 2008 to € 9,9 million in 2009) and some other products.

Table Nr. 5, Import, export and trade balance of agricultural-food products according to the groups of products from the Customs tariff for 2009

		Export		Import		2009
		2009		2009		
CN	Name	Value in 1000 €	Participation	Value in 1000 €	Participation	Trade balance
01	Live animals	4,419	1.2%	1,237	0.2%	3,181
02	Meat and other slaughter products for nutrition	17,114	4.8%	84,379	16.9%	-67,265
03	Fish, crustaceans, mollusks and other invertebrates	2,145	0.6%	9,684	1.9%	-7,539
04	Milk and milk products, poultry, bird eggs, natural honey	3,870	1.1%	25,603	5.1%	-21,733
05	Products of animal origin not mentioned before	299	0.1%	3,276	0.7%	-2,977
06	Live trees and other plants, bulbs, roots, cut flower	2,362	0.7%	4,551	0.9%	-2,189
07	Vegetables, roots and shoots for nutrition	52,050	14.5%	6,467	1.3%	45,583

08	Fruit and nuts, bark of citrus fruits or melon and watermelon	21,785	6.1%	23,381	4.7%	-1,596
09	Coffee, tea, mate-tea and spices	1,467	0.4%	16,167	3.2%	-14,700
10	Cereals	2,786	0.8%	15,516	3.1%	-12,730
11	Products of mill industry, malt, starch, insulin, wheat gluten	268	0.1%	18,976	3.8%	-18,708
12	Oils seeds and oleaginous fruits, industrial and medical plants	2,408	0.7%	12,725	2.5%	-10,317
13	Shellac, rubber and other vegetable juices and extracts	34	0.0%	1,081	0.2%	-1,047
14	Plant materials for basketry	17	0.0%	223	0.0%	-206
15	Fats and oils from animal or vegetable origin and products of their decomposition	6,058	1.7%	36,587	7.3%	-30,529
16	Processing of meat, fish, crustaceans and mollusks	13,608	3.8%	24,729	4.9%	-11,121
17	Sugar and products of sugar	6,494	1.8%	32,195	6.4%	-25,701
18	Cocoa and products of cocoa	6,974	1.9%	26,472	5.3%	-19,498
19	Products based on cereals, flour, starch and milk, sweet products	28,142	7.9%	32,157	6.4%	-4,015
20	Products of vegetable, fruit and nuts	27,913	7.8%	20,076	4.0%	7,837
21	Different products for nutrition	12,433	3.5%	44,146	8.8%	-31,713
22	Drinks, alcohols and vinegar	62,613	17.5%	24,041	4.8%	38,572
23	Food prepared for animals	442	0.1%	17,584	3.5%	-17,142
24	Tobacco and products as replacement of tobacco	79,204	22.1%	13,021	2.6%	66,183
Other agricultural products above Chapter 24 of Customs tariff		2,862	0.8%	5,489	1.1%	-2,626
Total value of Import and Export of agricultural-food products		357,767	100%	499,763	100%	-141,996

Table Nr. 6, Area of crops, production and yield of cereals 2004-2009

	2004	2005	2006	2007	2008	2009
Area of cereals (in ha)						
Cereals	189.337	203.158	212.072	211.695	192.638	207.049
Wheat	101.607	108.881	100.815	102.081	97.506	101.500
Barley	44.975	50.654	58.467	56.916	53.172	56.408
Rye	4.546	4.752	4.335	4.699	3.969	4.516
Oat	2.408	2.687	2.162	2.554	1.307	25
Maize	32.913	33.578	43.260	42.452	33.829	41.157
Rice	2.888	2.606	3.033	2.993	2.855	3.443

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Production (in t)						
Cereals	676.632	644.619	725.841	579.556	745.438	717.694
Wheat	356.825	333.880	309.772	247.492	342.770	308.280
Barley	148.892	136.891	164.129	131.169	193.885	168.070
Rye	10.273	9.451	10.162	10.091	10.740	11.845
Oat	4.091	3.593	3.736	3.449	1.931	54
Maize	141.875	148.234	223.379	170.337	179.441	208.208
Rice	14.676	12.570	14.663	17.018	16.671	21.237
Yield (t in ha)						
Cereals	3,36	3,06	3,34	2,99	3,73	3,67
Wheat	3,51	3,07	3,11	2,45	3,50	3,04
Barley	3,31	2,70	2,82	2,31	3,60	2,98
Rye	2,26	1,99	2,35	2,15	2,70	2,62
Oat	1,70	1,34	1,74	1,35	1,48	2,16
Maize	4,31	4,41	5,17	4,01	5,30	5,06
Rice	5,08	4,82	4,83	5,69	5,80	6,17

Source: Ministry of agriculture, forestry and water management

Table Nr. 7, Area, production and yield of industrial and forage crops, 2004-2009

	2004	2005	2006	2007	2008	2009
Area of crops (in ha)						
Industrial and forage crops	62.948	50.210	47.196	47.428	45.977	52.331
Tobacco	15.204	15.800	14.500	14.100	12.000	16.145
Sunflower	17.717	5.400	3.700	3.500	4.900	5.300
Opium poppy	116	451	534	534	534	601
Clover	3.857	3.784	3.625	2.960	2.925	3.067
Vetch-hay	2.851	2.643	2.410	2.435	2.514	2.561
Alfalfa	18.315	17.847	18.218	19.464	19.434	19.716
Forage peas	2.018	1.738	1.521	1.367	1.340	1.898
Forage maize	2.425	2.171	2.241	2.633	1.841	2.480
Fodder beet	445	376	447	435	489	563

Production (in t)						
Industrial and forage crops	233.867	238.014	246.040	228.809	211.044	254.731
Tobacco	21.630	27.691	25.036	16.290	16.126	24.122
Sunflower	7.764	6.711	6.016	5.095	5.530	7.774
Opium poppy	62	91	89	96	119	504
Clover	16.166	15.901	16.951	11.921	12.441	12.684
Vetch-hay	9.254	8.680	10.822	9.461	9.656	10.327
Alfalfa	113.012	121.527	125.832	114.130	119.153	126.112
Forage peas	5.557	5.172	6.624	3.662	4.605	5.431
Forage maize	55.694	48.027	48.916	62.701	37.144	61.558
Fodder beet	4.728	4.214	5.754	5.453	6.270	6.219

Yields (t in ha)						
Industrial and forage crops	5,82	5,98	6,52	6,18	5,93	6,66
Tobacco	1,42	1,75	1,73	1,16	1,34	1,49
Sunflower	0,44	1,24	1,63	1,46	1,13	1,47
Opium poppy	0,53	0,20	0,17	0,18	0,22	0,84
Clover	4,19	4,20	4,68	4,03	4,25	4,20
Vetch-hay	3,25	3,28	4,49	3,89	3,84	4,03
Alfalfa	6,17	6,81	6,91	5,86	6,13	6,40
Forage peas	2,75	2,98	4,36	2,68	3,44	3,10
Forage maize	22,97	22,12	21,83	23,81	20,18	27,30
Fodder beet	10,62	11,21	12,87	12,54	12,82	11,08

Table Nr. 8, Areas and production of Greenhouses-glasshouses 2006-2009

Crop	2006		2007		2008		2009	
	ha	t	ha	t	ha	t	ha	t
Tomatoes	120	12.580	121	14.960	140,6	14.952	154	12.360
Cucumbers	42,5	7.100	50,4	8.860	54	9.812	55,76	6.748
Hot peppers	4	3,8	2,5	2,7	2,5	2,52	2,59	2,61
Sweet peppers	1,5	75	2,0	65	3,8	147	5	62
Cabbage	-	-	17	850	15	700	18,8	487
Total	168	19.759	193	24.738	216	25.614	236	19.660

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Table Nr. 9, Area of crops, open production and yield of vegetable (including potato) 2006-2009

	2006	2007	2008	2009
Areas (ha)				
Crop	42.004	42.408	37.135	38.621
Tomatoes	4.940	5.284	4.613	5.731
Pepper	9.150	8.949	5.980	8.438
Melon	6.053	5.891	5.751	5.987
Potato	11.611	11.060	11.144	13.527
Bean	10.250	11.224	9.647	4.938
Production (t)				
Crop	66.0274	581.877	623.920	634.712
Tomatoes	12.2795	107.053	113.944	145.395
Pepper	14.8522	132.335	160.848	154.771
Melon	15.0069	140.046	132.310	123.939
Potato	227.868	193.393	206.592	204.717
Bean	11.020	9.050	10.226	5.890
Yield (t/ha)				
Crop	19,03	12,63	13,67	12,25
Tomatoes	24,86	20,26	24,70	25,37
Pepper	24,79	23,77	23,01	18,34
Melon	24,79	17,49	18,54	15,13
Potato	19,63	0,81	1,06	1,19
Bean	1,08	0,81	1,06	1,19

Table Nr. 10 Production of fruits (including grape) 2004-2009

	2004	2005	2006	2007	2008	2009
Fruit (including grape)	397.762	409.975	254.308	209.701	481.656	401.594
Apples	82.414	86.217	95.826	152.089	174.315	91.878
Plums	25.815	25.254	29 745	27 773	32.826	9.923
Peaches	12.045	11.041	10 532	10 461	11.252	10.266
Apricots	4.476	2.964	3 561	3 531	3.706	2.950
Pears	7.058	8.892	9 728	8 235	8.260	2.290
Cherries	4.017	4.358	4 646	4 966	5.631	337
Sour cherries	7.324	5.532	6 037	7 034	8.832	33.292
Grape (table grape and wine grape)	254.613	265.717	254.308	209.701	236.834	250.658

According to the data available, the agriculture is third largest sector (after services and industry) with total participation in the state economy between 11-14% in comparison to the member-states in the Union where the participation is 1,6%. Long time was the agriculture considered as mean of amortization of the social-economic changes in the economy sector.

Besides the convenient conditions for agricultural and farming production, the Republic of Macedonia is net importer of agricultural and food products. Even though the export of several agricultural products is increasing (tobacco, wine), sadly but truth, the negative balance of foreign trade with

agricultural products is increasing at the same time.

Since 2001, the processes for admission of the country in WTO⁷ has began, which contributes to two dominant phenomena:

- Negative, that can be realized with the opening of the domestic market for entrance of producers outside the borders, which therefore produce under conditions that are very different than those in the Republic of Macedonia;
- Positive, where the domestic producers acquire an opportunity to take place in the markets of the other countries, therefore satisfying the standards for safety of food production.

3.2 Features of rural environment

Despite the enormous field for research, there are not too many data that regard the sociology of rural environment, and therefore it is very hard to elaborate one precise and clear image. One study⁸ is however elaborated, where the State Statistical Office and Ministry of local self-government performed socio-economic mapping of the disparities among the municipalities of Macedonia, and designated six zones on the basis of the population concentration in the territory: a weak concentration zone (up to 50 inhabitants/km²), medium concentration zone (51-100 inhabitant/km²), overpopulated zone (151-500 inhabitants/km²), significantly overpopulated zone (501-1000 inhabitants/km²), very significantly overpopulated zone (501-10000 inhabitants/

km²) and massively overpopulated zone (more than 1000 inhabitants/km²). In 2002, almost half (61) of the municipalities belonged in the weak concentration zone, 26 municipalities had medium concentration, 7 were overpopulated, 19 were significantly overpopulated, 4 were very significantly overpopulated and 6 municipalities had more than 1000 inhabitants per km².

In the last few years, a decreasing trend could be noticed in the population density of rural environment, which can contribute to more difficult development of organic farming to certain extent. Besides that, the villages of this region are characterized with ageing of the population, i.e. a population that comes to the end of its working life that can also contribute to more difficult development.

⁷ World Trade Organization

⁸ Socio-economic disparities among municipalities in Macedonia, UNDP, 2002

3.3. Human resources

Demographic structure

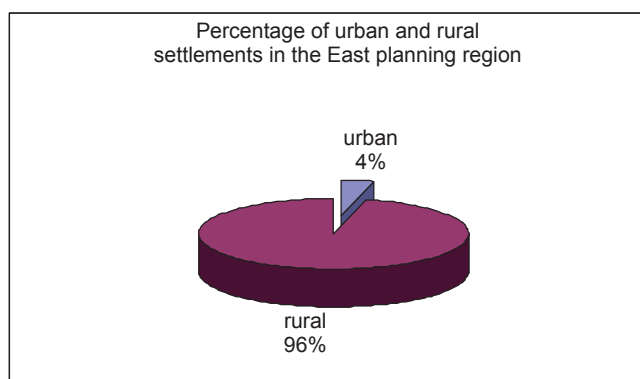


Image Nr. 3, Percentage of urban and rural settlements in the East planning region

There are only 4% settlements in the urban category from the East planning region, while 96% are in the category of rural settlements (Image 4).

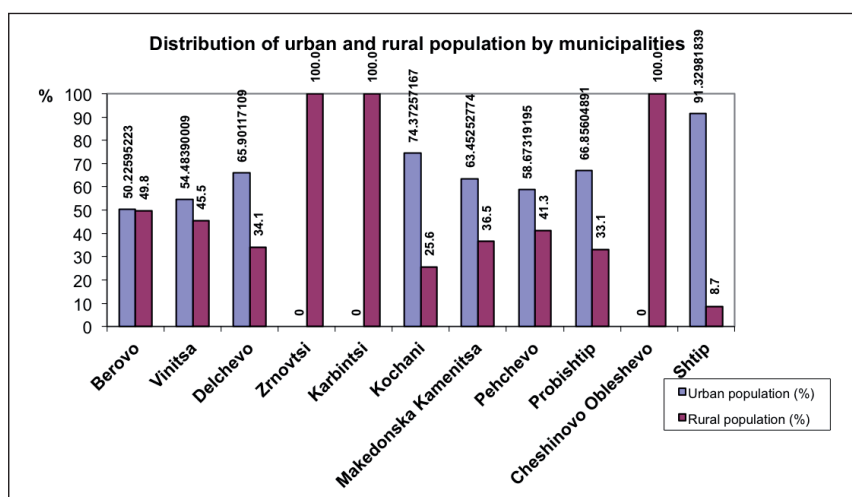


Image Nr. 4, Arrangement of the urban and rural population regarding the municipalities of the East planning region

The largest number of urban population has the Municipality of Stip (91,3%), while the municipalities Zrnovci, Karbinci and Cesinovo-Oblesevo have only rural population. In the Municipality of Berovo, the proportion of urban (50,2%) and rural population (49,8%) is approximately the

same. In other municipalities the number of urban population is greater than the number of rural population.

According to the previously analyzed data, the region has unequal arrangement of the urban and rural population.

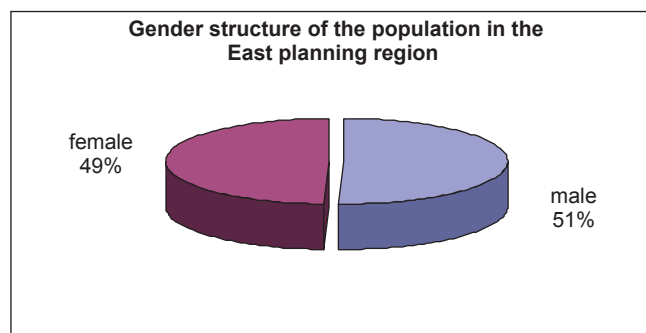


Image Nr. 5, Sex structure of the population in the East planning region

The number of male population (51%) is larger than the number of female (49%) population in the East planning region (Image 5).

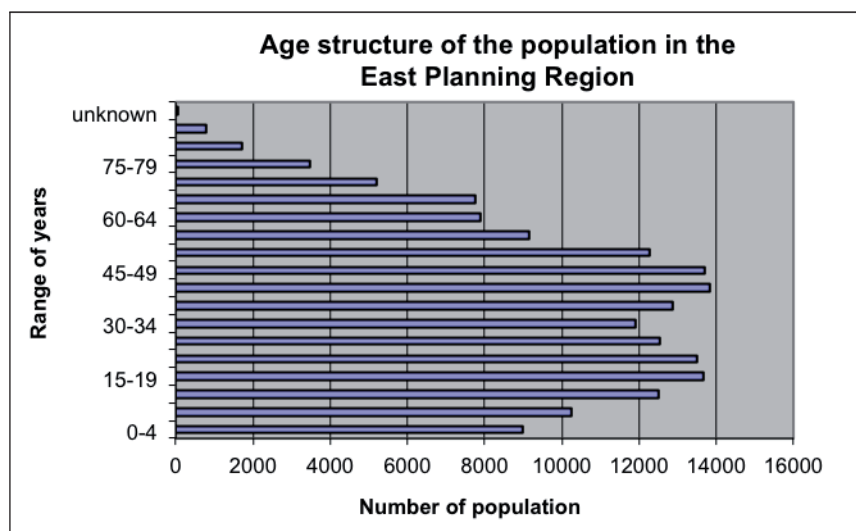


Image Nr. 6, Age structure of the population in the East planning region

According to the data presented on the Image Nr. 6, the largest is the number of population on the age of 40 to 49 years old, and the lowest is the number of population above 85 years old. In the category of working age population, there are overall 107.616

inhabitants, while in the category of school age (primary and secondary education) there are overall 36.402 inhabitants.

In Annex I, a detailed age structure of the population regarding municipalities in the East planning region is shown.

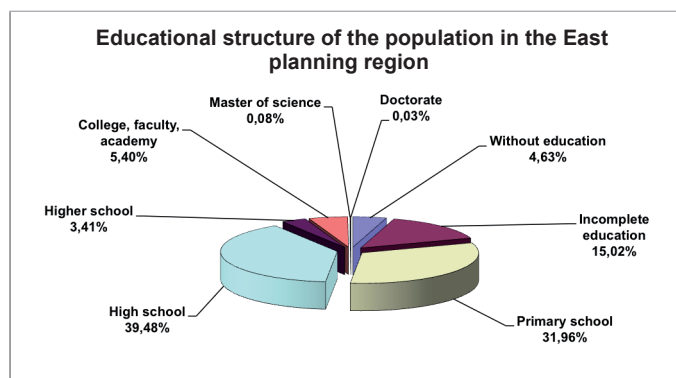


Image Nr. 7, Educational structure of the population in the East planning region

According to the statistical data in 2007, only 0,03% and 0,05% of the population in the East planning region possesses the title Doctor of Science, or Master. 5,4% of the population has finished higher school, faculty or academy, while 3,41% of the population

has associate degree. 39,48% of the population has secondary education, 31,96% of the population has elementary education, while the rest 31,96% of the population has not completed its education yet.

Poll

For the needs of this study a poll was carried out on different settlements in all 11 municipalities of the East planning region. The questionnaire as a whole is given as attachment to Annex E.

Within the frameworks of the poll, 983 people of the region were inquired. The number of the polled inhabitants according to the settlement and municipality are shown in the Table Nr. 11.

Table Nr. 11, Number of polled inhabitants according to the municipality and settlement.

Municipality	Settlement	Number of people polled
Berovo	Budinarci	12
	Vladimirovo	12
	Dvoriste	11
	Macevo	8
	Mitrasinci	12
	Ratevo	13
	Rusinovo	20
	Smojmirovo	12
Total		100
Vinica	Blatec	15
	Dregobrasa	16
	Istibanja	12
	Laki	12
	Leski	12
	Trsino	15
Total		82
Delcevo	Virce	22
	Grad	20
	Dzvegor	20
	Istevnik	2
	Razlovci	1
	Stamer	14
	Star Istevnik	9
	Trabotiviste	9
	Ciflik	4
Total		101
Zrnovci	Vidoviste	9
	Morodvis	15
	Zrnovci	36
Total		60
Karbinci	Argulica	23
	Gorni Balvan	14
	Karbinci	12
	Kucica	3
	Odjalija	3
	Prnalija	4
	Radanje	19
	Tarinci	12
	Trogerci	13
Total		103

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Kocani	Leski	12
	Nivicani	28
	Pantelej	16
	Preseka	13
	Polaki	18
	Rajcani	6
	Jastrebnik	4
Total		93
Makedonska Kamenica	Kocevica	10
	Lukovica	20
	Mostica	10
	Cera	10
Total		50
Pehcevo	Negrevo	14
	Pancarevo	17
	Robovo	18
	Umlena	17
	Crnik	19
	Ciflik	16
Total		101
Probistip	Gorno Barbarevo	12
	Dolno Barbarevo	12
	Dreveno	12
	Drenak	12
	Zarapinci	12
	Lezovo	12
	Lesново	11
	Petrino	12
	Puzderci	13
	Strisovci	13
Total		121
Cesinovo-Oblesevo	Banje	4
	Ziganci	3
	Kucicino	14
	Sokolarci	4
	Spancevo	4
	Teranci	11
	Cesinovo	14
	Oblesevo	8
	Ciflik	7
Total		69

Stip	Brest	10
	Vrasakovo	14
	Dolani	14
	Ljuboten	12
	Nikoman	10
	Piperovo	13
	Puhce	11
	Sarcievo	3
	Suvo Grlo	12
Total		99

The questionnaire consisted of several groups of questions.

In the group of general questions are those connected to the place of residence, age, sex, education and the individual agricultural producer status of the examinees.

Analysis of the age structure of examinees (Image 8) shows that in the East planning region people that deal with agriculture are older than 50 years (44% of the examinees), the young population (20-30 years old) that deals with agriculture is only 4%. The largest number of the working age population is between 30 to 40 years old (16%) and 40 to 50 years old (36%).

Regarding the sex structure of the examinees, 93% were male and only 7% were female, that indicates to the traditionally subordinated role of women in Macedonian agriculture, where the dominant role is left to the man, as a head of the family.

The image Nr. 9 represents an analysis of the education level of examinees. Only 3% of them have higher education, 46% are with secondary education and most of them are with elementary education.

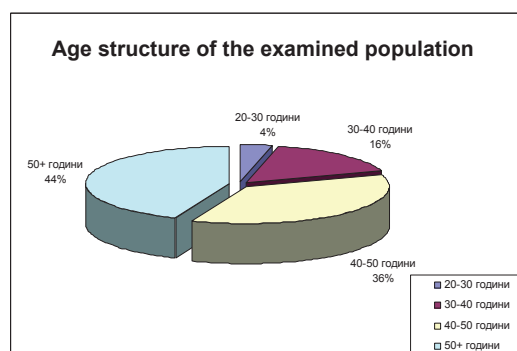


Image Nr. 8, Age structure of the examined population

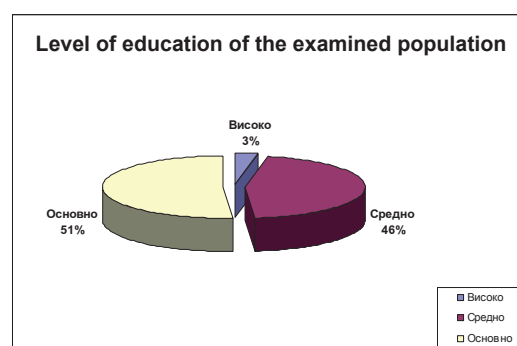


Image Nr. 9, Level of education of the examined population

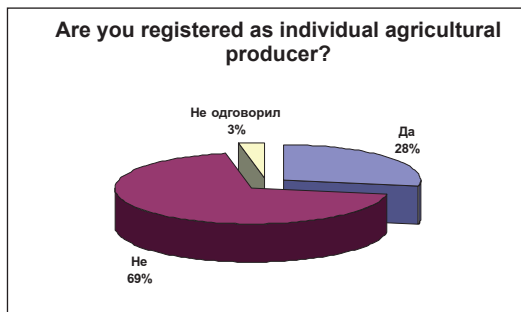


Image Nr. 10, Are you registered as individual agricultural producer?

Regarding the status of agricultural producer, 28% responded with yes, 69% with no and 3% didn't even answer the question. Supposedly, most of the farmers polled don't understand the term individual agricultural producer.

Regarding the type of agricultural practice carried out by examinees, the answers are shown on image Nr. 11. According to the analysis, all examinees in the municipalities: Cesinovo-Oblesevo, Berovo, Delcevo, Karbinci, Probistip and Vinica, are dealing with conventional agriculture. In the municipalities Makedonska Kamenica, Pehcevo, Stip and Zrnovci, part of the examinees deal with conventional and part of them with organic agricultural production. In Zrnovci 5 examinees responded that they deal with

both types of agriculture. The result of the municipality of Kocani is very interesting, where all 97 examinees answered that they deal exclusively with organic agricultural production. On the other hand, the analysis of the question's answer "What is organic farming?" as well as the answers of the question "What kind of manure do you use?" shows that a small part of the examinees know the real importance of this type of production, because all examinees use artificial manures. This indicates to ignorance of the organic agriculture as a system of production and the examinees probably consider the organic production as something they cultivate for their own needs without application of pesticides.

Regarding the professional assistance in the work, the greatest part of the examinees responded that they don't get any professional assistance (86%). Part of them answered that they get professional assistance by the Agency for development of the agriculture (6%), agricultural pharmacies (pharmacists) and agronomists (3%) and by the state/Ministry of agriculture, forestry and water management (3%). As a source of professional assistance, with less than 2% are listed the following things: municipalities, agricultural programmes, seminars, parents, children and friends.

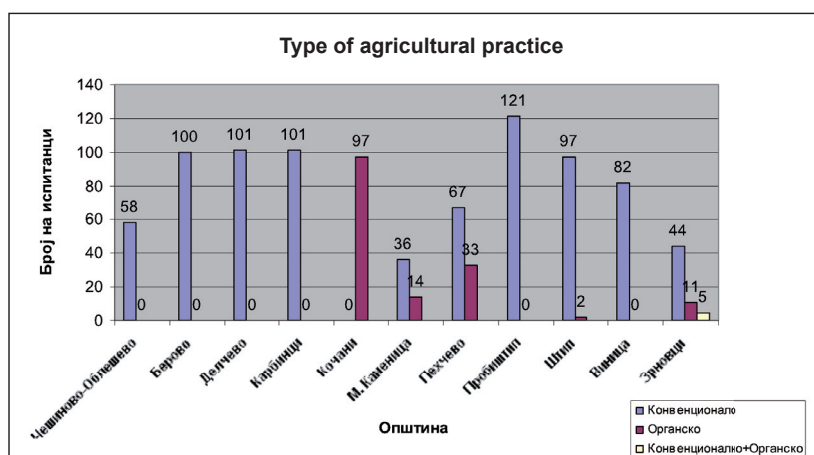


Image Nr. 11, Type of agricultural practice

Table Nr. 11, Analysis of cultivated crops, potential crops for organic farming and known local forest fruits, medicinal and volunteer plants in municipalities.

Municipality	Mostly cultivated crops in conventional agriculture	Crops that can be cultivated in organic agriculture	Local forest fruits, medicinal and volunteer plants
Stip	Cereals (wheat, oat, barley, rye) Vineyard	No response	Perforated St. John's wort Lime Chamomile
Berovo	Potato Plum Cereals (wheat, barley rye)	Potato Bean Garden crops (tomato, pepper)	Cranberry Blackberry Raspberry Mushrooms Teas (rose-hips, wild-thyme, mint, oregano)
Vinica	Potato Bean Cereals (wheat, barley, rye)	No response	Strawberries Raspberries Blackberries Cornel cherries Mushrooms Teas (oregano, perforated St. John's wort, rose-hips)
Delcevo	Potato Maize Cereals (wheat, barley, rye)	Cereals All crops No response	Strawberries Raspberries Blackberries Cornel cherries Mushrooms Teas (oregano, perforated St. John's wort, rose-hips)
Zrnovci	Garden crops (pepper, tomato, leek) Cereals (wheat, oat, barley, rice)	Wheat Rice Don't know	Raspberries Blackberries Cornel cherries Teas (oregano, lime, rose-hips)
Karbinci	Cereals (wheat, barley) Pepper Potato Bean	Garden crops Pomiculture No response	Blackberry Mushrooms Teas (mint, chamomile, lime)
Kocani	Cereals (wheat, oat, barley, rye) Potato	Hazelnuts Walnuts Cereals (wheat, barley, oat) Potato	Mushrooms Teas (yarrow, perforated St. John's wort, wild-thyme)
Makedonska Kamenica	Garden crops (pepper, tomatoes, bean) Cereals (wheat, oat, barley, rye) Maize	Garden crops Pomiculture (apples, plums, sour cherries)	Strawberries Raspberries Blackberries Cornel cherries Mushrooms Teas (oregano, perforated St. John's wort, rose-hips)

Pehcevo	Cereals (wheat, oat, barley, rye) Maize Bean Potato Plums Sour cherries	Potato Bean Pomiculture	Cranberry Blackberry Raspberry Mushrooms Teas (rose-hips, wild-thyme, mint, oregano)
Probistip	Cereals (wheat, oat, barley, rye)	Cereals Pomiculture Raspberries and blackberries	Blackberries Cornel cherries Mushrooms Teas (chamomile, perforated St. John's wort, rose-hips, wild-thyme, mint, oregano)
Cesinovo-Oblesevo	Rice Wheat Maize Alfalfa Pepper	No response Wheat Alfalfa Garden crops Potato	Blackberry Raspberry Cornel cherries Teas (lime, chamomile, mint, oregano, elder)

Table Nr. 11 shows an analysis of the examinees' responses regarding the crops that are mostly cultivated in conventional agriculture, crops that according to examinees are convenient for organic farming, and local forest fruits, medicinal and volunteer plants that examinees know. The analysis shows that mostly cultivated crops in the East planning region are cereals, potato, fruits (predominantly plum and sour cherry) as well as garden crops in Zrnovci, Karbinci and Makedonska Kamenica.

Regarding the crops convenient for organic farming, the examinees suggest different crops, but mostly those that are cultivated in the conventional systems.

The diversity of the above mentioned local forest fruits, medicinal and volunteer plants shows that the population knows the nature around and the biodiversity of plants which can be used. Besides that, the largest part of them announced that they have practice in collecting, but a few use manuals for collecting and taking care about the amount they collect.

A part of the questionnaire was devoted to the questions in the field of agro technical measures.

Even though a large number of examinees gave confirmative answer on the question "Do you know what crop rotation is?" given explanations indicate that this term is unknown to almost 100% of the examinees. Regarding the use of seed material, 35% of examinees use their own seed material, 39% buy it and 26% use combination of both.

Almost 100% of the examinees haven't performed agrochemical analysis of soil. All examinees use artificial manure with different composition for manuring the soils, while animal manure is used by 100% of the examinees in all municipalities with exception of Delcevo, Karbinci and Probistip, where only part of the farmers use animal manure. The most common method of manuring is to plough in and take out, while the plant residues are treated most often with ploughing in, taking out, burning, and rarely composting.

Most of the examinees don't have data about earning as well as expenditures of their work, and they don't know how much does production of one crop cost. The products are sold in wooden boxes or bags of 50 kg. They rarely produce for well-known buyer; none of them is a member of association, although they have a wish to cooperate for market goals.

3.4 Legislation

3.4.1 Legislation on organic farming in the Union

The regulation of the Union that came into force on 01.01.2008 (Regulation No 834/2007, on 28th of June 2007), replaced the old regulation 2092/91 that regulated the organization of organic farming within the frameworks of the European Union until the date stipulated above. The reasons for replacement are many, however, some of them are mentioned below:

- The previous regulation was too extensive and allowed great level of “freedom” for the member-states to define the conditions that rule on their territory. The new solution gives legal framework that shall have “competency” over the whole territory of the Union, and the member states will define only their characteristics in accordance with the soil-climate conditions in each of them;

- In the previous case, there was a huge number of by-laws that significantly contributed to confusion of the producers for the things that can and cannot be practiced in the agricultural holdings ;

- The definition of the old regulation was neither in the part of allowed nor in the part of not allowed means for health protection of the plants, sustainability and improvement of the soil and series of competencies more, which are competencies of the ministers of agriculture. Due to reducing the opportunity for political influence on the development and sustenance of the organic farming, the new regulative prescribes the allowed means for usage in separate document (EU regulation 889/2008, Official journal of the European union L 250/1 from 18.09.2008);

- Certain definitions should be established in order to avoid ambiguities and to guarantee univocal application of the rules for organic production;

- In certain circumstances, the operators might be faced with difficulties in the purchase of organic animals for propagation of reduced genetic group that

endangers the development of this sector. Therefore, it should be allowed inorganic animals to be brought in the farm for propagation purposes;

- The organic production is a general system for farms’ management and production of food that combines the ecological practices, the high level of biodiversity, the protection of human resources, the application of high standards for animals’ wellbeing and the method of production in accordance with the fact that certain consumers prefer products, which are produced with application of natural substances and processes. Hence, the method of organic production plays a double social role, from one hand it provides specific market that corresponds to the requirements of the consumers of organic products, from the other hand it provides public goods that contribute to protection of the environment and the wellbeing of the animals, an to rural development as well.

- The share of organic agricultural sector is in constant growth in most of the member-states. The growth of consumers’ demand in the resent years is particularly remarkable. It is possible the recent reforms of common agricultural policy, with emphasis on the market orientation and supplying quality products for the needs of the demand, to stimulate the market of organic products to greater extent. In this surroundings, the legislation of agricultural products plays more important role within the framework of the agricultural policy and it is closely related to the development of agricultural markets;

- The legal framework of the Community, that regulates the sector of organic production should follow the goals for providing fair competition and adequate functioning of the internal market of organic products, as well as preserving and justifying the trust of consumers to products labeled

and organic ones. It should, furthermore, strive towards providing conditions where the sector can improve in accordance with the development of the production and the market;

– The communication from the Commission to the Council and the European parliament for European action plan on organic food and agriculture suggests improving and strengthening the standards for organic agriculture and the requirements for import and inspection of the Community. In its conclusions from 18th of October 2004, the Council invited the Commission to overview the legal framework of the Community in this field in order to provide simplification and general understanding, and especially to establish the principles that encourage adjustment of the standards, and when possible to reduce the number of details. Therefore, it is appropriate to define more explicit goals, principles and rules that are applicable to organic production, in order to contribute towards transparency and trust of consumers as well as towards adjusted perception of the concept of organic production.

Having in mind all points previously stipulated, the Council of the Union reached a Decision to replace the old regulation 2092/91, and therefore, the General framework of the Community for the rules on organic production should be established regarding the production of plants, livestock and aquacultures, including the rules for collecting volunteer plants and sea algae, the rules for conventions, as well as the rules for production of processed food, including the wine, livestock feed and organic yeast. Furthermore, the Commission approved the use of products and substances and decided which method shall be used in organic agriculture and processing of organic food. The development of organic production should be additionally eased, especially with the use of new techniques and substances that are more convenient

for organic production. Genetically modified organisms (GMO) and the products produced by or with GMO are incompatible with the concept of organic production and consumers' perception on organic products. Therefore, they should not be used in organic agriculture or processing of organic products anymore. The goal is to accomplish as minimal as possible presence of GMO in organic products. The existing thresholds for labeling represented maximal upper values that are exclusively related to unexpected and technically impracticable presence of GMO. The use of GMO in organic production is forbidden. For clearness and understanding, it should not be possible to label certain product as organic, when the same one should be labeled for containing GMO, when it is composed of GMO or it is produced of GMO.

The organic agriculture should be primarily based on renewable resource within the frameworks of the locally organized agricultural systems. In order to minimize the use of not renewable resources, waste or by-products from plant or animal origin, they should be recycled so the nutrients can go back to the soil. The organic crop production should contribute towards sustaining and strengthening the fertility of soil as well as preventing soil erosion. It is preferred the plants to be fed by the soil eco-system, and not by the soluble manures added to the soil.

The organic animal husbandry respects the standards for animals' wellbeing and meets the needs related to the animals' habits, while the health management of animals should be based on preventing from diseases. In this regard, a special attention should be paid to the conditions of accommodation, farming practices and density of herds. Furthermore, the selection of breeds should consider their capacity for adaptation to the local conditions. The rules for carrying out farming and aquaculture production should at least be in compliance with the provisions of the European

convention for protection of animals kept for farming purposes and the successive recommendations of its committee.

The organic processed products should be produced with the application of new methods of processing, which shall guarantee that the organic integrity and the vital qualities of the products are preserved in all phases of the production chain. The processed food should be labeled as organic only when all or almost all ingredients of agricultural origin are organic. However, special provisions for labeling of processed food should be established, which include agricultural ingredients that cannot be obtained in organic way, as the products of hunting and fishing. Moreover, due to informing the consumers, transparency of market and in order to stimulate the use of organic ingredients, a reference should be enabled to the list of ingredients in specific conditions of organic production.

It is appropriate to provide flexibility regarding the application of the production rules, in order to enable adaptation of the organic standards and requirements to the local climatic and geographical conditions, specific farming practices and development phases. This should enable application of rules for exceptions, but only within the frameworks of limited specific conditions, established in the legislation of the Community.

For protection of consumers and fair competition, the terms used for designation of organic products should be protected from use of inorganic products in the Community, regardless of the language in use. Also, a protection should be applied for regularly derived phrases and abbreviations on all terms regardless of the fact if they are used alone or in combination.

Due to the consistency with the legislation of the Community in other fields, when it comes to plant and farming production, member-states should be allowed to apply, within the frameworks of their territories, the

national rules for production, which are more severe than the rules for organic production of the Community, under the condition that these national rules are applied for inorganic production as well, and that these rules are in accordance with the law of the Community.

In order to ensure that organic products are produced in accordance with the requirements established by the legal framework of the Community for organic agriculture, the activities carried out by the operators in all phases of production, preparation and distribution of organic products should be subjected to system of control established and managed in accordance with the rules established in the Regulation (EC) No 882/2004 of the European Parliament and the Council on 29th of April 2004 for inspection supervision that is carried out in order to confirm the compliance with the Law on food products and fodder and the rules for health and wellbeing of animals.

The organic products imported in the European community should be approved in order to be released for sale in the market of the Community, when they are produced in accordance with the rules for production and are subjected to systems of control that are suitable and equivalent to those established in the legislation of the Community. Furthermore, the products imported in accordance with equivalent system should be covered with certificate issued by the competent body or authorized body for inspection of the third country in question.

The estimation of the equivalence regarding the imported products should consider the international standards established in the Codex Alimentarius.

It is considered appropriate to keep a list of third countries accepted by the Commission as countries with standards of production and systems for inspection equivalent to the ones established in the legislation of the Community. For third

countries, which are not included in that list, the Commission makes a list of organs and bodies for inspection that are authorized as competent for the tasks of providing inspection and certification in the third countries in question.

The relevant statistical information should be collected in order to obtain confidential data that are necessary for carrying out and obeying this regulation and as a tool for producers, market operators and policy makers as well. The necessary statistical information should be defined regarding the Community Statistical Programme.

Goals of organic farming

- a) Founding of sustainable system for agricultural management that:
 - respects the systems and cycles of the nature and preserves and strengthens the health of soil, water, plants and animals and the balance between them.
 - contributes to high level of biodiversity,
 - responsibly uses the energy and natural resources as water, soil, organic matter and air and
 - respects the high standards for animals' wellbeing, and especially fulfills the specific needs for behavior of certain animal species;
 - b) Production of high quality products and
 - c) Production of wide choice of food and other agricultural products that correspond to the requirements of the customers and that should not damage the environment, human health, health of plants and animals and their wellbeing.
- use live organisms and methods of mechanical production,
 - practice cultivation of crops in the soil and farming production or practice aquaculture that respects the principles on sustainable use of fishery.
 - exclude the use of GMO products, that come from or with GMO, except the products of veterinary medicine practice and
 - are based on risk evaluation and use of precautionary and preventive measures;
- b) Limitation of the use of external input materials, and when external input materials are necessary and when there are not appropriate practices and methods for management, they are limited to:
 - input materials of organic production,
 - natural and naturally obtained substances and
 - mineral fertilizers with low solubility
 - c) Severe limitation of the use of chemically synthesized material, except in exceptional cases when:
 - there are not appropriate practices for management,
 - the external input materials are not available in the market and
 - the use of external input materials contributes to unacceptable influence on the environment and
 - d) Adaptation wherever necessary, considering the sanitary status, regional differences in climate and local conditions, development phases and concrete practices for cultivation.

Principles of organic farming

The organic farming is based on the following principles:

- a) Appropriate drafting and managing of the biological processes based on ecological systems with application of natural resources that are integral part of the system through methods that:

3.4.2 Legislation in the Republic of Macedonia

The legislation on organic farming is consisted of series of documents from national interest; therefore, the responsibility for its elaboration takes the Department of organic farming at the Ministry of agriculture, forestry and water management. Regarding the fact that since 2005, the Republic of Macedonia is candidate country for membership in the Union, a full harmonization of the domestic legislation with the one in EU is necessary, therefore taking care for preserving the characteristics that it disposes of. Hence, it is necessary to identify the strategic documents adopted by the community that regard the organic farming, but the rest of the acts as well that guarantee equality in the performance on the domestic markets and markets outside the borders of the country, as:

- Stabilization and approximation agreement (2001) – social equality, employment and use of natural resources for accomplishment of sustainable development;
- National strategy for agriculture and rural development - Status and needs for construction of policy in agriculture and human environment;
- Strategy for harmonization of the domestic sector of agriculture and food with the Common agricultural policy of the Community -
- Second National Ecological Action Plan (2006) – identification of the threats regarding the environment and their incorporation in the policy on sustainable development of agriculture, as well as maintaining the level of natural resources, which have essential importance for sustainable development of agriculture. The measures that should contribute to fulfilling the goals set are:
 - Economic use of natural resources and controlled use of artificial manures and pesticides;

- Stimulation of organic production and improvement of the monitoring system;
- National strategy of biodiversity with Action plan (2004) – it aims towards preserving the biodiversity and its application on sustainable principles, regarding the unique natural resources and the rich national tradition. In the part C of the strategy that regards the sustainable use of biodiversity, a group of measures for support of the development of agriculture and preserving the human environment are included, with the following activities:
 - Stimulation and development of organic agriculture as a mean for accomplishment of sustainable development (C.2.1.1);
 - Stimulation and development of production of cultivated, volunteer, medical and aromatic plants (C.2.1.2) and
 - Making limitations (optimal biological threshold) for the use of biological resources (C.1.2.1)
 - National strategy for sustainable development – the coordinative body is the Ministry of environment protection, which should accomplish series of goals through:
 - Phase I – analysis and estimation of relevant documents
 - Phase II – section strategic planning
 - Phase III – national strengthening (consolidation).

In December 2005, the Republic of Macedonia acquired a status of candidate country for admission in the membership of EU, without specified date for beginning of the negotiations. This status imposed a need for gradual harmonization of the domestic laws with those of the Union. Therefore, after abolition of the old regulation 2092/91 and coming into force of the new one 834/2007, the Ministry of agriculture, forestry and water management with its Department

of organic agriculture began a procedure for replacement of the old Law on organic farming⁹ with completely new one.

The new law, similarly to the regulation of the Union is significantly different from the way of organization. In the place of numerous by-laws as Books of rules, Statutes and other type of documentation that can confuse the users, only one document is envisaged with several Books of rules, which can encompass all significant elements that give general instructions for treatment to the users.

Legal framework

The documents that define the legal framework, on which the organization of organic farming is based and which are referenced by agricultural producers that deal with this type of production and the professionals that give instructions for fulfillment of their principles and goals are:

- Law on organic farming (Official Gazette of the Republic of Macedonia 146/09,

old legal solution which was based on EU regulation 2092/91 and was valid to 31.12.2009) defines the conditions, general principles, productions, processing, packing, sale, import-export activities, and production of food from organic origin for people as well as animals.

- Series of by-laws (Books of rules) that separately define the procedures of crop production and animal husbandry.
- National strategy and Action plan for organic agriculture in the Republic of Macedonia 2008-2011.
- Strategy for development of tourism in the Republic of Macedonia.

The procedure for adopting the National strategy and Action plan was in accordance with the so called White Book for European governance¹⁰, which envisages an open system of governance, i.e. transparent method for policy making, with greater involvement and account to all that the appropriate policy regards.

Table Nr. 12, Phases in creating the National strategy and Action plan

Time	Event	Content
13- 14.12.2006	First workshop: Analysis of Status Quo	The workshop between parties of private and public sector concerned that analyzed the condition Status Quo and decided upon the goals of the future National Action Plan (NAP).
24.04.2007	Second workshop:	The workshop between parties of private and public sector concerned that dealt with the first draft of the document and asked for suggestions on amendments.
December 2006, July 2007	Elaboration of the first draft	The work group for the NAP, consisted of professionals from private and public sector, regularly meets in order to elaborate the NAP. Moreover, separate conversations are conducted with the parties concerned.
July 2007	Publication of the first official draft-document	The first official draft-document is sent to all parties concerned

⁹ Official Gazette of the Republic of Macedonia No. 146/2009

¹⁰ EC 2001

August, September 2007	Sending round and examining of draft-document in the Ministries	
	Regional meetings and discussions on NAP	In different regions of Macedonia, meetings with farmers' groups and associations are organized, in order to discuss about NAP
September 2007	Third workshop: Public debate on NAP	Workshop between parties from private and public sector concerned, in order to debate on NAP
Autumn 2007	Finalization of NAP for its adoption in the Council	Elaboration of the final draft, on the basis of the comments from the public debate.

In this group of legal solutions belongs the Law on nature protection¹¹ as well, where several categories for protection of the nature and the environment are envisaged. According to the level of rigidity, there are six categories determined for protection, the

Government of the Republic of Macedonia is competent for adopting three of them, while there is an opportunity for the other organizational units to take initiative for the rest of the categories.

3.5 Analysis of the conditions in the domestic and international market

Three phases could be generally listed in the stage development of this type of production. All of them are mutually related to the readiness of farmers to one intensive system of cultivation, to apply system of production that has holistic approach.

In the first phase, the transit to production of the basic food products (potatoes, fruits and vegetables) is the most common. The reasons are different, but certain characteristics are more important. Above all, this group of products are mostly required by consumers, which is related to the security of the producers for the sale of their own production.

As crops that are mostly produced in the second phase of transit are the following: cereals, milk and meat products. As we can see from the structure of these products, the mutual connection between agronomy and animal husbandry can be noticed. The first ones take part in the crop rotation with the crops from the first phase, and the animal husbandry is the main user of agronomic products as well as direct contributor as a provider of animal manure.

Finally, the third phase is consisted of crops and production that requires greater expertise in production and support from teams of professional, and here can be found: fresh organic products, selected fresh salads, processed and not processed food products.

Markets can be divided in three groups as well. In the first group belong the so called "mature markets" that can be distinguished by the high consumption per capita, slow growth of the market, and the general motivations of their consumers for the decision to buy organic product are the protection of the environment, the wellbeing of animals and the concern for their own health. Austria, Denmark, Switzerland, Germany belong to this group. The second group of markets can be distinguished by the moderate consumption per capita and still high growth rate of the market. In these countries, the sales channels are specialized shops for organic food and direct sale by the producers. Finland, Italy, Holland, Sweden, Belgium and England belong to this group. The last group of markets, where the Republic

¹¹ Official Gazette of the Republic of Macedonia No. 67/2004

of Macedonia belongs, can be distinguished by low consumption per capita, and the markets are attended/supplied by pioneers in organic production. The markets of Czech Republic, Greece, Ireland, Slovenia, Spain and Portugal belong here.

Market of organic production

The world industry of organic products continues to grow in 2008, and the total sale of organic products in the world was estimated to 50,9 billion of American dollars, which represents 235% growth in comparison to 1999, when the total sale of organic products amounted € 15,2 billion.

The greatest demand of organic products is in North America and Europe, and these

two regions compose 97% of the total market of organic products. The other regions as Asia, South America and Australia are important producers and exporters of organic food.

In the following period, a lower steps in the growth of world organic market are expected, as a result of the financial crisis. Many countries are in economical recession and therefore it has an influence on the reduction of investments and reduction of purchasing power of customers. The markets in USA, Great Britain, Germany etc. have shown even lower growth rates in 2008 and 2009. A positive growth of markets of organic products is expected in the following years, but under lower growth rates as well.

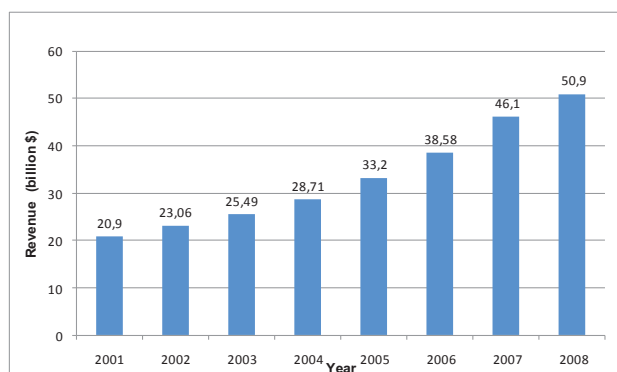


Image Nr. 12, Development trend of the world markets for organic products

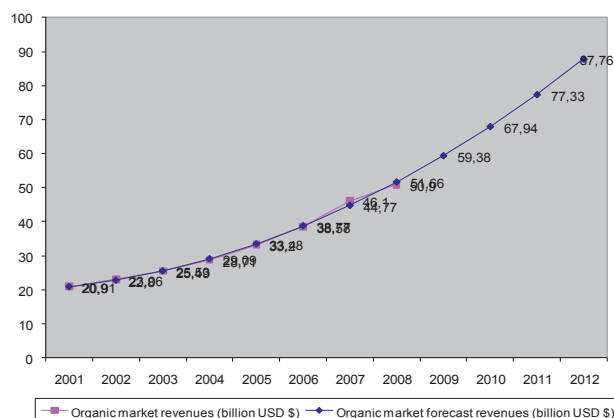


Image Nr. 13, Parabolic trend in the production of organic products (in billion USD \$)

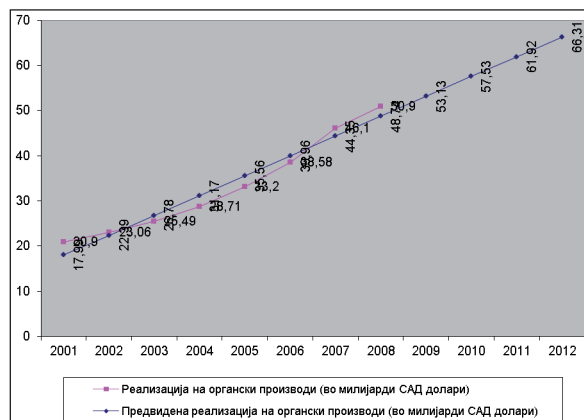


Image Nr. 14, Rectilinear trend of the market for organic products (in billion USD \$)

Europe has the largest and the most sophisticated market for organic food and beverages in the world. The total retail of organic products in Europe is estimated to € 17,9 billion in 2008, which represents an increasing of approximately 10% in comparison to 2007, where the value of the European market of organic products amounted € 16,2 billion.

The huge selling value is due to the fact that five of the largest markets of organic products are located in Europe. In some European countries, the organic products participate with more than four percents of the total sale of food.

The German, French and the market of organic products in Great Britain are the largest markets in Europe. The biggest discounts in Germany, as Aldi, Lidl and Plus have the largest share in the market due to their competitive prices regarding the other sellers. The biggest retailer in Germany is Tesco that offers over 700 organic products. The markets in Germany, France, Great Britain and Italy compose almost 75% of the sale of organic products in Europe. The consumers in Denmark, Switzerland and Austria are the major consumers of organic products. These countries have their own market share in the total sale of the food as well.

Unlike them, the consumers in South, Central and East Europe are the weakest consumers of organic food. The markets of these countries are small, but they are growing markets of organic food. The Central and East Europe compose 2% of the sale of organic products in Europe. The largest part of the produced organic food of these countries is exported to West Europe. The countries as Romania and Ukraine are important sources of cereals.

The largest markets are those in Germany, France and Great Britain. Denmark, Austria and Switzerland have the largest share of organic products in the total sale of food in Europe, and these countries are the largest consumers of organic products per capita as well. The average consumption of organic products per capita in Europe amounts 25,8 euro annually for 2008.

However, it is necessary to mention that the increasing of value in the retail trade does not mean just increasing the scope of trade, it can be the result from increasing of the prices.

It is very hard to predict the future tendency. Several points are considered important, but they might act in the opposite direction. Many consumers in the developed markets can change the places they shop, as a result of the financial crisis. Others

can reduce their consumption of organic products, or take care of the products they buy. Despite the negative influence of the recession in some countries, the organic sector has a potential for future growth, as the focus of consumers towards the values as justice, concern about the health, local origin of products and taste is increasing, those are fields that the organic production can distribute to consumers.

The development of production and demand for certain categories of products are going to the same direction. In many developed markets, the demand of certain categories of products - vegetables, salads, fruit and in several cases milk products - is greater than the supply, which results

in considerable amount of products that should be imported. The production in South and East Europe is adapted to export and each increasing in the demand of the markets in developed countries brings new opportunities.

The prices of organic products show fluctuations in the period between 2009 and 2009, with increasing in 2008 and decreasing of the prices of organic products in 2009 as a result of the economic crisis. After many years of high growth rate, the time for stabilization has come. The growth rates in future are expected to be not that big and relatively moderate, with little fluctuations between surplus and deficit in the market.

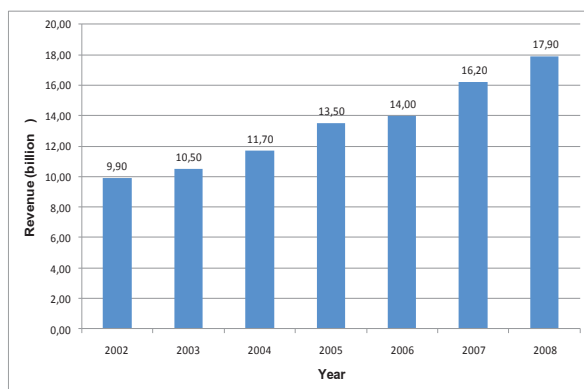


Image Nr. 15, European organic market revenues

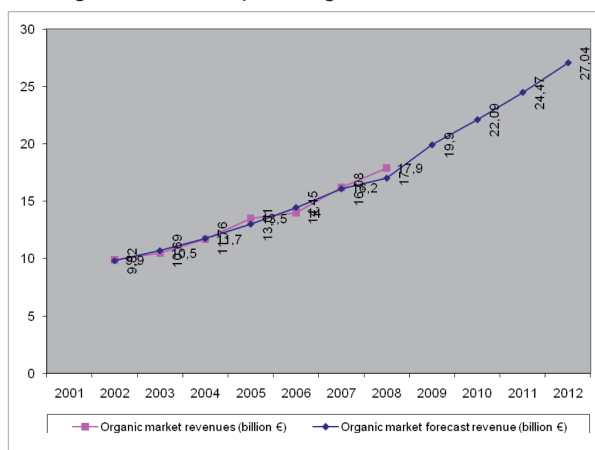


Image Nr. 16, World market of organic products (in billion USD \$)

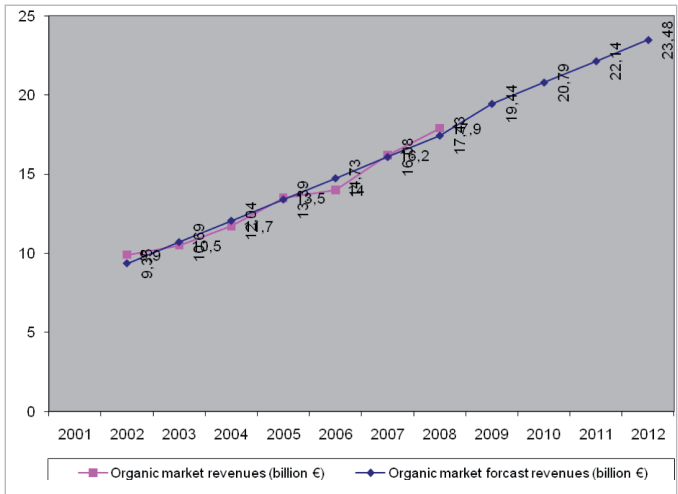


Image Nr. 17, European organic market revenues (Linear trend line, billion €)

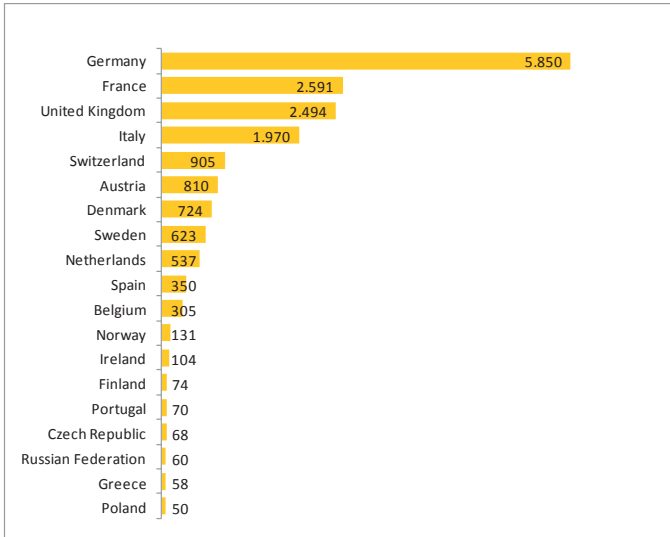


Image Nr. 18, Organic sales in Europe in 2008 (billion €)

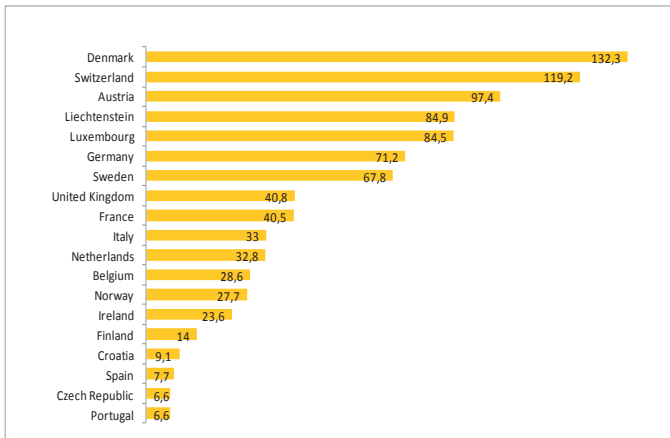


Image Nr. 19, Organic sales per person in Europe (2008, in € per year)

Image Nr. 19, Organic sales per person in Europe in 2008 (in € per year)

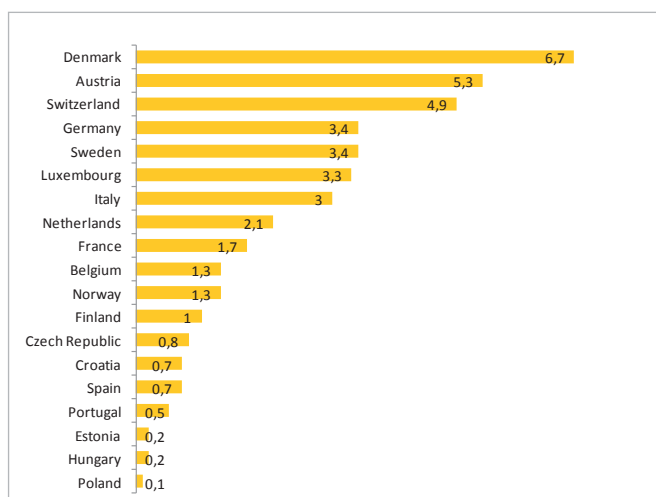


Image Nr. 20, Share of organic food in the total sale of food in Europe for 2008 (in %)

Germany

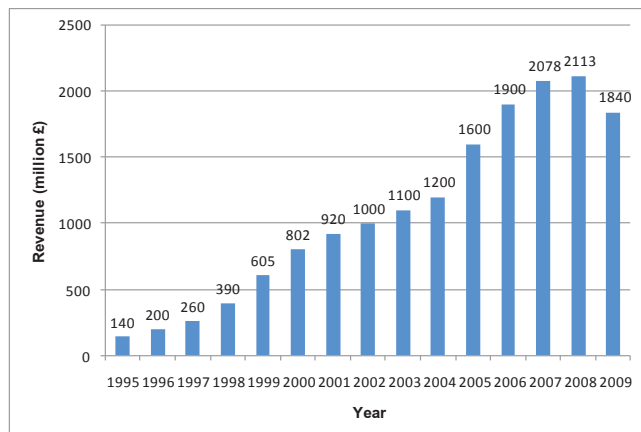
Germany is the largest market of organic products in retail that is supplied by domestic production as well as import. In 2008 the shops in Germany sold 20% more organic products in comparison to 2007 and that is 57% of the total sale of organic products. The sale of organic products in Germany was increased from € 1,48 billion in 1997 to approximately € 5,85 billion in 2008. There was a market stagnation in 2009. The scope of sale was insignificantly increased, but as a result of the price reduction, the value of domestic market was reduced as well.

France

From 1994 to 2009 the organic sector in France is constantly growing. During this period, the number of organic farms was increased for 457%, while the areas of organic production were increased for 490%. The recent data published by Agence Bio show that the number of organic farms in 2009 amounted 16.466, while in comparison to 2008, the number of organic farms was

increased for 23,7 %. The total area of organic production amounted 677.513 ha in 2009, which is an increasing of 16% in comparison to 2008. The participation of organic farms in the total number of farms in France amounts 3,14%, while the areas of organic production represent 2,5% of the total arable land in France.

France, with population over 60 million, represents one of the largest markets of food in Europe. The market share of organic products in 2009 reached 1,9% of the total sale of food. From 2005 to 2009, the profit from the sale of organic products was nearly doubled from € 1,6 billion to € 3 billion in only four years. France passed Great Britain and Italy and became the second largest market in Europe. Retail shops and specialized shops of organic products have almost equal share of the market (42 and 40% each of them). Fruits and vegetables (17%), milk products (16%) and wine (10%) are groups of products that have the biggest share in the total sale of organic products.



Great Britain

The sale of organic products in Great Britain amounted £ 1.849,2 million in 2009 or reduction for 12,9% in comparison to 2008. The sale was significantly reduced, after many years of constant growth.

Image Nr. 21, Sale of organic products in Great Britain

Italy

In the first six months of 2009, the market of organic products can note down an increasing of 7,4%. The sale of fruits and vegetables was increased for 38% in the first six months of 2009. Milk products are the second largest category with 18% of the total sale.

Switzerland

The market of organic products in Switzerland was increased for 11,2% in 2008 and amounted SHF 1.44 billion or 4,9% of the total market of food in Switzerland.

The market of organic products in Switzerland continues to grow and the value of the sold organic products amounts 1,55 billion Swiss francs or more that 1 billion euro, which represents an increasing of 7% in comparison to 2008 (1,4 billion of Swiss francs or 0,9 billion euro). Organic eggs, bread and vegetables are categories that take the largest part in the total market of organic products, with 16%, 15% and 10% of the total sale.

Austria

In 2008, the consumers in Austria spent 6,3% more on organic food than in 2007. The

retail shops represent the largest channel for sale of organic products, with 66%. 5,3% of the total sale of food and beverages in Austria is for organic products.

Denmark

After Sweden, Denmark has the second largest growth rate of organic market in Europe in 2008. The increased growth rate is due to the rough increasing of the prices of organic products, as well as the increasing of the scope of sale for 11%. The most important categories of organic products are milk products and eggs with 37%, followed by the cereals with 13%.

Sweden

Sweden had the largest growth rate of organic market - 38% in 2008. The sale of organic products amounted 5,99 billion Swedish kroner or € 623 million. Milk products and eggs take the largest part of the sale of organic products (34% of the total sale), followed by vegetables (15%), fruit (14%) and bread and cereals (9%). The domestic supply and import are increasing in order to satisfy the increased demand.

United States of America (USA)

The sale of organic food in USA in the period between 2000 - 2009 is increased from \$ 6,1 billion to \$ 24,8 billion in 2009. The participation of organic food in the total sale of food in USA increased from 1,2 to 3,7 % as well. The sale of organic fruits and vegetables represents 38% of the total

sale of organic products, and reached \$ 9,5 billions, which is an increasing of 11,4% in comparison to the sale in 2008. The sale of organic fruits and vegetables represents 11,4 % of the total sale of fruits and vegetables in USA.

The largest part of organic food is sold by the retailers and grocery stores.

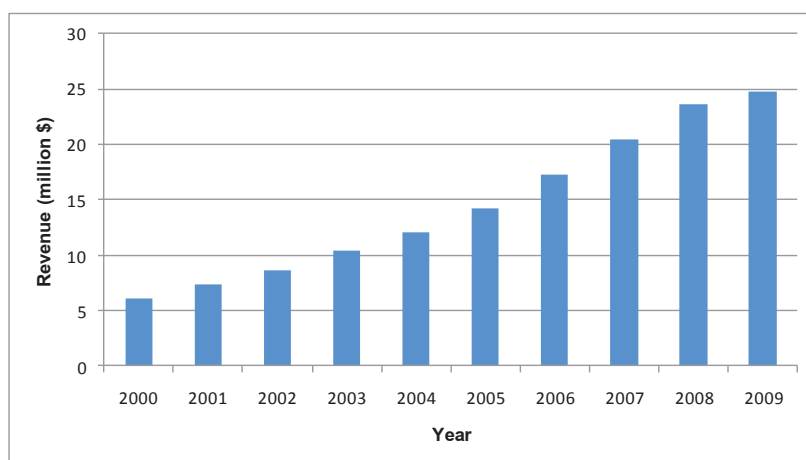


Image Nr. 22, Development of the market of organic food in USA

Macedonia

Macedonia does not dispose of sufficient amount as well as sufficient variety of products to undertake real marketing activities. As a result of not having constant supply of sufficient domestic organic products, it is difficult to achieve cooperation with attractive sale spots. Most of the processing companies do not want to engage their facilities for processing small amounts of fresh organic products. The fresh fruits and vegetables are often sold with the price of the conventional ones.

In order to export their products outside the country, the producers of organic products in Macedonia should organize associations of producers to produce sufficient amount for export.

One positive example of collective approach in the export market is the sale of the Japanese persimmon in the region of Valandovo. The producers of organic Japanese persimmon, through their association, united the total supply of Japanese persimmon, and therefore they reached satisfactory amount for sale in the markets of Switzerland and EU.

Another example of successful company, that produces organic products and places them in the domestic and foreign market is the pharmacy company Alkaloid. This company is certified as processor of different products as teas, mushrooms, preserved fruit, juices, concentrates for juices, jams that are places on the domestic and foreign market as well.

Supply and demand

Motives for buying by consumers encompass: safety and sanitary safety of food (there is a fear of food that is not safe); concern for preserving the nature, protection of the environment and wellbeing of animals; good taste of organic products and refusal of products with GMO (according to the analysis of consumers).

On the other hand, the main motives for refusal are impracticality (organic food considered as raw/unprocessed product),

unavailability, high prices, lack of information on benefits for the environment and absence of interest for organic products.

The consumers can be divided into three categories:

- Politically and ideologically motivated, concerned about the rights of the animals and/or the environment
- Aware of the health
- Manipulated that are easily influenced by media or prices and availability of organic products.

Areas of organic farming in the world, EU and the Republic of Macedonia

3.5.1 Organic farming in the world

The main results of the last global survey on organic farming in 2008 show that:

- 35.000.000 hectares arable land in the world is used for organic production by almost 1.400.000 producers.
- The regions with largest areas of organically managed (established, certified) agricultural land are Oceania, (12.1 million hectares), Europe (8.2 million hectares) and Latin America (8.100.000 hectares). The countries with the most organic agricultural land are Australia, Argentina and China.
- The highest shares of the organically managed agricultural land are in Falkland Islands with around 36,9%, Lichtenstein with 29,8% and Austria with 15,9%.
- The countries with the highest numbers of producers of organic products are India with around 340.000, Uganda with 180.000 and Mexico with 130.000 producers.
- More than one-third of organic producers are located in Africa.
- On global level, the organic agricultural

land area increased in all regions every year.

- Twenty-six percents or 1.650.000 hectares of agricultural land under organic management was reported in Latin America, mainly due to strong growth in Argentina.
- In Europe, the organic land increased by more than half a million hectares, in Asia by 0.4 million.
- About one-third of the world's organically managed agricultural land – 12 million hectares – is located in developing countries. Most of this land is in Latin America, with Asia and Africa in second and third place.
- The countries with largest areas under organic agricultural management are Argentina, China and Brazil.
- 31.000.000 hectares are organic areas with volunteer plants and lands for apiculture. The majority of this land is in developing countries – in stark contrast to agricultural land, of which two-thirds is in developed countries. Further organic areas include aquaculture areas (0,43

million hectares), forest (0,01 million hectares) and grazed non-agricultural land (0,32 million hectares).

- Almost 2/3 of the agricultural land under organic management is grassland (22 million hectares). The cropped area (arable land and permanent crops) constitutes 8.2 million hectares, which represents a quarter of the organic agricultural land.

As a comparison, it can be noticed that in 2006, the total agricultural areas in the world¹², where organic crops were cultivated, amounted 30,6 million ha, or 0,7 % of the total world agricultural land. With its 11,8 million ha, Australia had the most of

agricultural areas under organic farming, the next is Europe with 6,9 million ha (1,1 million ha of them are in Italy) and Latin America with 5,8 million ha (3,1 million ha are in Argentina). After them follow North America with 2,2 million ha, Asia with 2,9 million ha and Africa with 0,9 million ha.

In order to obtain more realistic overview of the developmental trend in the areas used for organic production, we will make graphic display through rectilinear and parabolic trend.

The rectilinear trend gives more optimistic scenario, with additional accelerated development of organic production (image Nr. 24)

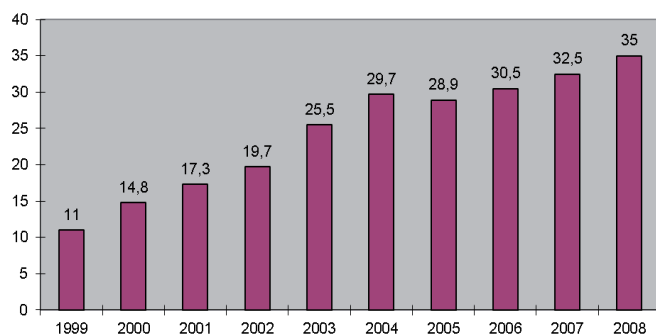


Image Nr. 23, Areas under organic farming in the world (in million ha)

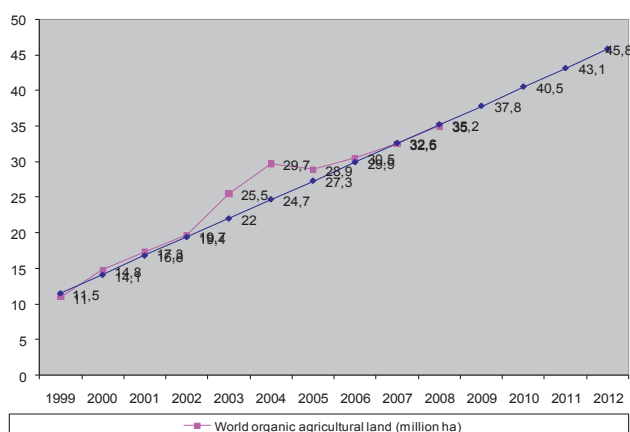


Image Nr. 24, Developmental trend of the areas under organic farming in the world in million hectares (2008) – (Exponential trend line)

¹² Unless stipulated otherwise, all data of this Chapter are taken from the Council of organic agriculture“, IFOAM, SOL, FiBL, 2007

While the parabolic trend gives slower growth, its opportunities to succeed in the following years are more secure.

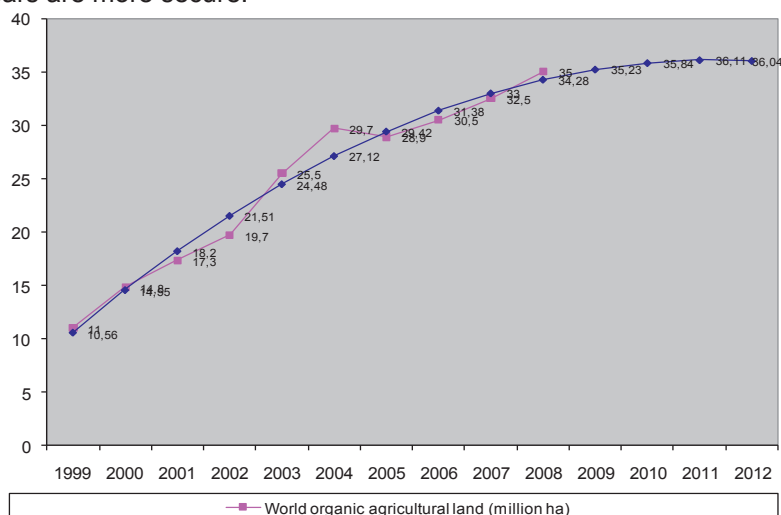


Image Nr. 25, Developmental trend of the areas under organic farming in the world in million hectares (2008) – (Linear trend line, milion ha)

3.5.2 Areas under organic farming in the Europe

The total area under organic farming in the world in 2009 amounted 37 million hectares (35 million ha in 2008), while in Europe 7,9 million ha which constitutes 23% of the total organic agricultural area in the world and 30% of the organic farms in the world. The European countries with the largest organic area are Italy with 1,07 million ha, Germany and Spain with 0,81 million ha each, the United Kingdom with 0,62 million ha, France with 0,56 million ha and Austria with 0,36 million ha, From the new member-states, more important organic producers are Czech Republic with 0,25 million ha, Poland with 0,17 million ha and Hungary with 0,12 million ha.

The total area under organic farming in Europe in 2006 amounted 6,9 million hectares (6,5 million ha in EU-25), which constitutes 23% of the total organic agricultural area in the world and 30% of the organic farms

in the world. The European countries with the largest organic area are Italy with 1,07 million ha, Germany and Spain with 0,81 million ha each, the United Kingdom with 0,62 million ha, France with 0,56 million ha and Austria with 0,36 million ha, From the new member-states, more important organic producers are Czech Republic with 0,25 million ha, Poland with 0,17 million ha and Hungary with 0,12 million ha.

The share of organic agricultural areas from the total agricultural land in Europe in 2006 amounted 1,38%, but with great differences from one to another land. Hence, the organic agriculture participates with 14,2 % of the total agriculture in Austria, 8,4% in Italy and 6,3% in Sweden. Although it is not a member state, Switzerland has a great share of organic agriculture in the total agriculture of the country, 10,9%.

Table Nr. 13, Areas under organic farming in EU and their structure of participation

Countries	2003		2005		2007		2008		2009	
	AGRICULTURE (ha) organic production	% organic production	AGRICULTURE (ha) organic production	% organic production	AGRICULTURE (ha) organic production	% organic production	AGRICULTURE (ha) organic production	% organic production	AGRICULTURE (ha) organic production	% organic production
Austria	445.879	15,40%	479.216	16,7%	481.636	17,0%	491.825	17,4%	518.172	18,5%
Belgium	23.966	1,72%	22.996	1,7%	32.628	2,4%	35.721	2,6%	35.721	2,6%
Bulgaria	650	0,01%	2.432	0,0%	13.646	0,4%	16.663	0,5%	16.663	0,5%
Cyprus	500	0,32%	1.698	1,1%	2.322	1,6%	2.322	1,6%	2.322	1,6%
Czech Republic	254.995	5,97%	254.982	6,0%	312.890	7,4%	341.632	8,0%	341.632	8,0%
Germany	165.146	6,21%	147.482	5,7%	142.857	5,4%	150.104	5,6%	150.104	5,6%
Estonia	40.890	5,14%	59.742	7,2%	79.530	8,8%	87.346	9,6%	90.438	10,0%
Finland	159.987	7,12%	147.587	6,7%	148.760	6,5%	150.374	6,6%	150.374	6,6%
France	550.990	1,86%	560.838	1,9%	557.133	2,0%	580.956	2,1%	580.956	2,1%
Germany	734.027	4,32%	807.406	4,7%	865.336	5,1%	907.786	5,4%	907.786	5,4%
Greece	244.457	2,91%	288.255	3,5%	278.397	3,4%	317.824	3,8%	317.824	3,8%
Hungary	113.816	2,62%	128.574	3,0%	122.270	2,9%	122.816	2,9%	122.816	2,9%
Ireland	28.514	0,65%	35.266	0,8%	41.122	1,0%	44.751	1,1%	44.751	1,1%
Italy	1.052.012	8,02%	1.067.102	8,4%	1.150.253	9,0%	1.002.414	7,9%	1.002.414	7,9%
Latvia	24.422	1,64%	104.235	6,1%	150.505	8,5%	161.625	9,1%	161.625	9,1%
Lithuania	23.289	0,93%	69.430	2,5%	120.418	4,5%	122.200	4,6%	122.200	4,6%
Luxembourg	3.004	2,34%	3.243	2,5%	3.380	2,6%	3.535	2,7%	3.535	2,7%
Malta	14	0,13%	14	0,1%	12	0,1%	12	0,1%	12	0,1%
Holland	41.865	2,18%	48.765	2,5%	47.019	2,5%	50.434	2,6%	50.434	2,6%
Poland	76.252	0,53%	159.709	1,1%	285.878	1,8%	313.944	2,0%	313.944	2,0%
Portugal	120.729	3,24%	211.865	5,8%	229.717	6,6%	229.717	6,6%	229.717	6,6%
Romania	56.800	0,41%	92.770	0,7%	131.401	1,0%	140.132	1,0%	140.132	1,0%
Slavonia	54.478	2,55%	90.206	4,8%	117.906	6,1%	140.755	7,3%	140.755	7,3%
Slovenia	23.280	4,79%	23.499	4,8%	29.322	6,0%	29.838	6,1%	29.838	6,1%
Spain	544.761	2,16%	622.762	2,5%	804.884	3,2%	1.129.844	4,5%	1.330.774	5,3%
Sweden	225.785	7,22%	222.268	7,0%	308.273	9,9%	336.439	10,8%	336.439	10,8%
England	695.619	4,32%	612.996	3,8%	682.196	4,2%	737.631	4,6%	737.631	4,6%
Total	5.706.127	3,14%	6.265.339	3,5%	7.139.692	4,0%	7.648.639	4,3%	7.879.009	4,5%

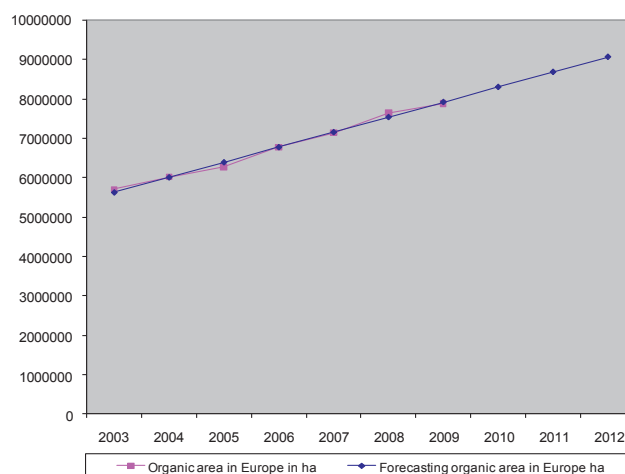


Image Nr. 26, Developmental trend of the areas under organic farming in EU (exponential trend line)

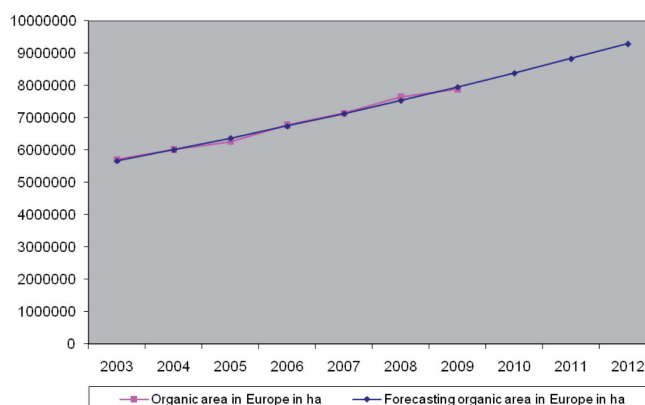


Image Nr. 27, Developmental trend of the areas under organic farming in EU (linear trend line)

3.5.3 Number and size of organic farms in the world

In 2007, the number of organic farms around the world was 633.891. Although Australia has the largest area under organic production, the number of individual organic farms is only 1869. However, the average size of organic farms in Australia is over 6.000 ha. The participation of organic farms in the total agricultural land in Australia is only 2,68%.

According to the data of FAO and other relevant organizations, around 228.533 organic farms are recorded in the European Union in 2009.

Individual member-states with largest number of farms are: Italy with 44.371 farms, Spain with 25.291 farms, Greece with 24.057 farms, Austria with 19.961 farms, Germany with 19.813 farms, Turkey with 15.406 farms and Poland with 14.888 farms.

The average size of organic farms in the countries of EU is 40 ha, which is significantly larger than the average size of conventional farms (15 ha). One possible explanation of this difference is the difference of the production structures in the two methods of production.

Considering the stated data of the areas under organic production and the number of producers (farmers) of organic production, not only can we understand the past development, but we can predict the subsequent one as well.

Expressed in more details, from the analyzed data we can conclude that since 2003, the area and the number of producers (farmers) of organic production is growing in almost all analyzed countries.

3.5.4 Organic markets in the world and Europe

The total retail of organic products in the world for 2005 was estimated to € 25 billion. Within the world frameworks, the incomes of the sale of organic food and beverages were increased for 43% from € 18 billion in 2002. The largest markets of organic food are located in Europe with 13 billion Euros and North America with 15 billion Euros.

The largest national markets in Europe are in Germany, United Kingdom, France and Italy. The markets in the new member-states are less developed. The total size of organic markets in the ten new member-states amounts € 60 billion.

The share of organic products in the total sale of food is between 1,5% and 2,5 % in individual member-states of EU-15. However, in Switzerland this share amounts as many as 7,5%.

While organic markets in North America have shown growth rate of 16% since 2002, the spectacular expanding of organic markets in Europe has slowed down in the recent few years. The annual growth of organic market in the recent years amounted around 5% in Italy, Germany and France, but as many as 12% in the United Kingdom.

According to the sources of IFOAM, for the period between 2003 and 2007, a growth of 11% in the United Kingdom, 6,1% in France, 5,5% in Italy and 4,8% in Germany was envisaged. The organic markets have a bright future before them. However, some risk factors can limit the growth, as occasional excessive supply of organic products, which can result in long-term negative effect. In the same way, the reduced price-premium can not only reduce the profit, but can reduce the long-term supply of organic products as well.

3.5.5 Organic farming in the Republic of Macedonia

The researches show that there are convenient conditions in the Republic of Macedonia for production of organic farming as: land, water and entire environment in individual parts of Macedonia that are around six times less polluted in comparison to the developed countries, which only confirms the well-known supposition that Macedonia has a huge potential for development of production of healthy food i.e. organic farming.

According to the obtained data, it can be noticed that the number of operators and the realized production of organic food in the few recent years is growing for over 30% a year in the world, and almost 100% a year in

the Republic of Macedonia.

The first officially certified 50 producers of organic food, associated in "Biosan" offered 345 tons of different agricultural products.

Realizing the importance of the organic production in the same way, the government allowed convenient subsidies for the producers. Therefore, it is clearly proven that Macedonia gets involved in the world trends of organic food production.

According to the data of the Ministry of agriculture, forestry and water management, the number of interested farmers for this type of food production is increasing for 100% every year.

Table Nr. 14. Operators of organic production with certified areas¹³

	2003	2004	2005	2006	2007	2008	2009
Number of farmers	13	21	50	102	150	226	327

This indicates to the fact that the interest of the farmers in organic production is growing each year.

Table Nr. 15, Dynamics of development of operators in organic production

Years	Number of farmers	Base indexes Base 2003	Chain indexes
2003	13	100%	
2004	21	162%	162%
2005	50	385%	238%
2006	102	785%	204%
2007	150	1154%	147%
2008	226	1738%	151%
2009	327	2515%	145%

From the processed data it can be noticed that the number of agricultural producers of organic food is rapidly growing each year.

However, in order to provide official indicators and information on certified areas

for organic production, we shall make more detailed analysis of the years 2005-2009 from the data obtained by the Annual reports of the Ministry of agriculture, forestry and water management. .

Table Nr. 16, Dynamics of development of operators in organic production for the period of 2005-2009

Years	Number of farmers	Base indexes Base 2003	Chain indexes
2005	50	100%	
2006	102	204%	204%
2007	150	300%	147%
2008	226	452%	151%
2009	327	654%	145%

Data from the table Nr. 16, indicate that the number of operators in organic production on certified agricultural areas for organic production in the Republic of Macedonia, for the analyzed period, is rapidly growing with growth rate of over 150% each year.

¹³ Zlatkovski V., Mihajlov Lj., Trajkova Fidanka, Bicikliski Olivera, *Status and Development of Organic Agriculture in The Republic of Macedonia, International Conference on Organic Agriculture in Scope of Environmental Problems, Book of Abstracts, Famagusta 3-7 February 2010, p.130*

Table Nr. 17, Number of operators (farmers) in organic farming for the countries of EU separately

	2003	2004	2005	2006	2007	2008	2009
Земји Country	ПРОИЗВОДИТЕЛИ OPERATORS						
Албанија / Albania			93		100	50	50
Австрија / Austria	19.056		20.310		19.997	19.961	19.961
Белгија / Belgium	671		720		821	901	901
Босна и Херцеговина / Bosnia and Hercegovina	92		26		304	304	304
Бугарија / Bulgaria	29		111		240	254	254
Хрватска / Croatia	130		269		483	632	632
Кипар / Cyprus	45		305		305	305	305
Чешка / Czech Republic	810		829		1.318	1.946	2.689
Данска / Denmark	3.510		3.036		2.841	2.753	2.753
Естонија / Estonia	766		1.013		1.211	1.259	2.536
Финска / Finland	4.983		4.359		3.971	3.991	3.991
Франција / France	11.359		11.402		11.978	13.298	13.298
Германија / Germany	16.476		17.020		18.703	19.813	19.813
Грција / Greece	6.642		14.614		23.769	24.057	24.057
Унгарија / Hungary	1.255		1.553		1.389	1.614	1.614
Исланд / Iceland			25		36	35	35
Ирска / Ireland	982		978		1.140	1.220	1.220
Италија / Italy	44.034		44.733		45.231	44.371	44.371
Латвија / Latvia	550		2.873		4.108	4.203	4.203
Лихтенштајн / Liechtenstein			35		39	37	37
Летонија / Lithuania			1.811		2.348	2.797	2.797
Луксембург / Luxembourg	59		72		81	85	85
Македонија / Macedonia	13		21		127	99	99
Малта / Malta			6		30	30	30
Молдавија / Moldova			121		121	121	121
Црна Гора / Montenegro					13	25	25
Холандија / Netherlands	1.522		1.468		1.465	1.402	1.402
Норвешка / Norway	2.303		2.496		2.611	2.702	2.702
Полска / Poland	1.977		7.182		11.887	14.888	14.888
Португалија / Portugal	1.196		1.623		1.949	1.949	1.949
Романија / Romania			2.920		2.238	2.775	2.775
Русија / Russian Federation			10		12		
Србија / Serbia						224	224
Словачка / Slovakia	100		196		280	350	350
Словенија / Slovenia			1.718		2.000	2.067	2.067
Шпанија / Spain	17.028		15.693		18.226	21.291	25.291
Шведска / Sweden	4.294		2.951		2.848	3.686	3.686
Швајцарија / Switzerland	6.124		6.420		6.199	6.111	6.111
Турција / Turkey	14.798		14.401		16.276	15.406	15.406
Украина / Ukraine	69		72		92	118	118
Обединето Кралство / United Kingdom	4.012		4.285		5.506	5.383	5.383
Вкупно / Total*	164.885	176.913	187.770	198.818	212.293	222.513	228.533

In order to obtain more clear overview on the future development of the areas and the number of operators in organic production, we shall develop future time series for period of three years, using the methods of prognosis through rectilinear and parabolic trend.

The developmental series will be

shown on the basis of the entire data on European Union's level, but it does not mean that trends can be developed for each country. However, from the trends of entire data shown, the developmental trend can be perceived and knowledge on the future development of organic production in individual countries can be derived.

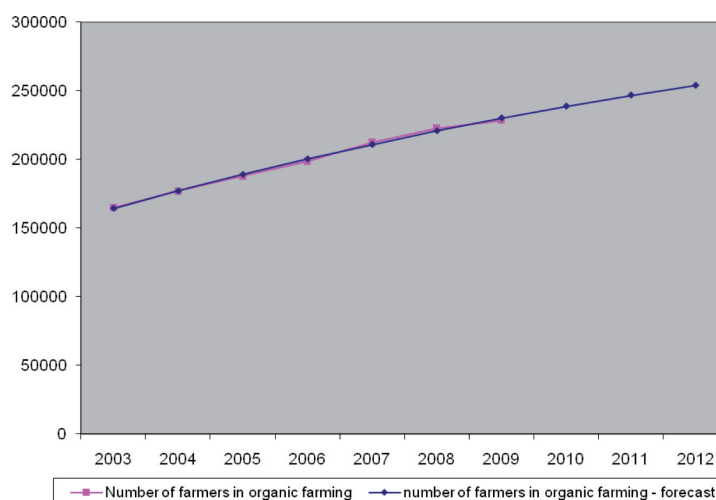


Image Nr. 28, Developmental tendency of the number of farmers in organic farming of EU (linear trend line)

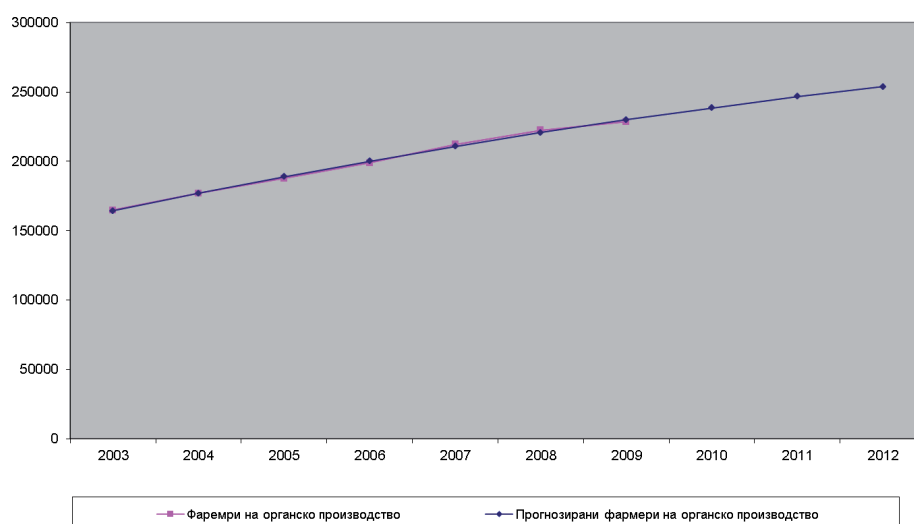


Image Nr. 29, Developmental tendency of the number of farmers in organic farming of EU (parabolic trend)

3.5.6 Expansion of organic food in the world

The production of organic food is experiencing a real expansion in the world. The number of people that opt for consumption of products of organic origin is increasing. And that is not all.

The clothes of organic cotton, organic silk as well as cosmetics of organic origin are the most required and most expensive products in the world market.

How much does the profit from these products amount can be noticed from the fact that these producers are often owners of private planes, expensive yachts and

huge properties. The world media in the recent months pay special attention to the production of organic food.

In the developed countries, the agriculture represents a significant factor in the total production and food processing.

13% of the food production in Denmark is organic, 10% in Austria and 8,7% in Switzerland.

The greatest market of organic food is Germany with 10% annual growth, which is twice bigger than the French market.

3.5.7 Measures of government support

The first measure for support of organic farming was undertaken by the Ministry of agriculture, forestry and water management in 2005, after the adaptation of the first Law on organic farming in 2004. Regarding the size of this sector back then, the support of modest 6.000.000,00 denars was appropriate. Sadly, the capacities of the organic farming sector were not on the required level back then, therefore the envisaged amount of funds was not fully used, and this leads to extremely destructive measure in 2006 – abolition of subsidies for organic farming.

However, this attitude of the country did not demotivate the producers, therefore, seeing a potential in this kind of production, they continued with their orientation towards organic agriculture, increasing the areas and the scope of products in the Republic of Macedonia at the same time.

Luckily, the state recognized the enthusiasm of the producers and the

potential from reducing the foreign exchange outflow for import of food and foreign exchange earnings for export of this type of products, and it introduced the subsidies for this production again in 2007. From then on, the amount for support of organic farming is in constant growth, depending on the potentials of the government budget. In the previous years, the amounts for support of organic agriculture were not in appropriate ratio with the subsidies of the common agricultural production, often creating too big or too small difference among them, which contributed to loss of interest for production of one of them or too big interest for production of other type of crops. The amount of government support for organic agriculture is fixed to 30% above the basic measure for support of common agricultural production.

The overview of the amounts of measures for government support in the years¹⁴ is illustrated on the image Nr. 30.

¹⁴ Source: Ministry of agriculture, forestry and water management, Department of organic farming

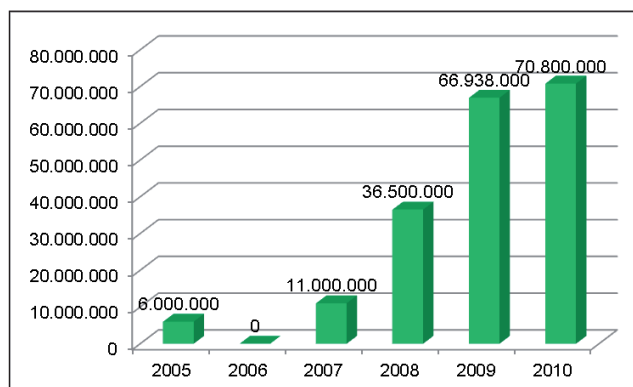


Image Nr. 30, Scope of government support in organic farming

Regarding the individual amounts of support, which can be divided between the types of crops, cereals (wheat, barley, triticale, oat, rye and rice) the size of the support in the period of 2007-2010 varies each years from 6.000,00 to 10.400,00 denars.

Graphical display of the government measure for support of cereals is shown on the image Nr. 31.

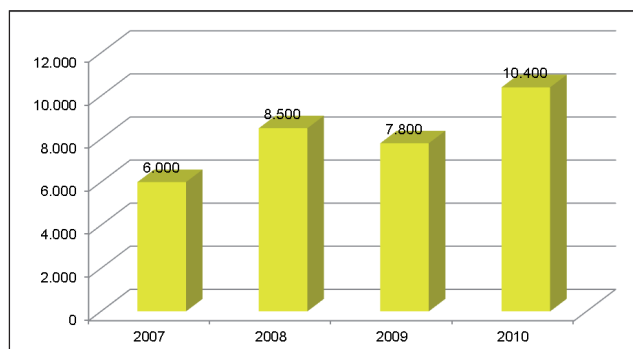


Image Nr. 31, Amount of subsidies for cereals in the years

The situation is more equal when it comes to forage crops, meadows and pastures, where the level of support has a stable trend, which can be concluded from the image Nr. 32.

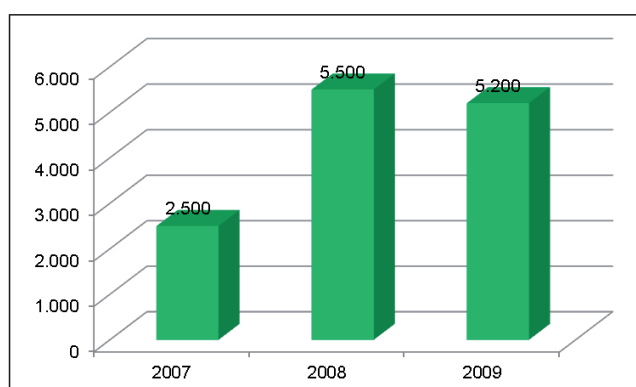


Image Nr. 32, Level of government support for forage crops, meadows and pastures.

Similarly to the previous situation, the government programme for support of industrial crops has a stable trend and goes from 5.000,00 to 10.400,00 denars.

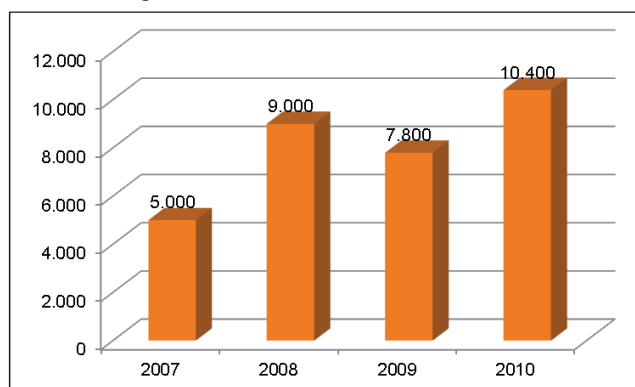


Image Nr. 33, Scope of government support for industrial crops

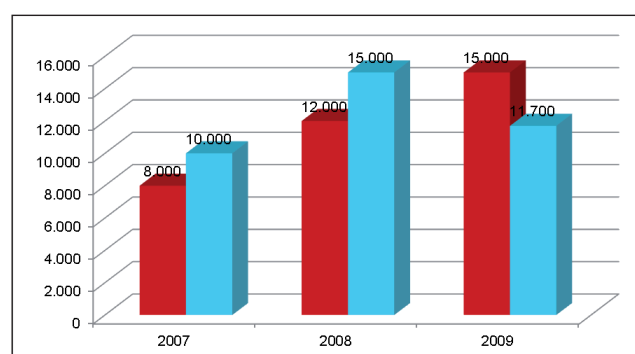


Image Nr. 34, Amount of government subsidy for perennial plants

The support for perennial plants in organic farming is higher in comparison to the annual plants. It is completely understandable, considering the need for plantation to return the investment and to preserve its good condition.

3.6 Sector SWOT analysis

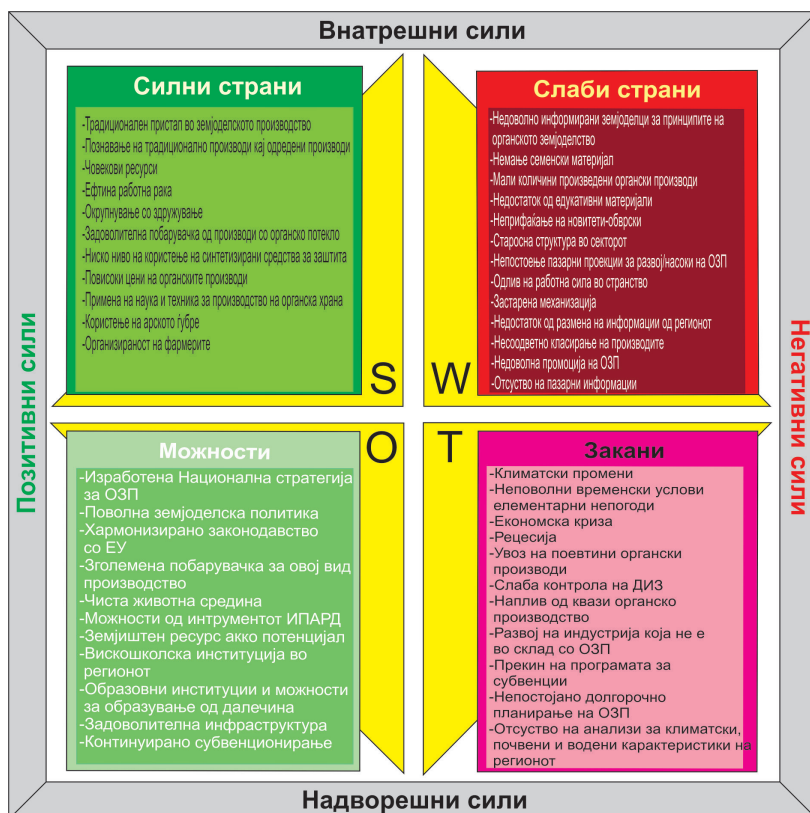
It is a tool that belongs to the Logical Framework Approach and it is used for identification of internal strong and weak parts of the analyzed subject, sector or organization, as well as the external factors such as opportunities and dangers that it is faced with. SWOT analysis can be used as a tool for general analysis or it can be used for establishing an altitude of the sector towards certain problem or challenge.

The quality of information that this analysis provides, as usually, depends on the selection of contributors that will participate in the analysis, but from the one that manages it as well, because the wrong understanding of the terms weak and strong parts, opportunities and dangers can contribute to missing the points as a whole, while carrying out the analysis.

The analysis is carried out in three phases:

1. A workshop for identification of the internal characteristics such as strong and weak parts, as well as external factors that have their own influence as opportunities and dangers is organized;
2. The things stated by the participants are analyzed, in order to define how can the strong parts of the sector exceed the weak parts, and how can the opportunities reduce the dangers as much as possible.
3. Firstly, the strategy is formulated, in order to develop appropriate measures afterwards.

In the workshop for SWOT analysis, the following internal and external factors were defined:



Дијаграм од извршената SWOT анализа

Strength	Weaknesses
Traditional approach towards agricultural production	Insufficiently informed farmers on the principles of organic agriculture
Knowledge of the traditional methods for obtaining certain products	Lack of seed material
Human resources	Small amounts of produced organic products
Low-paid workforce	Lack of educative material
Enlargement by associating	Non-acceptance of novelties-duties
Satisfactory demand of products from organic origin	Age structure of the sector
Lower level of application of artificial means for protection	Absence of market projections for development/directions of CMO (Common market organizations)
Higer prices of organic products	Brain drain
Application of science and technique for production of organic food	Obsolete mechanization
Use of animal manure	Lack of information transfer in the region
Organizational stage of farmers	Inadequate classification of products
	Insufficient promotion of CMO
	Absence of market information

From the points mentioned above it can be concluded that as factors which may influence the sector of organic farming with positive and negative effect, can we determine the elements that will have crucial influence on providing conditions for sustainable development of organic farming in this planning region if properly directed.

Therefore, as elements with positive effect that this sector disposes of and that represent basic preconditions for organization of organic farming, we can mention the following: traditional approach towards production, plant spices cultivated on properties, satisfactory demand for products of organic origin, low level of application of artificial means for protection of the plants' health and use of animal manure as a mean for improving the soil fertility.

On the other hand, part of the internal factors, over which the sector has its influence, can be successfully transformed from limiting elements to advantage. As such factors we can mention the following: insufficiently informed farmers on the principles of organic agriculture, absence of seed material, lack of educative materials as well as lack of information transfer in the region, inadequate classification of the products and absence of market information that represent a challenge for the contributors in this sector to focus on the preparation of appropriate projects for reducing the number or completely removing the weak parts, which are significant limiting element at the moment.

Opportunities	Threats
Elaborated National strategy for CMO	Climatic changes
Favorable agricultural policy	Not favorable weather – natural disasters
Legislation harmonized with EU	Economic crisis
Increased demand for this type of production	Recession
Clean environment	Import of less expensive organic products
Opportunities from the IPARD instrument	Low control of the State Agricultural Inspectorate
Land resources as potential	Flow of quasi-organic production
Higher-educational institution in the region	Development of the industry in accordance with CMO
Educational institutions and opportunities for distance education (Internet)	Abolition of the subsidies programme
Satisfactory infrastructure	Inconstant long-term planning of CMO
Continuous subsidizing	Absence of analysis for the characteristics of the climate, soil and water in the region
	Absence of the system for danger warning for diseases and pests

Similarly to the previous description, the opportunities are forces that positively influence the development of the sector, but the sector can not influence them, i.e. their effect (intensity, frequency, direction of action) does not depend upon the will of the sector. The elaborated strategic documents are such that create legal framework in the sector, increased demand of this type of products, clean environment, educational institutions and satisfactory infrastructure. The opportunities mentioned above, in coordination with the sector, can have positive influence in elimination of the weak parts.

The dangers, on the other hand, are forces with negative influence on the development of the sector, but the sector cannot influence them. Regarding the character of the elements in this group, where the climatic changes, natural disasters, recession, import of less-expensive organic products and the low control of the State Agricultural Inspectorate are defined, what is left for the sector is to follow the development of the events and with accurate analysis to take measures and steps for reducing their negative influence.

3.7 Mapping the potentials for organic farming

3.7.1 Agriculture

3.7.1.1 Soil

It is an integral part of the biosphere, which has its role not only in agriculture, but as qualitative regulator of the human environment as well. Similarly to the water, the soil is one of the main factors in agricultural production, which unlike the water, is not renewable source, at least not during the lifespan of one human being. The soil plays very significant ecological role: Ability to filter, compensate and process the substances;

- Place to reside and genetic guardian of plants, animals and large number of animal forms;
- Producer of biomass.

It is formed by influence of 5 factors: climate, organisms, relief, parent material and weather that have an effect on 4 basic components: minerals, organic matters, water and air.

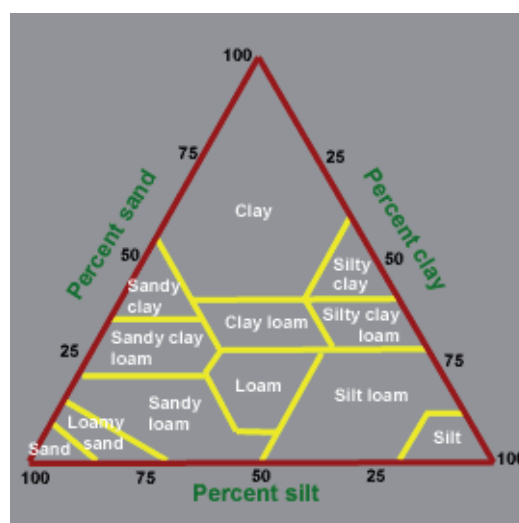


Image Nr. 35, Division of soil types regarding the content of different structures

Many indicators are used to determine the quality of soil. However, among the more important and most accepted are the following:

1. Physical characteristics: structure, depth of soil layer, field water capacity, water permeability;
2. Chemical characteristics: reaction pH, electrical conductivity, soluble amounts N:P:K, organic matters (ratio C/N);
3. Biological characteristics: microbiological biomass, microbial activity.

In order to keep the natural characteristics of the soil, it is necessary to undertake series of measures that should contribute

to preserving the natural fertility of soil, microbiological activities, maintaining its ability to dispose of certain capacity for water holding etc. All this can be achieved by respecting the priority of work contrasted with the habit of conventional agricultural production, to intervene with machines, tools and chemical means. Therefore, the organic agriculture must be performed in the most adequate moment, and not when the person has the time to do that. The postponing of work operations can result in shifting a whole series of subsequent activities and in creating favorable conditions for development of damaging flora, which is hard to deal with later.

Table Nr. 19, Total land area in municipalities ¹⁵

	Number of individual agricultural holdings	Total available land area (ha)	Total used agricultural land (ha)	Used private owned agricultural land (ha)	Land rent from others (ha)	Land rent to others (ha)	Number of parcels
Berovo	3.026	10.480	5.960	5.640	454	134	12.029
Vinica	3.643	5.716	3.525	3.136	491	102	13.040
Delcevo	3.439	9.179	4.198	4.029	253	85	12.403
Zrnovci	857	992	937	827	138	29	3.524
Karbinci	1.384	3.408	3.191	2.323	920	52	4.633
Kocani	4.859	6.137	4.719	3.631	1.163	75	14.262
Mac. Kamenica	1.317	2.343	1.197	1.177	25	6	5.036
Pehcevo	1.140	3.467	2.562	2.357	252	47	5.147
Probistip	2.491	4.789	3.462	3.093	412	43	8.610
Cesinovo-Oblesevo	2.424	4.514	4.362	4.058	385	81	11.391
Stip	3.215	6.479	5.438	4.298	1.205	64	6.867

From the overview we can conclude that there is a large property fragmentation. The average size of property of individual agricultural holding in the East planning region amounts 1,7 ha, which makes the agricultural production more expensive to greater extent.

3.7.1.2 Water

It is one of the significant factors, whose method of use makes difference between the organic and conventional agriculture. Namely, in the conventional agriculture the irrigation is performed in order to satisfy the needs for water of plants and often without taking care of the irrigation standards. This can not happen in organic agriculture, because the irrigation here is performed in order to satisfy the needs for water of the soil. Not just the needs of the soil as inorganic matter, but of the microorganisms that live in it as well. The irrigation standard is another issue, considering that it is satisfied with the use of systems that save water (drop by drop or use of sprayer), and the standard that is add is 70% of the field water capacity.

The water is renewable source, but it is hard to reach in certain parts or the quality is that bad that it is impossible to use it. The agriculture, as activity, is actually in constant competition with the other business activities, which realize greater profit rates. The main problems regarding water are down to available amounts, quality and distribution.

The amounts of water that should be added, depend on:

- Field water capacity;
- Weather ;
- Relief of the land;
- Type of crop;
- Pheno-phase of the plants.

¹⁵ Source: State Statistical Office, Statistical Database, Agriculture Census 2007, <http://www.stat.gov.mk/pxweb-2007bazi/dialog/statfile18.asp>

3.7.1.3 Crop rotation

Till the middle of the XVIII century, a system of three-field crop rotation was applied and after introduction of legumes a system of four-field crop rotation is used. However, before we go over the description of the systems mentioned above, we should say something about the application of this agro technical measure.

The benefit from the use of different crops in planting plans contributes to:

- sustaining and improving the structure of the soil;
- providing significant amounts of nitrogen in the soil through symbiotic activities of the leguminous plants and bacteria with nitrogen fixation characteristics;
- reducing the washing out of nutrients;
- reducing the problems with pests;
- increasing the microbiological activity of the soil;
- reducing the problems with weeds, without application of herbicides;
- providing sufficient amounts of different food for the livestock;

The crop rotation at annual plants seems pretty simple, but the real challenge is when crops should be selected that compose the scheme for crop rotation of the perennial plants. Although it is not a classical type of crop rotation, because the grapevine and fruit trees are on fixed places for years, the introduction of other crops in the production enables achieving identical effects as in annual ones. The most common plant species that are introduced in the scheme of crop rotation are the annual legumes of the family trifolium, which are very specific in the Mediterranean area. The application of intercropping, cover crops, mulching is not rare. Hence, it is not difficult to conclude that there are a large number of plant species that can be used for preserving biodiversity.

Finally, when planning appropriate scheme of crop rotation, the following principles should be considered:

- after planting crops with deep root system, crops with shallow one should be planted;
- plant species that are especially sensitive to weeds, should be planted after crops that prevent weeds' occurrence;
- after planting crops with large root mass, crops with small root mass should be planted;

crops with great demand of nitrogen should be planted after crops with nitrogen fixation ability.

In order to compose a good scheme of crop rotation it is necessary to carry out appropriate analysis on the advisability of its application, which includes:

- climatic values
- influence on environment and biodiversity
- sustainability of the producing models
- analysis of the most common weeds, diseases and pests
- optimal use of natural resources
- microbiological activity
- soil's fertility.

For organic production of plants and production of plant products, types and varieties that are adapted to the soil-climatic conditions and that are resistant to pests should be used in the selection of varieties. The crop rotation in organic production should be as much diverse as possible with a goal to preserve the fertility of the soil, to reduce the washing out of nutrients, to reduce the problems with pests and to preserve and increase the microbiological activity of the soil. The crop rotation should be different and accordingly composed for long-term fertility, preserving and not weeding of the soil, without use of herbicides for providing healthy conditions in accordance with the nature.

According to the stated example we can conclude that yields from farming and agronomic products are approximately equal and really attainable in comparison with the organic and conventional production. In certain territories of the region (Kocani, Vinica), with more fertile soil and more wet regions are surely expected greater yields than stated.

In that context we should add the results from the researches carried out in the middle of the Mediterranean (Central Italy), which are related to the effect of the nutrients' residues available for the crop that follow (in this case sunflower) in the long-term crop rotation, which includes 4-year cultivation of alfalfa (*Medicago sativa*), in comparison to the series of annual plants, therefore an equal yield of the sunflower is determined as in the conventional production (3.000 kg/ha grains i.e. 1.4000 kg/ha oil).

Similar results regarding the biological supply of soil with nitrogen in the organic systems of crop rotation are obtained in the organic agriculture of Great Britain and Germany where the data stored for 5 and 7 year are analyzed. All three types of crop rotation are based on alfalfa as annual green

manure, in order to estimate the supplying with nitrogen through green manure and its influence on the crop that follows. The estimated admission of nitrogen through symbiotic nitrogen fixation of the root system of alfalfa, was between 20-350 kg/ha depending on the conditions.

From these data, it can be concluded that when organizing organic production, a very important segment is to carry out the crop rotation properly, where it is compulsory to include leguminous plants as precondition for nitrogen fixation and as most appropriate green manure (sideration). From need for crop rotation point of view, which is considered to be one of the most important agro technical measures for preserving the soil's fertility and reducing the danger of uncontrolled appearance of weeds and pests, according to the scientifically proven data from the researches performed in the central Italy, the proper creation of crop rotation could reduce the problems with weeds for as much as 50 percents.

The table below shows the tolerant and intolerant crops for cultivation of monoculture (successive cultivation of the same crop in the same place).

Table Nr. 19, Tolerant and intolerant crops for cultivation in the same place again (modified by Sattler and Wistinghausen, 1985);

TOLERANT CROPS (tolerate monoculture)	INTOLERANT CROPS (do not tolerate monoculture)	MINIMAL PAUSE (years)
Rye	Sunflower	7- 8
Maize	Flax	7 – 8
Millet	Sugar and fodder beet	5 – 6
Potato (where there is not a danger of nematodes)	Potato (in the areas with danger of nematodes)	2 – 4
White clover	Different types of cabbage family	5 – 6
Common vetch	Pea	5 – 6
Larger part of grasses (<i>Poaceae</i>)	Oat	4 – 5
Yellow lupine	Oilseed rape	4 – 5
Soya	Wheat	2 – 3
Plants for green manure	Barley	2 – 3
	Carrot	3 – 4
	Alfalfa	5

Table Nr. 20, Compatibility – adequacy for combination of separate crops in the crop rotation (modified according to Lampkin, 1988);

CROP THAT FOLLOWS	PREVIOUS CROP													
	aw	ab	sb	sr	o	m	pe	b	a	gc	p	ep	be	cf
Autumn wheat (aw)	1	1	1	3	3	3	5	5	3	3	5	5	3	3
Spring wheat (sw)	1	1	1	3	3	5	4	5	5	5	5	4	5	5
Autumn barley (ab)	3	1	1	3	3	1	5	2	3	3	1	5	1	1
Spring barley (sb)	3	1	3	3	3	5	2	2	1	3	5	4	5	5
Autum rye (ar)	3	3	3	3	3	3	5	5	3	3	3	5	2	2
Spring rye (sr)	3	3	3	3	3	5	4	5	5	5	5	4	5	5
Oat (o)	3	3	3	3	2	5	5	5	5	5	5	4	5	5
Maize (m)	5	5	5	5	5	2	5	5	5	5	5	4	5	5
Pea (pe)	5	4	5	5	5	5	1	1	1	5	5	4	5	5
Bean (b)	5	4	5	5	5	5	1	1	1	5	5	4	5	5
Alfalfa (a)	4	3	5	5	3	3	1	1	1	1	5	5	5	5
Grass-clover mix (gc)	3	3	5	5	5	3	5	5	3	3	5	5	5	5
Potato (p)	5	4	5	5	5	5	5	5	5	5	2	2	5	5
Early potato (ep)	5	4	5	5	5	5	5	5	5	5	2	2	5	5
Beet (be)	5	5	5	5	5	5	5	5	5	5	5	4	1	1
Cabbage family (cf)	5	5	5	5	5	5	5	5	5	5	5	5	1	1

5 = excellent adequacy;

4 = good adequacy, but unnecessary if there are other more adequate crops. These combinations are justified if combined as additional (secondary, stubble) crops or crops for green manure;

3 = possible adequacy;

2 = limited success with great risk rate;

1 = bad adequacy and not recommenden.

It should be said that the legumes, cereals and oleaginous plants have a significant role in the choice that the farmers dispose of. These crops at the same time, whose autochthonous material can be found in the back country of Macedonia, give an opportunity for additional engagement of labor force, which is necessary for working, harvesting and in certain cases processing of the agricultural products as a result of the lack of appropriate mechanization.

Some traditional crops, which are almost extinct from our fields, can contribute to increasing of diversity and proper planning of the organic crop rotation. A special attention should be paid to the neglected crops that were traditionally present on these areas

before, as flax, poppy, cotton, chickpea and peanuts.

The selection of potentially rare types of crops in the organic agriculture depends on the climatic conditions, soil characteristics, opportunities for production, tradition, requirements for special type and quality of food etc.

The potential alternative crops for organic production and for better crop rotation that could succeed in our region are:

- Buckwheat (*Fagopyrum esculentum* Moench);
- Millet (*Panicum miliaceum* L.);
- Oilseed rape (*Brassica napus oleifera* L.);
- Quinoa (*Chenopodium quinoa* Willd);

- Pumpkin, common and oil (*Cucurbita pepo* [L.] Greb. var. *oleifera* Pietsch.);
- Sweet potato (*Ipomoea batatas* [L.] Poir.).

The European Union finances and carries out programmes for promotion of organic agriculture, studying the biological characteristics of plants, production, industrial treatment and processing. Some plants are listed below that are included in these programmes:

- Coriander (*Coriandrum sativum* L.);
- Oilseed rape (*Brassica napus oleifera* L.);
- Sunflower (*Helianthus annuus*);
- Flax (*Linum* spp.);
- Sorghum (*Sorghum* spp.);
- Artichoke (*Helianthus tuberosus* L.);
- Lupine (*Lupinus* spp.);
- Chicory (*Cichorium intybus* L.);
- Quinoa (*Chenopodium quinoa* Willd.);
- Hibiscus (*Hibiscus* spp.);
- Ricinus (*Ricinus communis* L.);

The most simple is the three-field crop rotation with the following order of the crops:

1. Crops that seek abundant manure;
2. Improvers or creators of soil's fertility;
3. Crops with modest requirements for nutrients.

It is better when green manure is included as well as annual aromatic and spice plants and flowering plants, i.e. four-field crop rotation. For example, the dynamic crop rotation according to Maria Thun has the following alternation of crops (in accordance with the symbols of the plant organs);

1. Year "root"
 2. Year "fruit"
 3. Year "flower"
 4. Year "leaf"
- Root garden crops are: carrot, beet, radish and celery;
 - Leafy garden crops are: cabbage, kohlrabi, lettuce and chard;
 - Fruit garden crops: tomato and pepper;
 - Flower garden crops: artichoke,

cauliflower, potato;

The strawberries as well as alfalfa in agricultural production, are 5 years in the same place, they come after root vegetable, and the root vegetable is after them, which means that the group root vegetables in the crop rotation, where strawberries are included, can be precursor or follower of strawberries.

The tomato is a garden crop, which can be cultivated as monoculture for several years one after another (up to 3 years) and exclusively this culture, of all garden crops contributes to semi-finished stable manure, which is in the beginning of the fermentation.

Plant associations

(good and bad neighbors – allelopathy)

Regarding the use and the results from the "association" of the plants we can make difference between:

- a) Plants that help each other:
 - carrot with pea, lettuce, garlic and onion;
 - cabbage family with cucumbers, pea, celery and chard;
 - celery with garlic;
- b) The plants that help the crop that follows and that enrich the soil:
 - leguminous and other crops for green manure;
 - flax (improves the structure of the soil), buckwheat (enriches the soil with phosphates),
 - soybean and turnip (of hard soil).
- c) Plants that does not stand each other – antipathy:
 - strawberry and cabbage;
 - pea and garlic;
 - beet and leek and potato;
 - onion and cabbage;
- d) Help of small-scale:
 - some crops hardly stimulate the other crops (1:100):
 - o aromatic plants as nettle have

positive effect on many crops, so a large number of organic producers plant them on the borders. It is similar with planting bean around celery and cucumber, chamomile around garlic and onion and horse radish around potato.

- e) Plants that protect neighbors from pests (as a result of the odor, flavor, color or another way to attract them):
 - Carrot and garlic – there is two-sided defense from carrot and onion fly;
 - Lettuce and radish – (the lettuce protects from flea beetle);
 - Sage and wild-thyme reject caterpillars;
 - The bean protects the tomato from Colorado potato beetle;
 - The ricinus and basil reject mosquitoes;
- f) Plants that reduce the number of diseases:
 - All kinds of garlic prevent from plant diseases;
 - The oilseed rape in orchards and vineyards through evaporation of oil from flowers protects the vineyards and orchards from diseases;

From the point stipulated above, the potential for development of organic farming in this planning region is obvious in several fields:

1. Production of certified seed and planting material:
 - a. cereals and oilseed crops
 - b. grain, root and herbage crops
 - c. fruit seedlings and grape-stalks
2. Production of animal feed (hay)
3. Production of garden, agricultural, fruits crops and dessert grape:

- a. fresh products that are directly sold on the market:
 - pome, stone, small fruits, chokeberry, berries and grape
 - Wheat, rye in grains
 - bean, potato, maize in grain head
- a. processings from
 - wheat, rye, maize (flour, bread and other products from cereals)
 - fruit juices, marmalade, jam, raisin, prunes and other types of processings
1. Utilization of existing opportunities for animal husbandry:
 - a. sheep breeding (meat, milk and milk products)
 - b. cattle breeding (meat, milk and milk products)
 - c. goat breeding (milk products).

3.7.2 Forestry

The forestry as a branch is one of the components from the study "Sustainable development of organic farming in the East planning region". The forest communities are common in this region, and through other forest products they will be the subject of this scientific study. According to the relief characteristics, the East planning region is composed of two parts, lowland and mountains. The climate, altitude, rainfalls, soil and other natural characteristics contribute to creation of forest communities, where various forest products exist according to the forest phytocoenosis. The various plants that exist in the forest are: medicinal and aromatic plants, lichen, shrubs, mushrooms etc.

The organic production is the future of the production not only in this region, but in the Republic of Macedonia in general, as standardized method of production of healthy food. With the approximation towards the European Union, the application of the European legislations and standards of organic production has begun. The "Goce Delcev" University – Stip, with the elaboration of this scientific study for "Sustainable development of organic farming in the East planning region" shall create a scientific document as a basis for achievement of sustainable development of organic agriculture in the region.

Forestry/Historical development

Since the beginning of the mankind, until today, the man was in constant contact with the forest and its products. At first the needs of the man were small, but with the development of the land and society the needs started to increase. The direct use that the man had from the forest was the wood in the first place, which was used for heating, construction, production of weapon etc. As secondary products from the forest, people used herbaceous plants,

medicinal plants, forest fruits, mushrooms and materials such as rock, water and sand. All these materials gain their own trade value with the development of the market, i.e. become tangible goods from the forest. Besides the tangible benefit, the man and society received intangible benefit as well, such as influence on the climate, filtering of the air, protection of the waters, protection from erosion etc. Following his material interest, the man has often irresponsibly and carelessly treated the forest, which resulted in deforesting a huge areas and fields of forest. In order to preserve the forest and to properly treat and renew it, the legislature adopted certain regulations, which clearly define the attitude of the society and individuals towards the nature. Some of the oldest regulations can be found from the time Before Christ, in the Roman times, than in the Middle Ages as well and today, when there are precise regulations, norms and law on forestry management established.

The first written documents and data are found in the old civilizations from the Near East and Asia. The Babylonian king Hammurabi 2067 – 2085 BC issued the first regulations for the method of forest utilization. In the time of the Roman Empire, Cato and Pliny had clear instructions on forest division to annual coppices. In the Central Europe, there is a regulation on forest issued by the episcopate of Mainz, and afterwards in 1359 in the town Erford. In Austria and part of the Balkan in Croatia, there was a law on forest issued by Maria Theresia in 1760. The modern forestry appears around XVIII and XIX century, mostly in France and Germany that with the assistance of German experts is transferred to the Russian Empire. In the Balkan Peninsula, there are signs which are similar to Central Europe, but the countries that were influenced by European countries have more advanced forestry in comparison to those with Turkish influence.

There are written documents on forest in archives of the Republic of Macedonia, from the period of Turkish/Ottoman Empire, but there are very few data from the World War II. The first awareness for the forests in the territory of the Republic of Macedonia made the Turkish travel writer and historian Evlija Celebija. He, in his travelogues, when passing through the territory of Macedonia, which was part of the Ottoman Empire in that time, noted down that when passing through region between Sveti Nikole and Stip in his caravan, he had a need to hire people from local population to crop the forest in order to enable the caravan to go by. If this is true, it could be said that this region and wider was rich with forests that are now gone. The first census of wood stocks was performed in 1938 in the territory of the Kingdom of Yugoslavia. More recently, in 1961 a general census was made, and the last census is in 1979.

With a separate law called "Cooperative law" that people know as "Kardeljev law", the forests and private properties were nationalized i.e. the state took over their management. Besides the Republic of Macedonia, this law was applied in Serbia, Monte Negro and Bosnia and Herzegovina. The cooperative law left many negative consequences in the sectors of agriculture and forestry, which are felt nowadays as well.

The benefit that people and the community have from the forests are many, priceless and multiplex, and as a result of these reasons, numbers are hard to be determined, i.e. it is hard to measure their real value. If categorization is done, then the benefits can be divided into several groups:

- Direct tangible benefit
- Indirect, with influence on the other branches
- Natural, medical and mental benefits.

The forest is defined as "Natural resource/ good of general interest for the Republic of Macedonia with special protection".¹⁶

What should it be consisted of, how should it look like, how should it be planned, how much of it should be cropped are another issues in the Book of rules for elaboration of forest-economic bases. With the law on forests, a planning on forest-economic bases is allowed in order to successfully perform the forest management. According to the legislation in the Republic of Macedonia, 180 forest-economic bases are elaborated on 180 forest-economic units.

Forest and types of forest

There are many definitions and interpretations on the forest, depending on the aspect of view the forest can be defined as ecological, biological, economic, technical and other types of forest. Each definition is important, but the most important are those that include the biological, ecological and economic component. According to the law on forest of the Republic of Macedonia in the article 6/1, the forest is defined as:

"Forest ecosystem that exists on forest land overgrown with forest types of trees and shrubs, bare lands near the forest as well as the rest of the bare lands and meadows in the forest, plant nurseries, forest paths, seed plantations, fire-prevention forest paths, wind – protection forests in the area that is larger than two acres and forest in the protected areas. The forest is consisted of young plantations and forest cultures on the area larger than two acres and areas that are part of the forest, but are temporarily not overgrown as a result of the human influence and natural hazards, where the natural regeneration has begun."¹⁷

In the East planning region there are several hunting forests in the municipalities of Kocani, Stip and Berovo. Currently, the

¹⁶ Law on forests in the Republic of Macedonia 19.05.2009

¹⁷ Law on forests in the Republic of Macedonia 19.05.2009, Official Gazette of the Republic of Macedonia No. 64 from 22.05.2009

Government of the Republic of Macedonia gives these game reserves under concession and management. The hunting forest "Sinkovica" is in the territory of Kocani municipality with an area of 830 ha beech coppices and it is used as game reserve of big game. On the territory of Stip municipality is the hunting forest "Patric" located, with area of 800 ha durmast oak forest, intended for big game. In the Berovo municipality there are several hunting forests, but the most well-known is "Rateska Reka".

Protective forests – Are all forests located to 50 meters distance from the big watercourses, dams and accumulations, forests near cities etc. The main goal of those forests is to protect the soil from washing out, i.e. to prevent sedimentation and to supplement the water accumulations. In this group belong the water-protection forests as well, which protect from erosion, water flows, lakes, dams etc. A well-known water-protection forests is "Strezevo" with an area of 1.416 ha. There is a water-protection forest "Bregalnica" in the East planning region on the territory of Kocani municipality of around 2.500 ha that represents a cultivated forest of black pine, with the goal to protect the soils from erosion, i.e. not to fill the dams Kalimanci at Makedonska Kamenica and Gratce at Veles.

Besides these forests we should mention other types of forest as: Forests for protection of arable lands, Forest for education and scientific-research work, memorial forests, special forest reserves etc.

Forest regions

The territory, the space or the regions in the whole history were a goal for conquest, occupation and capturing. On the natural resources of the territory depended the number of interested parties to take over that area or that country. There were always aggression and wars fought for usurpation of these spaces. The most wanted were those regions that had conditions for natural

production, i.e. that were rich with forests, minerals, ore or simply a strategic position for warfare, communications, roads, lakes etc. In order to begin with any kind of development of any branch, the most important thing is the information on how much, what kind of quality or quantity the region disposes of. If you have this important information, it is very easy to develop and improve that area.

In order to obtain a full image of the forest resources in the Republic of Macedonia and for easier forest management, a regionalization of the territory is made, and therefore on the basis of the determining factors, there are three regions established:

- East region
- Central region
- West region

The East region is composed of the following bigger municipalities: Stip, Strumica, Kumanovo, Kocani, Vinica, Berovo etc.

The Central region is composed of the following bigger municipalities: Skopje, Veles, Negotino, Kavadarci, Gevgelija etc.

And the West region is composed of the following bigger municipalities: Bitola, Ohrid, Struga, Tetovo, Gostivar, Prilep etc.

Forests in the Republic of Macedonia

The forests cover around one-third of the land on the Earth, and there are mostly on those localities, which as a result of the inadequate climate, infertile soil, inaccessible terrain and landing form, are not convenient for agricultural production and other uses.

The dendroflora in the Republic of Macedonia is consisted of 319 species of trees and shrubs with more than 80 subspecies and varieties within the frameworks of 119 genera and 54 families, and 16 % of the total number of species are Balkan endemics and subendemics. According to the previous researches on the types of forest, the trees and shrubs form 81 forest phytocoenoses within the frameworks of 31 associations, 11 genera and 6 classes.

The largest part of forests and forest lands in the Republic are located in the flow of the river Vardar, i.e. on the drainage-basin into the Aegean Sea, which is very logical according to the area of the drainage-basin. According to the amount of timber in one hectare, the quality and growth of timber, the situation is very different. In accordance to

these characteristics, the best situation is on the drainage-basin of Crni Drim into the Adriatic Sea.

The forestry in the Republic of Macedonia is a branch that participates with 0,3 to 0,5% in GDP, but if the secondary or generally useful functions of the forest are valorized as a whole, the contribution is much bigger.

Composition of the forests	Area in ha
Pure broadleaf forests	471.138,49
Mixed broadleaf forests	239.744,73
Pure coniferous forests	70.812,23
Mixed coniferous forests	8.350,56
Other broadleaf and coniferous forests	45.009,51
Total	835.055,82

Table Nr. 21, Composition of the forests regarding the area

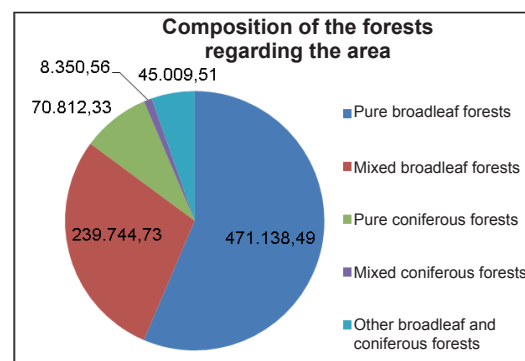


Image Nr. 36, Composition of the forests regarding the area (Source: Public Enterprise "Makedonski Sumi" 1998-2008)

From the data in the table Nr. 36 it can be concluded that the largest area belongs to the pure broadleaf forests with 471.138,49 ha i.e. 56%, the mixed broadleaf forests have an area of 239.744,73 ha or 29%, the pure coniferous forests have an area of 70.812,33 ha i.e. 9%, the mixed coniferous forests have an area of 8.350,56 ha or 1% and the other broadleaf and coniferous forests have an area of 45.009,51 ha i.e. 5% of the total area of 835.055,82 ha.

According to the data of the special plans for forest management, the total area of arranged forests and forest lands amounts 1.091.857,59 ha, 835.055,82 ha from it or 76.48% is an overgrown area, while 256.801,77 ha i.e. 23,52% is not overgrown area. Around 8% of the forest lands are not arranged and they can be distinguished by low productivity.

Table Nr. 22, Area and timber of forests

Commercial and cultivation form	Area		Timber			Annual growth	
	ha	%	m ³	m ³ /ha	%	m ³	m ³ /ha
High forests	259.905	31	47.993	185	49	792.223	3.0
same-aged	106.419	41	10.078	95	21	190.134	1.79
different-aged	163.485	59	37.915	232	79	602.089	3.68
Coppices	565.152	69	27.945	42	51	824.559	1.46
Coppices	546.180	99	27.666	51	98	808.068	1.48
shrubs	18.972	1	279.458	14	2	16.491	0.87

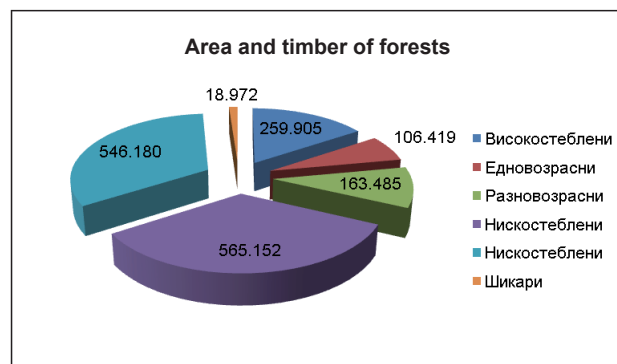


Image Nr. 37 - Area and timber of forests (Public Enterprise "Makedonski Sumi" 1998-2008)

According to the table Nr. 37, it is shown that the high trees have an area of 259.905 ha i.e. 31%, while the coppices have a larger area with ration 2:1 and it amounts 565.152 ha, i.e. 69%. The timber of high trees is greater and amounts 47.993.809 m³ i.e. 185

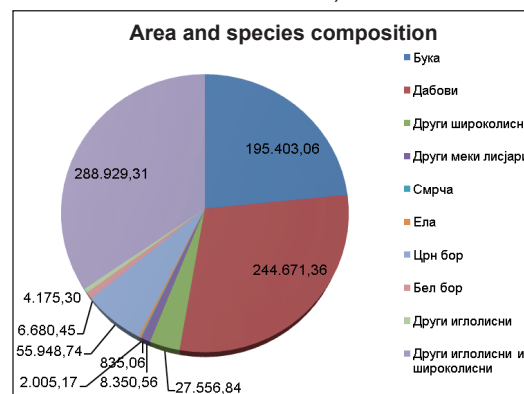
m³/ha while the timber of coppices amounts 27.945.762 m³ i.e. 42 m³/ha. The annual growth of high trees is 792.223 m³ i.e. 3 m³/ha, while of coppices is 824.559 m³ or 1,46 m³/ha.

Table Nr. 23, Area and species composition

Area of forests according to the species composition	Area in ha
1. Beech	195.403,06
2. Oak	244.671,36
3. Other broadleaf	27.556,84
4. Other soft non-coniferous	8.350,56
5. Spruce	835,06
6. Fir	2.005,17
7. Black pine	55.948,74
8. Scotch pine	6.680,45
9. Other coniferous	4.175,30
10. Other coniferous and broadleaf	288.929,31

According to the image Nr. 38, at the territory of the Republic of Macedonia, and in the East planning region at the same time, the following tree types are prevalent: beech, oak, spruce, fir, scotch and black pine and other species in a smaller area.

Image Nr. 38, Area and species composition (Source: Public Enterprise "Makedonski Sumi" 1998-2008)



Forest phytocoenoses in the region

There are many forest phytocoenoses in the region, but we will list the most prevalent and the most typical, in order to show the potentials of the forest communities in the region.

- Pubescent oak and oriental hornbeam forests (*As.Querco* – *Carpinetum orientalis*)

- Pubescent oak and hop hornbeam (As. *Quercus* – *Ostrya carpinifoliae*)
- Community of oak trees “cer” (As. *Quercetum confertae-cerris*)
- Oak community (As.Orno-*Quercetum petrae*)
- Various-leaved fescue-beech forest (As. *Festuca heterophyllae-Fagetum*)
- Pine-beech forest (As.*Fago-Pinetum nigrae*)
- Montane beech forest (As. *Calamintho grandiflorae* – *Fagetum*)
- Scotch pine-beech forest (As.*Fago-Pinetum silvestris*)
- Subalpine beech forest (As.*Fagetum subalpinum*)
- Fir and beech forest (As.*Abieti-Fagetum macedonicum*)
- Moist & Mesophile forest (As.*Altherbosum Alnetum glutinosae*)

Management of forest and forest communities in the region

The management of forest and forest communities in the East planning region is performed by the state institutions of the Republic of Macedonia:

- Public enterprise for forest management “Makedonski Sumi” through its forestry economies on the territory of this region.
- Ministry of Agriculture, Forestry and Water Management through its offices in the region
- Ministry of Environment and Physical Planning

The control and the supervision is performed by the State Forestry Inspectorate and Forestry Police, as a part of the Ministry of Agriculture, Forestry and Water Management, which directly preserves the forests in accordance with the legislation and regulations stipulated in the Law on forests.

There are six forestry economies in the East planning region as a part of the Public Enterprise “Makedonski Sumi” and they are responsible for the forest management of the region. They are:

- Forestry economy “Serta” – municipalities Stip and Karbinci
- Forestry economy “Osogovo” – municipalities Kocani, Probistip, Zrnovci and Cesinovo-Oblesevo
- Forestry economy “Malesevo” – municipality Berovo
- Forestry economy “Ravna reka” – municipality Pehcevo
- Forestry economy “Golak” – municipalities Delcevo and Makedonska Kamenica
- Forestry economy “Plackovica” – municipality Vinica

In the following table we will show the total forest potential in the East region with forestry economy units, overgrown areas, high trees, coppices, shrubs, timber, annual growth and annual available cut. The last table shows the total areas i.e. the total range of forest resources or the forest fond of the region.

Table Nr. 24, Forest Fond - East planning region

	East planning region	Area ha						Timber m³	Annual growth m³	Annual available cut m³
		Area of forestry economy units in ha	Total Overgrown	High trees	Coppices		Shrub			
					Crops					
Forestry economy										
1	Forestry Economy "Malesevo" - Berovo	28.538,58	23.561,30	18.788,20	4.503,60	269,50	0,00	5.281,271	89.498	656.872
2	Forestry Economy "Ravna Reka" - Pehcevo	9.358,50	8.485,30	7.328,89	1.156,41	0.00	0.00	1.878,611	34.158	236.099
3	Forestry Economy "Golak" - Delcevo	35.740,60	27.830,30	16.721,10	10.681,80	260,50	166,90	2.395,495	58,301	355.510
4	Forestry Economy "Plackovica" - Vinica	26.841,71	21.166,49	10.561,04	10.528,45	77,00	0.00	3.351,691	60.822	499.867
5	Forestry Economy "Osogovo" – Kocani	30.040,70	26.375,80	12.088,00	13.443,90	310.10	533.80	2.960.638	61.515	519.592
6	Forestry Economy "Serta" – Stip	17.506,73	15.423,28	1.620,90	13.657,8	154.00		258.768	8.016	39.796
Total		148.026,82	122.842,47	67.108,13	53.971,96	1.071,10	700,70	14.026.474	312.310	2.307.736

According to the table Nr. 24, the condition of the forest lands in the region of Bregalnica is fully shown as a land of forest fond, which has a total area of 148.026,82 ha i.e. 18% of the total area of forest in the Republic of Macedonia that amounts 835.055,82 ha. We can conclude that the region has a very good potential for forest species and forests.

From the data of the Forest Economies, the largest area has the Forest Economy "Golak" Delcevo and Makedonska Kamenica, with an area of 35.740,60 ha, after it comes the Forestry Economy "Osogovo" Kocani with an area of 30.040,70 ha where the territories of the municipalities Probistip, Zrnovci and Cesinovo-Oblesevo are included, the next is the Forestry Economy "Malesevo" Berovo with the total area of 28.538,58 ha, than Forestry Economy "Plackovica" Vinica, with an area of 26.841,72 ha, Forestry Economy "Serta" Stip and Karbinci with an area of 17.506,73 ha and the smallest forest area has the Forestry Economy "Ravna Reka" Pehcevo with an area of 9.358,50 ha.

The total overgrown area in the region amounts 122.842,47 ha, where the high trees have an area of 67.108,13 ha, coppices have an area of 53.971,96 ha, the crops have an area of 1.071,10 ha while shrubs are very little and amount 700,70 ha.

The timber in the East planning region is expressed in cubic meters and amounts 14.026,474 m³, the largest timber is in Forestry Economy "Malesevo" Berovo with 5.281,272 m³ and the smallest is in the region of the Forestry Economy "Serta" Stip that amounts 258.768 m³.

The total annual growth expressed in cubic meters in the region amounts 312.310 m³. The highest growth is in the Forestry Economy "Malesevo" Berovo with 89.498 m³, while the lowest annual growth is in the Forestry Economy "Serta" Stip with 8.016 m³.

The annual available cut in the Forestry Economy "Malesevo" Berovo is the greatest in the region and amounts 656.872 m³, the next are the Forestry Economy "Osogovo" Kocani

with 519.592 m³ and the Forestry Economy "Plackovica" Vinica with 499.867 m³, than the Forestry Economy "Golak" Delcevo with 355.510 m³, the Forestry Economy "Ravna Reka" Pehcevo with 236,009 m³ and finally the Forestry Economy "Serta" Stip with 39.796 m³.

From the information shown we can receive a full image for the region and the resources of the forest potentials and forest fond that can serve for economic development and improvement of the region.

Recommendation

We can conclude that in comparison to the rest of the regions in the Republic of Macedonia, the East planning region regarding the area of 18% and the total forest fond has a very good forest potential. As a direction to development, a greater attention should be paid on the sustainable forest management as well as the maximal use of the rest of forest products. A greater attention should be paid on the organic production in forestry as a potential as well, which would represent a branch for fast economic growth. The forestry in the past was focused only on production and exploitation of the timber, and the rest of the forest products were very little treated. With joint correlation between all relevant institutions, organizations and partners it should be directed towards full exploitation of the forest. That implies not to violate and destroy the biodiversity, i.e. a permanent forest management.

The European good experiences should be used here as well, as they come from countries with very good forest management as Finland, Slovenia, Bulgaria etc. The potentials that exist as finished product, with the proper treatment, can be adapted for organic production in the region. With proper exploitation of the forest and forest products, the production of forest and secondary forest products will be increased, and by including the local population in the collection of aromatic and medicinal plants, the family

budgets will be improved.

The East planning region, that abounds with natural resources, climate, diverse hydrography, potential for aromatic and medicinal plants, clear ecological environment, diverse forest fond, biodiversity,

agricultural crops and plants, it is a region with potential for organic production. With all these potentials and resources, the region can easily be represented as natural touristic potential and can be a promoter of the rural tourism in the Republic of Macedonia.

3.7.3. Hydrology

Bregalnica is one of the largest rivers in the Republic of Macedonia, it rises from the Malesevski mountains. The flow of Bregalnica is accompanied by tributaries from the right as well as from the left side. From the spring to the place where it joins Vardar, Bregalnica is 224 km long. The water of Bregalnica is clean and it's treated in the 1 and 2 category which is convenient for irrigation of agricultural crops. In the 60s started the idea for construction of two accumulations: Ratevo and Kalimanci.

The first accumulation was built in the far 1968 and its usage started in 1976 with dual purpose, i.e. it is used for water supply of the population in the Malesevska valley and for irrigation of the agricultural areas.

It is projected for irrigation of the areas of 1.280 ha, it is built with detailed drainage network of 950 ha, but the level of the system's use is only 10-15%.

The water from the accumulation Ratevo is physically and chemically clean and convenient for irrigation.

Basic data on the Dam "Ratevska reka"

Position	River Ratevska, 6km away from Berovo
Beginning of usage	1976
The area of the drainage-basin	53,6 km ³
Type of the dam	concrete, lacquered
Constructive height of the dam	53,0 m
Accumulation capacity	10,5 million m ³
Dam crest width	194,0 m
Spillway	through the dam in to the central part
Spillway capacity	
Fundamental slipway	throughout the body of the dam with two flat stoppers 800/1000 mm, capacity 5,0 m ³ /s
User	Water Management "Bregalnica" Kocani

Other data

Use	Irrigation and water supply
Total irrigated area	28.000 ha

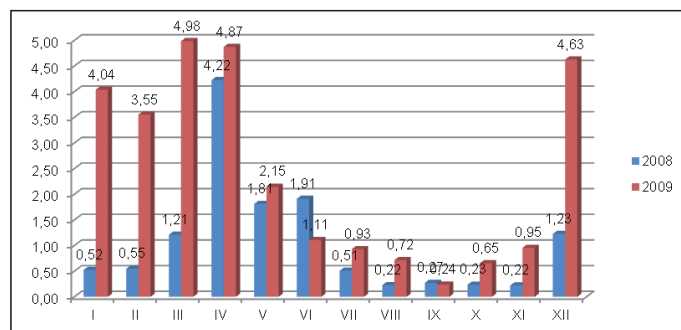


Image Nr. 39, Overview of the average daily inflows of water in the accumulation "Ratevska Reka" for 2008-2009 (in 10⁶ m³)

From the graphical display, it can be noticed a very strong differentiation in the amount of water that inflows in the accumulation during 2008/2009. If the analysis is performed on a quarterly basis, it would be concluded that most of the inflows in the lake happen in the first quarter, i.e. March is the period with the most water inflows.

If we count out the amounts of rainfalls for 2005-2007, we will get a clear view of the basic reason for the increasing inflow in the lake. Therefore, in 2008 the total quantity of rainfalls amounted 639,9 mm, in comparison to 720,4 mm in 2009.

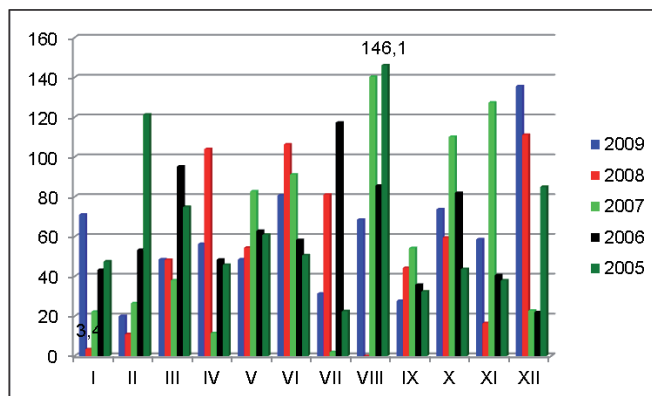


Image Nr. 40, Monthly amounts of rainfalls at the dam of Ratevska river 2005-2009 in mm

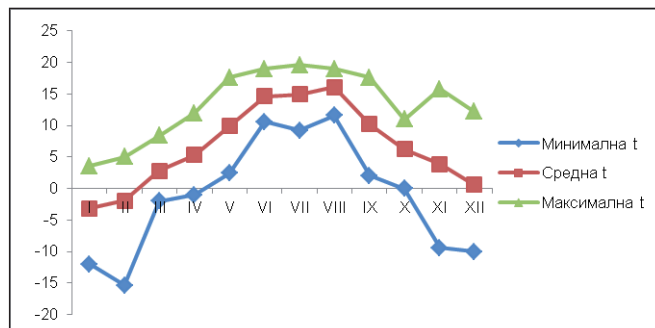


Image Nr. 41, Tabular view of the air temperature at the dam of the Ratevska river for 2008

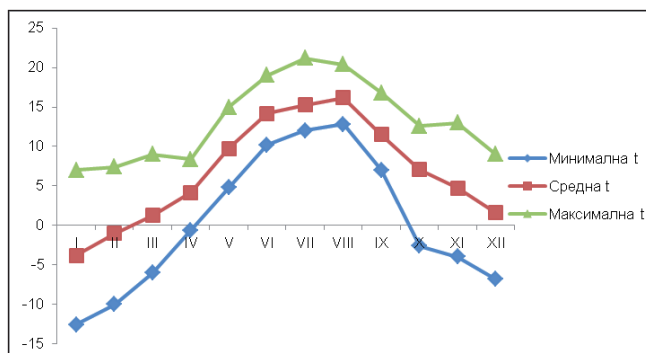


Image Nr. 42, Tabular view of the air temperature at the dam of the Ratevska river for 2009

Ratevska river is analyzed in three ways:

1. Through raingalls
2. Through gauging station "Budinarci" on Bregalnica
3. Empirically through well-known methods.

From the precipitation stations, Berovo, Pehcevo, Crnik, Mitrasinci, Vladimirovo, Laki and Babini kolibi are processed. All of them are processed for the period of 30 years.

Characteristics of the drainage-basin

From the above mentioned, the area of the drainage-basin amounts $P=376 \text{ km}^2$. Almost the entire edge is afforested with coniferous and deciduous trees.

The left side is more afforested than the right one. The left side is steeper, but besides that, it is less crisscrossed than the right side.

Over 85% of the drainage-basin with area of $53,6 \text{ km}^2$ is afforested from the Ratevska river to the side-view of the dam. The bare lands are mostly pastures and meadows. According to that the run-off index, and therefore the specific flow in this area are pretty high.

Geographic location and relief

Malesevska valley is in the upper flow of the river Bregalnica with 700-1140 meters altitude above sea level. It is fenced with Malesevski mountain on the east (Kadiica 1932 m, Cengino field 1744 m and Trebolija) that separate the valley of Struma and they are natural obstacle to the breakout of the warm air from Aegean Sea. On the south and partially on the south-east, the massif

of Ograzden is spread with 1801 m altitude above sea level. Ograzden separates Malesh from Strumicko field. On the west is Plackovica and Obozna that separate Malesh from Radovisko and Kocansko field. It can be said that it is half-open.

From relief point of view we can make difference between 4 formations:

- Mountain part that consists of above mentioned mountains and that contains all rivers' springs of that area as well.
- Hill part that is mostly a continuation of the mountain part. It is cut with many swollen rivers that flow into Bregalnica.
- Downhill part that is spread into small area, it is mostly consisted of alluvial cones from the previous two parts. This part is formed from the local rivers Smojmirska, Umlenska, Robovska, Vladimirska and Golem dol.
- Plain part, which is located by the river Bregalnica and it is in form of panhandle with acvial layers.

Bregalnica rises for the Malesevski mountains – region Cerlija. It is formed with many mountain springs that are rich with water. As a confirmation of this is the fact that there were downriver a lot of fulling-mills and saw-mills on water propulsion. Upriver of Berovo it has mountain characteristics.

Second left tributary is Ratevska river, and the next is Vladimirska river. Right tributaries are Smojmirska, Umlenska and Robovska rivers. Ratevska river rises from the mountain Ograzden, it is consisted of 2 branches and has water throughout the whole year.

Kocani valley

Ground waters and springs

Kocanska tectonic depression is filled with volcanic layers consisted of andosite, dacitic, tuff sands, sandstones, clays, breccia etc. That volcanic material is erupted from the volcanoes in Kratovo and Zletovo, and it is deposited into the lake waters with thickness of around 1.000 m⁸. Through the basin flows the river Bregalnica, which together with the tributaries deposits alluvial sediments where the ground waters are accumulated.

According to the depth, there are shallow (phreatic) and deep (artesian) waters. The shallow ones have free level and they are cold (fresh) waters, and the deep ones (artesian) have high temperatures and are thermal waters.

The shallow cold ground waters can be found in the alluvial deposits of Bregalnica and their tributaries. Lithologically, they are consisted of sands, gravels, sandy clays, with different coefficient of filtration, where different amounts of ground water reserves are accumulated. These deposits by the village Pribacevo are 106 meters thick. In them, at the village Grdovci in the region Grdovski Orman, 18 wells are perforated with a total capacity of around 300 l/s. According to the chemical composition, the water is hydrocarbonate – sulphate – calcium – magnesium. In the alluvium of Zrnovska river 4 vertical pipes for wells were perforated, B-1 has a depth of 50 meters and capacity of 30 l/s. As a conclusion for the shallow ground waters it can be said that they have a huge economical importance and should be used in accordance with a strict plan, and a special attentions should be paid on their protection.

The second type, artesian ground water in the Kocanska depression, can be found in the volcanogenic sedimentary deposits, and it is economically important as well. It can be found on different depths, from 30 to 1000 m, in all three types of aquifers confined, unconfined and perched with different filtration coefficient.

Kocanska Valley represents the largest thermal basin of waters with high temperatures on the Balkan Peninsula. 18 perforations are made there so far, 14 of them are self-discharge, and the water-carrying horizons have a depth of 86 go 1.096 meters with capacity of 2,2 to 350 l/s. And temperature of 5—80 °C. The waters are heated from intrusions, and the young volcanism has a role in penetrating of roads. Wells in the central part of the basin have greater capacity and the water has a higher temperature.

The thermal springs can be found at the following villages: Dolni Polog, Banje, Krupiste and Istibanja. The thermal water in the artesian basin of Kocani belongs to the group of hydrocarbonate - sulphate - nitrite - magnesite waters according to the chemical composition. They are used for heating of the Court, three schools, the factory Ruen and glasshouses for production of early garden crops.

Rivers and lakes

Bregalnica, which flows in the middle of the field, is the main recipient in the Valley. All river flows of this area flow into Bregalnica, ten rivers from the left side, from Osogovo, and six rivers from the right side, from Plackovica. Bregalnica enters in the Kocanska Valley at Istibanja, flows towards south-west, and leaves it at Krupiste. Throughout the field the river is flat, with an average gradient of 1,8 ‰. The river bed is shallow and not-consistent, it is often covered by the alluvia of tributaries and torrents that provokes pouring of water and flooding of the surrounding lands.

That and the shallow aquifer are the reasons for formation of muddy areas around the bed, almost throughout the whole flow in the field.

Larger tributaries of Bregalnica are: from the right side - Zletovska, Kocanska and Orizarska River, from the left side – Osojnica and Zrnovska River. Besides them, there are several smaller rivers and streams in the Valley.

Table Nr. 25, Overview of the watercourses in the East planning region

Name of the river	Area of drainage-basin (in km ²)	Length (in km)	Average gradient	Forestation in %
Kocanska	198,0	34,0	39,3 ‰	45
Orizarska	137,0	30,0	39,5 ‰	50
Voltinje	28,5	7,5		5
Vrbicka	21,0	12,0		0
Zletovska	460,0	50,0		25
Zrnovska	70,0	23,0	47,6 ‰	60
Morodviska	7,0	6,0		90
Vidoviska	5,0	6,0		85
Bregalnica	4307,0	225,0	7,0 ‰	-

There is one reservoir in the region of Kocani. That is Kocansko lake, that the local population know as Gratce. It is built on Kocanska River, 6 km north from Kocani, by the village Dolno Gratce in 1959. The dam is ferroconcrete, its height is 32 meters, the crest is 150 meters long and spot height has 476 meters altitude above sea level. The lake is 3,5 km long, 0,2 km wide and its biggest depth is 29 meters. The area of accumulation amounts 0,19 km², it accumulates water of 2,4 million m³ that is used for supplying with water the population and the industry in Kocani and for irrigation of 576 ha arable area in Kocansko field.

Kocansko field is irrigated with waters of the Kalimanci reservoir as well. It is located on the river Bregalnica in Ovcepolsko-Istibanjska ravine, and it is build in 1969. The dam is stone-embankment with clay-core, its height is 92 m and it is 240 m long.

The lake is 14 km long, 0,3 km wide and 80 m deep. Its area is 4,23 km² and it accumulates water of 127 million m³. Its basic usage is for irrigation of around 28,000 ha mostly rice fields in the Kocanska Valley, but part of it goes to the arable areas of Ovce Pole. For that purpose two main canals are built, the right one is 98 km long and it transports the water of the lake to Ovce Pole, the left one is 36 km long. The water surplus is used for production of electrical energy through the hydroelectric power station with the power installation of 12,8 MW.

3.7.4. Climatic conditions

The climate is one of the factors, which through ecological valence of the plant species, mostly defines what kind of and to which extent would one biotype be present. During the evolutionary development of the Earth, the stated parameters were determined on the natural way. However, the man with his activity contributed a significant part of plant species to be moved from their gencenter to greater distances, as far as other continents. However, neither with the most modern agro technical measures and technologies can the climatic conditions of specific area be influenced. Therefore, before starting with the planning for organization of organic production, it is of huge importance to make proper estimation of the weather in certain area. The estimation must be impartial, based on measurements of the climatic conditions for many years such as: maximal and minimal temperature, amounts and timetable of rainfalls (annually and monthly), occurrence of the first autumn and the last spring frost, dominant direction and intensity of the wind. From the averages of these quantities, a determination of the plant species that could be cultivated in

accordance with the principles of organic farming can be performed.

The data that are used can be found in the Study obtained by the Hydro-meteorological Directorate in Skopje.

Malesevo-Pijanec region

According to the data that are disposable for the station Berovo, which operates since 1949 as meteorological station of second rank, Berovska valley can be distinguished by harsh winters with temperature below 0 degrees (-34°C), while summers, besides their certain coolness, have high temperatures to $+33,6^{\circ}\text{C}$, and therefore the climate in the valley is continental.

The relative humidity of the air in July is 59%, and the maximal humidity is in December with 96%.

The cloudiness viewed as indicator of the climate, points out that most of the bright days are in the second half of June, July and August and the first half of September.

The winds have an average speed of 4-12 m/s. They blow from north-west, north and south direction.

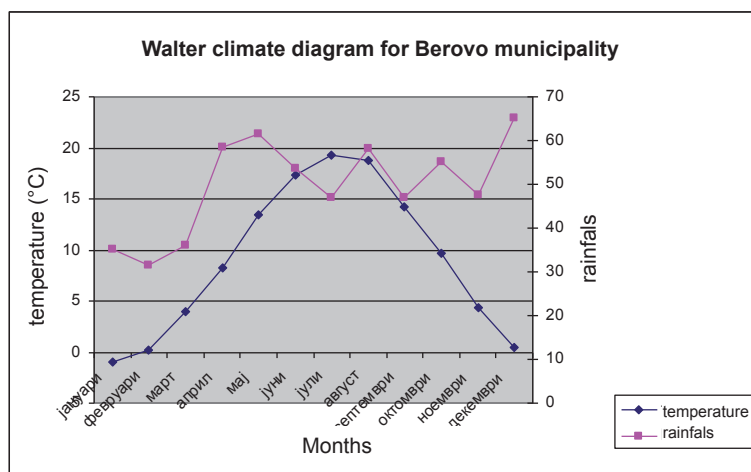


Image Nr. 43. Walter climate diagram for Berovo municipality (1990 – 2009)

On the Walter climate diagram for Berovo (image Nr. 43), the data for the average monthly temperatures and monthly amounts of rainfalls for the period of 1990-2009 are shown. The average annual temperature for the presented period is 9,1 °C, while the average amount of rainfalls is 596,9 mm. For the given time interval, the periods January – June and August – December are humid, while July is the unique arid month.

The lowest average monthly temperature is registered for the month January (-1 °C), while the highest average monthly temperature is registered in July (19,3 °C). The least rainfalls are in February (31,6 mm), and the most in December (65,2 mm). The first frost falls in autumn on 03.10, and the last frost is in spring, registered on 30.04, while the first snow has fallen on 26.11.

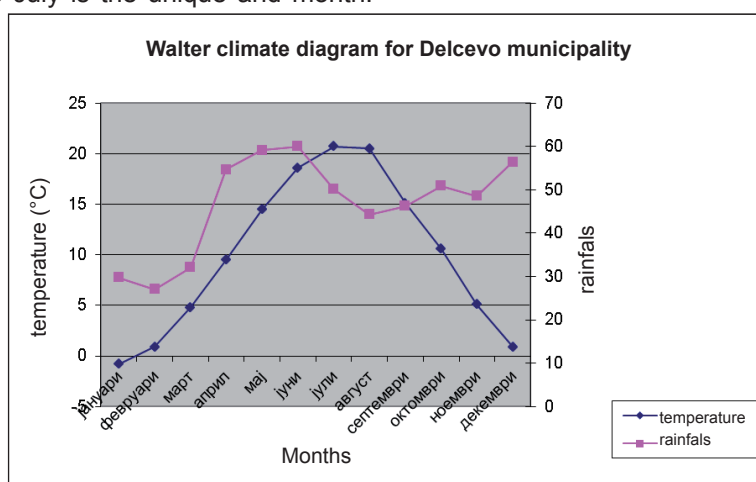


Image Nr. 44, Walter climate diagram for Delcevo municipality (1990 - 2009) ¹⁸

On the Walter climate diagram for Delcevo (image Nr. 44), the data for the average monthly temperatures and monthly amounts of rainfalls for the period of 1990-2009 are shown. The average annual temperature for the presented period is 10 °C, while the average amount of rainfalls is 559,2 mm. For the given time interval, the periods January – June and September – December are humid, while July-August is the unique arid period. The lowest average monthly temperature is registered for the month January (-0,8 °C), while the highest average monthly temperature is registered in July (20,7 °C). February has the least rainfalls (27 mm), and the most are in December (56,4 mm). The first frost falls in autumn on 11.10, and the first snow has fallen on 8.12.

Kocani valley

Many factors influence the climate of Kocanska Valley. Before all, it lays in the middle part of the Balkan Peninsula; it is fenced with three mountains: Plackovica from the south, which protects it from direct air south circulations, Golak and Obozna from the east and the high Osogovo from the north, that protects the valley from the cold north air masses.

Solely on the west, through the low hills it is widely open to Ovce Pole, with continental influences and towards south-west through the river Bregalnica the Valley is exposed to moderate Mediterranean influences. Along the river valleys that come down from the surrounding mountains as Zletovska, Kocanska, Zrnovska River etc, mountain influences break their way through.

¹⁸ Source: Hydro Meteorological Directorate

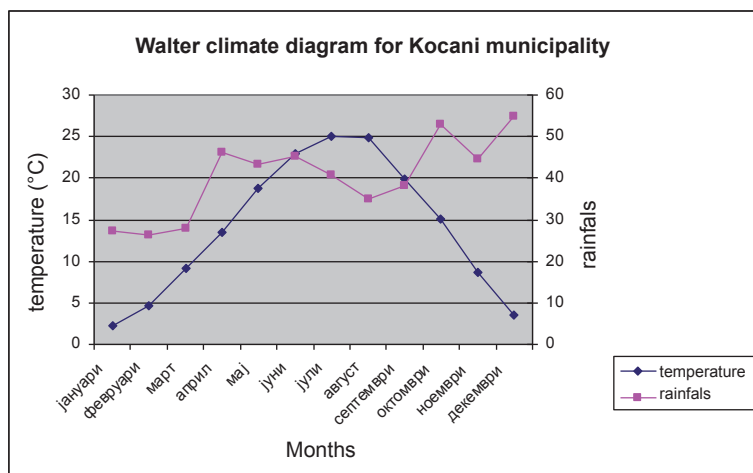


Image Nr. 45. Walter climate diagram for Vinica Kocani (1990 – 2009)¹⁹

On the Walter climate diagram for Kocani (image Nr. 45), the data for the average monthly temperatures and monthly amounts of rainfalls for the period of 1990-2009 are shown. The average annual temperature for the presented period is 14,1 °C, while the average amount of rainfalls is 483,2 mm. For the given time interval, the periods January – June and September – December are humid, while July-August is the unique arid period.

The lowest average monthly temperature is registered for the month January (2,3 °C), while the highest average monthly temperature is registered in July (25,1 °C). February has the least rainfalls (26,3 mm), and the most are in December (55 mm). The first frost falls in autumn on 03.10, and the last frost is in spring, registered on 04.04, while the first snow has fallen on 06.12.

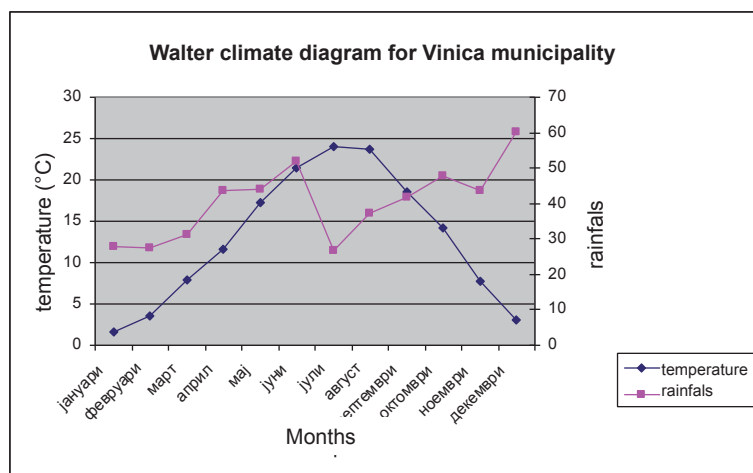


Image Nr. 46. Walter climate diagram for Vinica municipality (1990 – 2009)²⁰

^{19, 20} Source: Hydro Meteorological Directorate

On the Walter climate diagram for Vinica (image Nr. 46), the data for the average monthly temperatures and monthly amounts of rainfalls for the period of 1990-2009 are shown. The average annual temperature for the presented period is 12,9 °C, while the average amount of rainfalls is 484,4 mm. For the given time interval, the periods January – June and September – December are humid, while July-August is the unique arid period. The lowest average monthly temperature is registered for the month January (1,6 °C), while the highest average monthly temperature is registered in July (24,1 °C). February has the least rainfalls (27,4 mm), and the most are in December (60,2 mm). The first frost falls in autumn on 16.11, and the last one is in spring, registered in 22.03.

The hills on the valley's edge, which are composed of schist, volcanic and chalky rocks and are insufficiently forested and bare, have as well their own influence on the climate, especially on the air temperature. This means that there is combination of altered Mediterranean and moderate continental climatic influence in the Kocanska valley.

More important meteorological elements and occurrences that condition and characterize the weather and climate in the Kocanska Valley are air temperature and humidity, atmospheric pressure, sunlight, rainfalls, winds, cloudiness, fog, frost etc. The data obtained by the Meteorological station in Kocani, which is on 345 meters altitude above sea level, i.e. 54-55° north latitude and 22-25° east longitude, regard 40 years period (1951/90).

With average annual air temperature of 13 °C, Kocanska Valley belongs to the group of warm valleys in Macedonia. It has similar air temperature with Strumicka Valley (13 °C) and Veleska Valley (13,3 °C), but significantly warmer are Tikveska (13,6 °C) and Gevgelisko-valandovska Valley (14,2 °C).

The following characteristic of the air temperature is that the average temperatures

are not below zero in none of the months of the year, which is a Mediterranean climate characteristic. The minimal average monthly air temperature in January is 1,6 °C, while the maximal in July is 23,5 °C. According to that, the annual fluctuation of the temperature is 21,9 °C. It is close to the annual temperature fluctuation in Kumanovsko (21,9 °C) and Ovce Pole (21,8 °C), which is the result of the continental influences from north that from Kumanovsko and Ovce Pole break their way through Kocanska Valley.

All summer months of the year have temperature above 20 °C, and the average summer temperature amounts 22,6 °C. The average winter temperature is high as well and amounts 3 °C. The average temperature in spring is 12,8 °C and in autumn it is 13,5 °C.

The temperature difference between months in the spring and autumn months is pretty emphasized; therefore the transition from winter to summer and summer to winter does not happen slowly, which is a characteristic of the areas that are to certain extents under continental climatic influence. This influence is expressed by the low temperatures in winter months as well, therefore the average annual minimal temperature amounts 6,3 °C, while the absolute minimal temperature amounts -25,4 °C, registered on 25th of January 1954. The absolute minimal temperature for months is below 0 °C, from September to April. The earliest date with autumn ice is on 30th of September, while the latest date for spring ice is on 27th of April, and the average annual number of 82.

In the hot part of the year, the Kocanska Valley is distinguished by pretty high values of the air temperature. The average annual maximal temperature amounts 18,6 °C, while the absolute maximal is 41,2 °C registered on 6th of July 1988. The number of summer days is high as well, i.e. the days when the temperature is higher than 25 °C, and those days are around 120. There are number

of tropical days as well (with temperature higher than 30 °C) which are approximately 49 in the year.

The average annual temperature sum is pretty high and amounts 4.724 °C, which enables the period of vegetation to last 200 days – from April to 20th of October.

Regarding the agriculture, the temperature ratio is convenient enough. It corresponds to the crops that seek warm environment. For example, the average annual temperature for the rice cannot be below 12-13 °C, not below 11 °C in the phase of germination, not below 22 °C in the phase of flowering and not below 19 °C in the phase of maturation. All these temperature conditions exist in the Valley, and they are adequate for a huge number of industrial crops such as opium poppy, cotton etc.

The humidity directly depends on the air temperature. It is an important climatic element, not only for agriculture, but for the human life as well. The average relative humidity of the air in Kocani amounts 72%. It is lowest in July and August 60% and the highest in December 84%. If we compare the humidity with the air temperature, we will conclude that the higher the temperature is, the lower the humidity is and vice versa. The relative humidity of the air in the winter towards summer months is decreasing and vice versa, it is gradually increasing in the summer towards winter months. The annual fluctuation of the relative humidity in Kocani amounts 24%.

The average annual sum of rainfalls amounts 522,5 mm. Lower amount of rainfalls in Macedonia can be found only in Ovce Pole, Skopska, Veleska, and Tikveska Valley. Kocanska Valley is a transitive zone between Ovce Pole and Maleseviski region. Two maximums and two minimums of rainfalls occur during the year. The main monthly maximum of rainfalls is in May (62,8 mm in average), and the second one is in November (60,0 mm). The main minimum

of rainfalls is in September (23,4 mm in average), and the second one is in January (36,1 mm). As rainless months appear January, February, March, April, July, August, September and December, and relatively rainy months are May, June, October and November. The average annual number of rainy days amounts 103, 4% of the days have higher daily amounts, equal or bigger than 20 mm.

Daily maximum of rainfalls of 55,1 mm is registered in 16th of November 1962.

The rainfalls in Kocanska Valley are mostly consisted of rains, and only 8% of snow. There are 15 days of snow in average, and the snow appears from November to April. The longest unbroken period of snow amounted 35 days and lasted from 23rd of January to 28th of February 1964.

The Kocanska Valley can be characterized with rainless periods as well. They are mostly short, but in several years there are rainless periods of over 80 days registered. Regarding seasons, the period with greatest frequency of rainless periods is autumn with 31%.

The number of days with fog is insignificant and the cloudiness is not big. Annually, there are 7 days with fog in average. The average annual cloudiness amounts 5,1, it is lowest in August 2,5 and highest in November 6,7 tenths. From the total number of days in the year, 22% are bright, 24% are dark, and 54 % are cloudy, so the average daily cloudiness is lower than 8 and higher than 2 tenths.

The average annual sum of sunlight amounts 2.222 hours, which is very close to the sum in Ohrid that amounts 2.233 hours. The average duration of sunlight is 6 hours a day, with maximum in July – 302 hours or 10 hours a day in average and the minimum is in December that amounts 89 hours in average or 3 hours a day.

The winds in Kocansko blow from all directions and any time of the year. From

the total number of measured cases, 692 ‰ include winds from different directions, and 308 ‰ do not include wind and are quiet. However, the south-west wind has the greatest frequency, with 196 ‰ annual average and average speed of 2,5 m/s.

These winds blow together with the west wind of Ovce Pole, and therefore the population calls them Ovcepolški winds. The south-west wind is mostly warm and soft. It blows mostly in spring and autumn. On the second place is the north-east one, whose average frequency amounts 104 ‰ and has an average annual speed of 24 m/s. It appears in all months of the year, with maximum in March and minimum in August. It emerges from the valley of Bregalnica, it comes down from Golak and Obozna and joins with the north wind that comes down from Osogovo along the valley of Kocanska and Orizarska River, they are cold winds, which carry cold weather and they blow mostly in the winter part of the year.

Besides the above mentioned, there are daily winds in Kocansko as well, known as Day wind (denik) and Night wind (noknik). The first one blows in day-time from the Valley towards the surrounding mountains, Osogovo, Plackovica and Golak, and the second one blows from the surrounding mountains towards the Valley. The night wind, especially in the summer period is pretty frequent, because it brings coolness that reduced the summer heat.

The temperature ratio, rainfalls and other climatic elements show that they are conditioned from the combined Mediterranean and moderate continental climatic influence and they are also influenced by the local orthographic characteristics of the Valley.

For temperatures these elements are manifested with the increased values of the annual temperature fluctuations, temperature differences in the spring and summer months and with expressive transition from winter to summer and vice versa.

For the rainfalls, a local disturbed Mediterranean climate is manifested, with certain continental influence. They are irregularly distributed through the year. Therefore, Kocanska Valley can be distinguished by local climate with disturbed Mediterranean influence and inclination towards moderate-continental climate.

Stip

The farthest west of this planning region belongs to Stip and the surrounding villages, from the border with Cesinovo-Oblesevo municipality and Probitip, Sveti Nikole on the west, Veles on the south-west and Radovis on the south.

The climate in this part is defined with the encounter of two climatic types: Mediterranean, that enters with the flow of the river Bregalnica from its main stem in Vardar and continental type that emerges from the north. Thanks to this arrangement of influences, the climatic features gain a character of most extreme varieties from the both climatic types. Long and hot summers that characterize the Mediterranean climate and long and cold winters, which characterize the continental type. This area is one of the most arid areas in the country, which limits the opportunity for intensive development of agriculture and animal husbandry to great extent. Solely thanks to the already built hydromeliorative system "Bregalnica", the conditions for irrigation are enabled, and therefore the organization for production of large number of crops throughout the whole period of vegetation is enabled as well.

However, in the last 5-6 years, a modification of these features can be noticed, regarding the fact that the summer period is getting more intensity, and the winters are becoming softer. There is a change in the distribution of rainfalls in the same time; the number of snowy days is lower.

On the Walter climate diagram for Stip (image Nr. 47), the data for the average monthly temperatures and monthly amounts

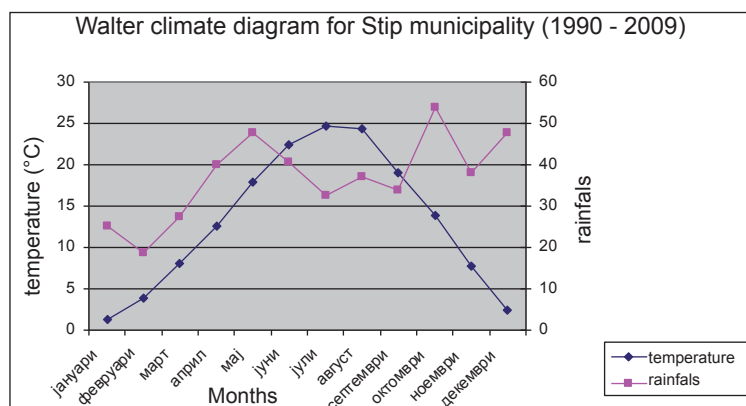


Image Nr. 47, Walter climate diagram for Stip municipality (1990 - 2009)²¹

of rainfalls for the period of 1990-2009 are shown. The average annual temperature for the period is 13,2 °C, while the average amount of rainfalls is 443,4 mm. For the given time interval, the periods January – June and September – December are humid, while July-August is the unique arid period. The lowest average monthly temperature is registered for

the month January (1,3 °C), while the highest average monthly temperature is registered in July (24,7 °C). January has the least rainfalls (25,1 mm), and the most rainfalls are in December (47,9 mm). The first frost falls in autumn on 05.11, and the last frost is in spring, registered on 30.03, while the first snow has fallen on 5.12. °C).

3.7.5. Selfindigenous species

The man has always longed to get acquainted with the nature and all opportunities that it enables. Since ancient times the man used the products of the nature, the food in the first place that he couldn't exist without, taking only the necessary amount to survive. From than on many things have changed, especially the relationship of the man with the nature and the benefits it provides. By increasing the population in the country, the amounts for food production are increasing as well. The modern industries for food production produce and sell preserved and genetically modified food, while the pharmaceutical companies on the other hand, expressing concern for the human health and using the medicinal plants and herbs, produce medications that improve the human health.

Macedonia disposes of ecologically clean environment, which abounds in

biodiversity of plants. Sadly, the usage of the natural plant potential, especially of the volunteer plants is still insufficiently explored. The development of this branch should be explored, promoted and implemented in order to obtain the desired results that will influence on the improvement of natural and economic conditions in the country.

The Republic of Macedonia has conditions for quality and rational usage of the medicinal plants. Besides the generally useful functions of the medicinal and aromatic plants, it should be mentioned that their economical importance is pretty high.

The state institutions in cooperation with the local administration and the business sector, by collection and utilization of the volunteer plants, should raise the economic goal to the highest level, including the local rural population for collecting of these natural fruits.

²¹ Source: Hydro Meteorological Directorate

Biological diversity

The Republic of Macedonia had ratified the "Convention of biological diversity" in 1997, and therefore it became a party in the convention on 2nd of March 1998.

The estimation of the biological diversity and status was made in order to discover the general aspects of protection, along with other global threats, as the climate changes and soil degradation. The most important properties of the biological diversity in the Republic of Macedonia are the large heterogeneousness and high degree of relics and endemism.

Flora

The vegetation in the Republic of Macedonia is a mosaic of various communities with representatives of various vegetation types. In terms of the lower flora groups in the country, algae are especially diverse group of organisms, of which about 1580 species have been defined so far. Fungi are heterogeneous group of organisms, and with the previous explorations 1250 species were registered, while the lichens number is around 340 species.

Flora at higher flora groups is pretty rich, with mosaic of various flora vegetation elements (tertiary relics, Mediterranean, Greek-Anatolian, Alaric, Caucasian, Central-European, Euro-Asian, Arctic-Alpine and cosmopolitan) and great number of endemic types (Macedonia, south Balkan and Balkan). The flora is represented with 210 families, 920 genera and around 3.700 species. The most numerous group are flowering plants (angiosperm), with around 3.200 species, 350 mosses, 42 ferns and 15 gymnosperms.

Among lower flora groups, algae are represented with the greatest number of endemism, with 135 endemic taxons or 8.5 % of the total flora of algae. Most of them are found in Ohridsko and Prespansko lake, a small number in Dojrannsko lake and mountain Baba. In higher flora groups

many endemic species - totally 117 species, are also found and are mainly seen among angiosperms – 114.

From all these data and information it can be concluded that the Republic of Macedonia represents a hoard of biological diversity and with its vegetation and flora it represents a natural environment for solid biological potential.

Utilization of non-timber forest products

The living things on the Earth exist through the three most important components: soil, water and air i.e. expressed through their quality and quantity, which is expressed through their composition - natural dynamic equilibrium. Forest and non-timber forest products represent one of the most important factors for creating environment where the biosphere is located and they are renewable source for organic raw material in the same time. This complex of forest and forest products is a natural resource with a huge value, i.e. it represents a source of multiple goods that directly and indirectly serves the man. With their priceless value, they have a very important role in the social and economic development of the man.

The forest, as a community, is cultivated and used nowadays primarily for production of wood pulp and assortments i.e. the main goal is the utilization of the tree. Regarding the non-timber forest products very little is done, and as direct products they are almost neglected in the forest communities. As a part of these products we will mention: medicinal plants, forest seeds, fruits, wild strawberries, fern, resin etc. In order these non-timber forest products to be properly treated, it is necessary to prepare separate methodologies, different techniques and technology, elaboration for usage, specifically educated staff, equipments, standards and norms in the field of rational use of volunteer plants.

The importance of these forest products can be realized from the fact that they are valuable raw materials that only exist in forest and by their use, a total use of the forest is enabled. As main categories for non-timber forest products management are:

- From the stem: seed, fruits, bristles and resin.
- From the forest area: Mushrooms, medicinal/aromatic plants, grassland and grass.
- From the soil : sand, stone, clay etc.

The different capacities of these products that exist on the forest soil represent components of great importance and have multiple applications, in human nutrition in the first place, in the pharmaceutical, food and cosmetic industry. By the usage of these products, not only the complex use of the forest begins, but solid financial effects and foreign exchange assets are obtained as well.

The natural resources, including the forest and forest products are basis for economic and social development, i.e. they represent general treasure of one country. The global policy of the developed countries and the developing countries is to cultivate and properly use the natural goods, confirmed on the "World summit on sustainable development" in 1992 in Rio and 2002 in Johannesburg. The permanent use of natural resources not only determines the opportunities for development of future generation, but it is a crucial factor for overcoming the poverty as well.

Volunteer, medicinal and aromatic plants

The quality of active substances in plant materials depend on the place and the conditions where the plant vegetates, but on the time and method of harvesting and the procedure for drying as well. In order to obtain a full overview of all important processes when treating volunteer plants,

we will show the most important rules for storage and distribution.

The producers and collectors of volunteer plants should ensure themselves that they avoid all types of damaging the existing vegetation places and the wild flora and fauna. At the same time, they should respect the provisions of CITES "Convention on international trade in endangered species of wild fauna and flora".

Quality guaranteeing

Having in mind that in organic farming governs the principle of total product traceability, a full documentation must be provided, beginning with the contracts between producers and buyers of volunteer plants, which must be in accordance with regionally and nationally recognized certifications and in written form as well.

Mushrooms and lichens

The forest communities, depending on the natural factors such as climate, altitude above sea level, humidity, soil, build and support the development of the rest of communities that not represent forest. Here we would mention the fungi that represent an individual and widespread group of living organisms that exist on forest soil. There are around 100.000 species of fungi, but the real number is much higher and every species has its natural importance in the nature. The mushrooms are heterotrophic organisms and unlike the plants, they feed on decaying dead or living plant and animal materials. According to the method of living, the mushrooms can be saprobes, parasites or to live in symbiosis with other organisms.

Saprobic mushrooms act as recyclers of dead organic matters and enable circulation of the matter in the nature.

Parasites feed on other living organisms and they usually provoke a level of damage.

Mushrooms of the third group form a specific and mutually useful relationship with

Table Nr. 26, Overview of Medicinal and Aromatic plant

Family	Botanical Name	Local Name
Abiaceae (Pinaceae)	<i>Abies alba</i> Mill	Fir, Silver fir
Asteraceae (Compositae)	<i>Achillea millefolium</i> L.	Yarrow, Thousand-leaf
Poaceae (Gramineae)	<i>Agropyrum repens</i> L.	Couch grass, Quitch grass
Liliaceae	<i>Allium ursinum</i>	Ramsons, Bear's garlic
Malvaceae	<i>Althaea officinalis</i> L.	Marshmallow
Apiaceae (Umbeliferae)	<i>Angelica sylvestris</i>	Wild Angelica
Ericaceae	<i>Arctostaphylos uva ursi</i> L.	Bearberry
Berberidaceae	<i>Berberis vulgaris</i> L.	Common barberry
Betulaceae	<i>Betula Pendula</i> Roth	Silver birch
Brassicaceae (Cruciferae)	<i>Capsella bursa pastoris</i>	Shepherd's purse
Asteraceae (Compositae)	<i>Chamomilla recutita</i> Rausch	Chamomile
Liliaceae	<i>Colchicum autumnale</i> L.	Autumn crocus
Rosaceae	<i>Crataegus monogyna</i> L.	One seed hawthorn
Equisetaceae	<i>Equisetum arvense</i> L.	Common horsetail
Gentianaceae	<i>Erythraea centaurium</i> Pers.	Red centaury
Rosaceae	<i>Fragaria vesca</i> L.	Wild strawberry
Rhamnaceae	<i>Frangula alnus</i> Mill	Glossy buckthorn
Gentianaceae	<i>Gentiana lutea</i> L.	Great yellow gentian, Bitter root
Geraniaceae	<i>Geranium macrorrhizum</i> L.	Bigroot geranium, Zdravetz
Araliaceae	<i>Hedera helix</i> L.	Common ivy
Asteraceae (Compositae)	<i>Helichrysum plicatum</i> L.	Everlasting flower
Caryophyllaceae	<i>Herniaria glabra</i> L.	Smooth rupturewort
Hypericaceae (Guttiferae)	<i>Hypericum perforatum</i> L.	St. John's wort
Cupressaceae	<i>Juniperus communis</i> L.	Common juniper
Malvaceae	<i>Malva silvestris</i> L.	Common mallow, High mallow
Fabaceae (Leguminosae)	<i>Ononis spinosa</i> L.	Spiny restharrow, Restharrow
Lamiaceae	<i>Origanum vulgare</i> L.	Oregano, Wild marjoram
Paeoniaceae	<i>Paeonia peregrina</i> Mill.	Scarlet peony
Asteraceae (Compositae)	<i>Petasites hybridus</i> L.	Common butterbur
Pinaceae	<i>Pinus mugo</i>	Mountain pine, Mugo pine
Plantaginaceae	<i>Plantago lanceolata</i>	Ribwort plantain, Narrowleaf plantain
Primulaceae	<i>Primula veris</i> L. Huds.	Common primrose
Rosaceae	<i>Rosa canina</i> L.	God rose
Rosaceae	<i>Rubus idaeus</i>	Raspberry
Rosaceae	<i>Rubus sp. diversa</i>	Blackberry, Bramble
Salicaceae	<i>Salix alba</i>	White willow
Lamiaceae	<i>Salvia officinalis</i> L.	Garden sage, Common sage
Caprifoliaceae	<i>Sambucus</i> L.	Elder, Elderberry
Lamiaceae	<i>Satureja montana</i> L.	Winter Savory
Lamiaceae	<i>Sideritis scardica</i> Griseb.	Mountain tea, Pirin mountain tea
Lamiaceae	<i>Stachys officinalis</i> L.	Purple betony, Bishop's wort
Asteraceae (Compositae)	<i>Taraxacum officinale</i> Web.	Common dandelion, Dandelion
Lamiaceae	<i>Teucrium montanum</i> L.	Mountain germander

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<i>Lamiaceae</i>	<i>Teucrium polium</i> L.	Felty germander
<i>Lamiaceae</i>	<i>Thymus</i> spp. L.	Thyme
<i>Tiliaceae</i>	<i>Tilis cordata</i> Mill.	Small-leaved lime
<i>Asteraceae (Compositae)</i>	<i>Tussilago farfara</i> L.	Coltsfoot
<i>Urticaceae</i>	<i>Urtica dioica</i> L.	Stinging nettle, Common nettle
<i>Ericaceae</i>	<i>Vaccinium myrtillus</i> L.	Bilberry
<i>Liliaceae</i>	<i>Veratrum lobelianum</i> Bernh.	White hellebore, False helleborine
<i>Scrophulariaceae</i>	<i>Verbascum densiflorum</i>	Denseflower mullein
<i>Violaceae</i>	<i>Viola odorata</i> L.	Sweet violet, Common violet
<i>Loranthaceae</i>	<i>Viscum album</i> L.	Mistletoe, European mistletoe

plants (certain plants can not come into bud without mushrooms) and this relationship is known as symbiosis, which is very important for the trees. Without the presence of mushrooms, the forests grow slower and lose the disease resistance. Mushrooms absorb water and minerals that plants use in the process of photosynthesis. As a result of their close adhesiveness to plants and

their important role in the natural life cycle, the mushrooms can be found in all habitats of plants. However, the forest remain to be habitats from most species of mushrooms.

In the table are shown the most important and most useful mushrooms that exist on the spaces as well as the time for their collecting. Shown in this way, we can obtain a clear image on the most prevalent species of mushrooms.

Table Nr. 27, Overview of the volunteer mushrooms and time for collecting

Volunteer mushrooms		
Latin/Botanical name	Local/Common name	Time for collecting
<i>Agaricus campestris</i> L.	Field/meadow mushroom	July - November
<i>Agaricus macrosporus</i> Pilat	Grootsporige champignon	July - November
<i>Armillaria mellea</i> Kummer	Honey agaric/ Honey fungus/Shoe-string fungus/Boot-lace fungus	August - November
<i>Amanita caeserea</i> Pers.	Caesar's mushroom	June – October
<i>Agrocybe cylindracea</i> Maire.	Southern poplar mushroom	Throughout the whole year
<i>Boletus edulis</i> Bull.	Penny bun, Cep	June - November
<i>Bovista plumbea</i> Pers.	Paltry puffball	June - November
<i>Cantharellus cibarius</i> Fr.	Chanterelle/Golden chanterelle	June - November
<i>Craterellus cornucopioides</i>	Trumpet of death/black trumpet/black chanterelle	August - November
<i>Hydnum repandum</i> Fr.	Wood hedgehog/Hedgehog mushroom	August - November
<i>Hydnum rufescens</i> Pers.	Terracotta hedgehog	August - November
<i>Lactarius deliciosus</i> Gray.	Saffron milk cap/Red pine mushroom	June—late autumn
<i>Lactarius deterrimus</i> Groger	False saffron milk cap	Autumn
<i>Marasmius oreades</i> Bolt.	Fairy ring mushroom	May - November
<i>Morchella conica</i> Pers.	Black morel	March - May
<i>Morchela esculenta</i> Pers.	Yellow morel	March - May
<i>Pleurotus ostreatus</i> Kumm.	Oyster mushroom	June – September

Lichens		
<i>Evernia prunastri</i> Ach.	Oak moss	Throughout the whole year
<i>Pseudevernia furfuracea</i>	Tree moss	Throughout the whole year

Table Nr. 28, Overview of related and similar species and their habitats

Related and similar species		
Latin/Botanical name	Related and similar species	Habitat
<i>Agaricus campestris</i> L.	<i>Amanita virosa</i> / <i>Agaricus</i>	Meadow/pasture
<i>Agaricus macrosporus</i> Pilat	<i>Amanita virosa</i> / <i>Agaricus</i>	Meadow/pasture
<i>Armillaria mellea</i> Kummer	<i>Armillaria tabescens</i>	Around trees and trunks
<i>Amanita caeserea</i> Pers.	<i>Amanita muscaria</i>	Open and hot places
<i>Agrocybe cylindracea</i> Maire.	<i>Agrocybe praecox</i>	Dry stems of poplar
<i>Boletus edulis</i> Bull.	<i>Boletus aereus</i>	In the forest
<i>Bovista plumbea</i> Pers.	<i>Amanita virosa</i>	Fields-pastures
<i>Cantharellus cibarius</i> Fr.	<i>Omphalotus olearius</i>	In the forest
<i>Craterellus cornucopioides</i>	<i>Cantharellus cinereus</i>	Deciduous forest
<i>Hydnum repandum</i> Fr.	<i>Hydnum repandum</i> var. <i>amarum</i>	In the forest
<i>Hydnum rufescens</i> Pers.	<i>Hydnum repandum</i> var. <i>amarum</i>	In the forest
<i>Lactarius deliciosus</i> Gray.	<i>Lactarius sanguifluus</i>	Pine forest
<i>Lactarius deterrimus</i> Groger	<i>Lactarius semisanguifluus</i>	Spruce forest
<i>Marasmius oreades</i> Bolt.	<i>Clitocybe dealbata</i>	Meadows and fields
<i>Morchella conica</i> Pers.	<i>Gyromitra esculenta</i>	In the forest
<i>Morchella esculenta</i> Pers.	Не постои замена со друг вид	Loamy land
<i>Pleurotus ostreatus</i> Kumm.	<i>Pleurotus pulmonarius</i>	Beech trunks

Lichens		
<i>Evernia prunastri</i> Ach.	Oak moss	It is developed on bark
<i>Pseudevernia furfuracea</i>	Tree moss	It is developed on bark

Legislations and regulations for collecting volunteer forest plants, fungi and lichens in the Republic of Macedonia in accordance with the organic production.

There are rules that regulate the collecting of volunteer forest plants, fungi and lichens in the Republic of Macedonia, but it should be mentioned that there is a lack of certain amendments, which should complete

the regulations on organic production and conventional sustainable systems.

All required information on the use of other forest products can be found in the Law on Forests of the Republic of Macedonia (71).

Export of mushrooms and lichens

Table Nr. 29, Overview of the exported mushroom and lichens from the Republic of Macedonia

Export from the Republic of Macedonia to other countries (in USD \$)					
	2003	2004	2005	2006	2007
Mushrooms	2.690	7.412	10.199	10.795	7.838
Lichens and Moss	1.095	776	686	581	1.096
Total	3.785	8.188	10.885	11.376	8.934

Table Nr. 30, Overview of the mushrooms importing countries in Europe

Volunteer mushrooms exported to the countries of the European Union					
Importers	2003	2004	2005	2006	2007
Italy	742	3.254	5.562	5.071	1.972
France	114	350	254	252	407
Germany	9	377	196	113	376
Austria	0	40	80	53	154
Spain	0	47	115	22	65
Switzerland	64	116	37	70	52
Holland	0	2	0	7	0
Lithuania	0	0	0	3	0
Poland	0	0	8	0	0
Total	929	4.186	6.252	5.591	3.026

In the overview of the tables, a data on volunteer mushrooms, moss and lichens for export abroad of the Republic of Macedonia as well as data on the biggest importers in Europe are shown. It can be clearly concluded that the size and the number of trade with volunteer plants is not consistent and it is different every year, depending on the market's needs. Furthermore, it can be concluded that the exported amounts represent economic potential and a better organization, utilization and increasing of this economic branch of the Republic of Macedonia should be considered in future.

In the interview with the representative from the company "Kokolaski" Ltd. Mr. Zoran Kokolanski from Berovo, specialized in purchase of volunteer plants, fungi, moss and lichens in the Malesevski region, it was emphasized that the real indicators for exported amounts could be only shown by the customs administrations of the country.

"The east planning region is a natural potential for volunteer plants, mushrooms, moss and lichens, but accurate and precise data on the amount of that potential is hard to obtain. The reason is that the growth of these plants on forest soil depends on the natural and climatic conditions every year. The potential of the East planning region is primarily in the Municipalities of Berovo, Delcevo, Makedonska Kamenica and Pehcevo and it goes around 1.000 tons for mushrooms to 40 tons for lichens and

moss, which is a pretty lower amount. For the Stip, Kocani and Vinica municipalities it is supposed that around 1500 tons of mushrooms and 30 tons of moss and lichens are exported annually. If we summarize these numbers for the East planning region, around 2500 tons of mushrooms are exported, therefore the fungi are the most exposed species of all volunteer plants, because the amounts of exported moss and lichens is only 70 tons on annual level. From all European countries that import this type of products, Italy is the leading country in amounts, import and cooperation with domestic local companies, generally speaking, it represents the best and the most required partner for cooperation".

The total process of collecting, transport and trade of volunteer plants, fungi, lichens and moss is a process that should be improved and consolidated with the Public Enterprise "Makedonski Sumi" in the first place, with the companies, buyers and collectors on the terrain themselves. This branch should represent one of the important economic potentials, that local-rural companies and population in these areas should benefit from.

Trade with medicinal plants

Medicinal and aromatic plants are actually whole, cut up in small pieces or intersected plants, parts of the plants, algae, fungi, lichens in unprocessed form that is

usually dry, but they can be fresh as well. Volunteer medicinal and aromatic plants are precisely defined with botanical scientific names, genera, species, variety, family and author.

Preparations of aromatic/medicinal plants are obtained when plants are subjected to following treatments: distillation, squeezing, concentration, fermentation, purification. Therefore, the following products can be derived: medicinal plants in powder, tinctures, extracts, ethereal oil, squeezed juices and processed exudates.

Dryer and hydro distillation facility

As a part of the processing capacities installed in this planning region, the dryer and the hydro distillation plant are parts of the Public Enterprise "Makedonski Sumi" subsidiary Malesevo Berovo.

Dryer

During 1987-1988 an initiative was taken for construction of capacity for processing of other forest products and medicinal plants (dryer). With its construction (1991-1992) began the drying of a large number of aromatic and medicinal plants, forest fruits, mushrooms etc. In the dryer with capacity of 150-200 t, products with high quality are obtained.

The most prevalent are European wild apple (*Malus sylvestris*), dog rose (*Rosa canina*), from the mushrooms penny bun (*Boletus edulus*), from the medicinal plants thyme (*Thymus serpyllium*), chamomile (*Matricaria chamomilla*), yarrow (*Achillea millefolium*), stinging nettle (*Urtica dioica*) etc. For all these above mentioned forest products, the dryer provides their long-term storage, achieving higher prices in the market, greater efficiency when transporting.

Hydro distillation plant

Hydro distillation plant began to operate in 1988, it successfully started and was profitable until 1999, when the total assortment of products was exported. The period after 1999 was characterized with certain problems on the market. The plant is equipped with modern technology that can process a large number of medicinal and aromatic plants to ethereal oils, i.e. larger number of other forest products are processed to ethereal oils, rosin etc. A modern dryer for medicinal plants and fruits operates as a part of the plant. The plant operates on the following way: by hydro distillation ethereal oils are obtained from juniper (*Aetheroleum juniperi*), yarrow commonly known as daisy (*Aetheroleum millefoli*), black pine (*Aetheroleum pini*), foenum (*pinus nigra*), scotch pine (*Aetheroleum foenum pinus sylvestris*), mint (*Aetheroleum piperitatae*), thyme (*Aetheroleum serpylli*), turpentine oil (*Aetheroleum terebinthae*), chamomile (*Aetheroleum chamomile*), rosin (*Calophonium*) etc. Ethereal oils are intermediate products that can be applied in the chemical and pharmaceutical industry.

Role and opportunities for development

This sector has a significant role in the total Macedonian agribusiness. The sector is fully export-oriented and therefore it exports more than 95 % of its production, while the import of these products is nearly not existing. Volunteer species are currently exported as raw materials, only a small part of them are finished products with added value. The export value of volunteer species for 2008 amounts approximately \$ 15 million which is 34% increasing in comparison to 2004, when the value of the total export amounted \$ 11 million.

Table Nr. 31, Export value of volunteer species in USD ²²

	2004	2005	2006	2007	2008
Italy	5.832.381	9.452.055	10.177.687	5.046.746	7.390.278
Mushrooms	5.748.203	9.192.900	9.657.282	4.692.752	6.639.783
Berries	59.229	234.211	496.096	262.315	723.493
Medicinal and aromatic plants	24.949	24.944	24.309	91.679	27.001
France	867.986	857.039	815.152	1.035.416	1.047.831
Mushrooms	511.711	646.158	529.022	627.763	1.043.996
Berries	0	34.053	14.767	83.465	3.835
Medicinal and aromatic plants	356.275	176.828	271.363	324.188	0
Germany	1.112.333	1.600.968	1.606.881	2.511.382	1.010.330
Mushrooms	429.961	195.765	113.446	391.893	115.853
Berries	324.380	1.167.845	1.098.569	1.788.999	894.477
Medicinal and aromatic plants	357.992	237.358	394.866	330.490	0
EU others	1.365.782	1.714.552	3.037.288	3.157.289	2.470.499
Mushrooms	528.686	349.177	521.880	700.826	983.712
Berries	357.054	666.600	1.985.925	1.843.092	1.483.684
Medicinal and aromatic plants	480.042	698.775	529.483	613.371	3.103
Closer region -Bg, Sr, Alb, Gr, BiH, Hr	1.646.817	886.238	3.379.090	2.414.126	2.129.881
Mushrooms	671.801	103.260	614.309	176.594	456.899
Berries	247.266	302.986	2.066.836	1.338.900	1.305.739
Medicinal and aromatic plants	727.750	479.992	697.945	898.632	367.244
Outside Europe	177.300	579.749	632.019	1.087.239	720.394
Mushrooms	0	0	0	4.741	536.213
Berries	0	0	0		176.720
Medicinal and aromatic plants	177.300	579.749	632.019	1.082.498	7.461
Total:	11.002.599	15.090.601	19.648.117	15.252.198	14.769.213

²² Source: USAID, Ag Biz Program

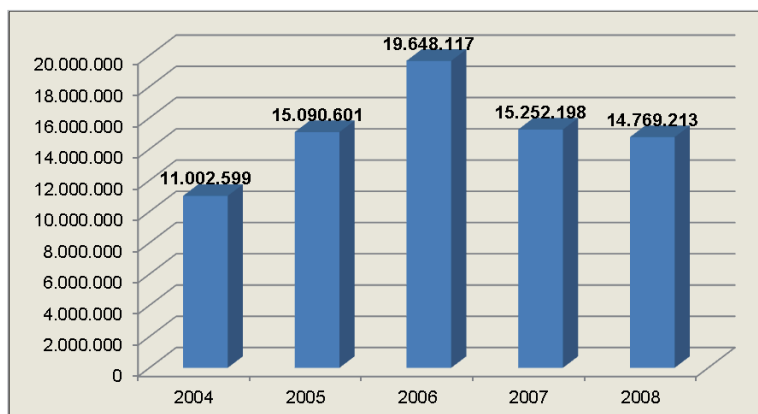


Image Nr. 48, Export value in USD \$

The biggest importer of volunteer products from Macedonia is Italy, with total export of around \$ 7 million, after it follow

France and Germany. The countries from the closer region are ones of the more important importers of volunteer species with total value of around \$ 2 million.

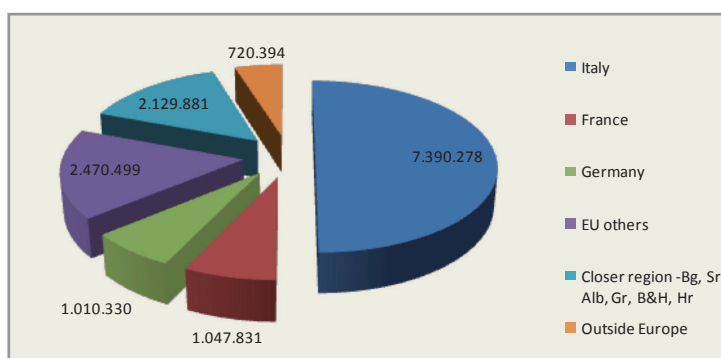


Image Nr. 49, Structure of the export regarding the countries for 2008, in USD \$ ²³

Structure of the species that are being collected and trends

Mushrooms

Mushrooms represent more than 60% of the total export value of all volunteer species. The export of mushrooms is mostly consisted of: Penny bun, Saffron milk cap and Chanterelle, but recently the interest on other species of mushrooms is increasing. The export value of mushroom is increased for around 17% between 2004 and 2008.

Berries

The export of volunteer berries is mostly

of: cranberries, junipers and blackberries. The export value of berries was increased for impressive 350% between 2004 and 2008.

Medicinal and aromatic plants

One decade ago, the medicinal and aromatic plants were the main products for export, but by increasing the level of their cultivation, the export value for this group is drastically reduced. The export value was reduced for 19 % between 2004 and 2008.

²³ Source: USAID, Ag Biz Program

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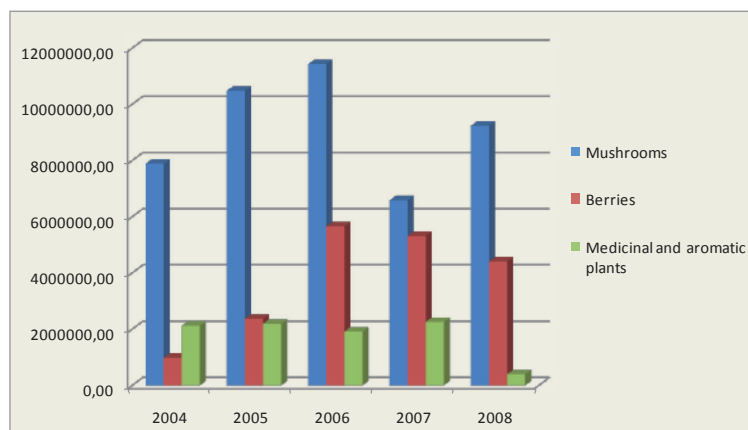


Image Nr. 50 Structure of the species that are being collected ²⁴

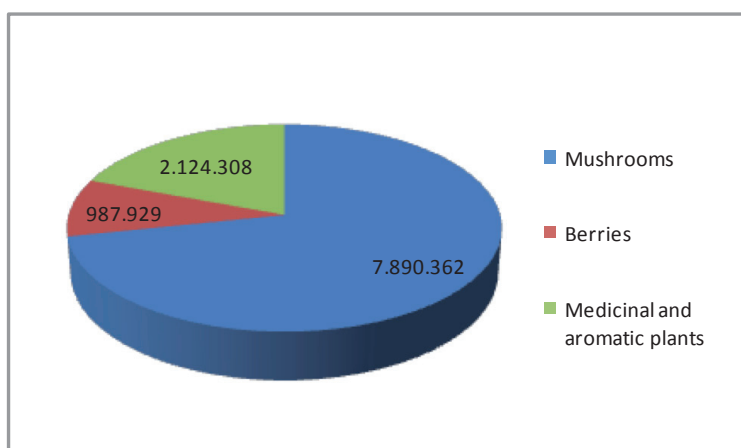


Image Nr. 51, Export value for 2004 in \$²⁵

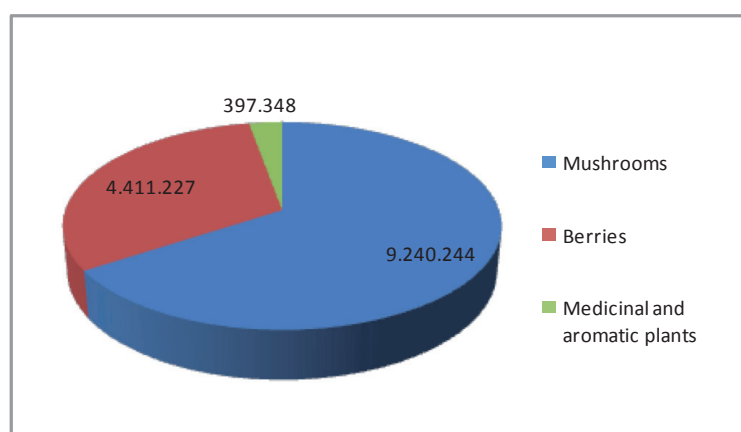


Image Nr. 6p.52, Export value for 2008 in \$.

^{24, 25} Source: USAID, Ag Biz Program

Social aspect and employment

Collectors

Around 60.000 people on national level are included in collecting volunteer species (in accordance with the purchased amount, exported amount and collecting average);

Collectors principally live in the most rural parts of the country and represent economically most vulnerable group of people;

Collecting and sale of volunteer plants represent an important additional income for a large number of households in the rural areas of the country;

The number of collectors is gradually reducing (increasing of the standard and raising the value of labor force, inexpensive supply of raw materials from the other countries, migration from rural to urban areas).

Buyers

They are legal and physical entities that make direct purchase from the collectors; There are around 100 companies and physical entities that participate in the purchase, most of them are not registered as traders.

Processors and exporters

Processing and export is organized by around 20-30 companies in Macedonia, where 600 people are employed.

Companies engage around 300 people in regular employment.

The sector employees and engages around 3.000 people as seasonal workers for 5 months period.

Balkan and therefore Macedonian volunteer species are appreciated as high-quality with unique, strong aroma and relatively high price. There is an increased offer of volunteer species in China, Turkey and Baltic countries, but those are with lower quality and significantly lower price. Balkan and hence Macedonian volunteer species

are used by the larger producer in order to "standardize" them (mixing high with low quality raw material that is offered on the markets). There is a potential for increasing the export value of volunteer species by adding value and sale of high-quality finished products, entrance of new markets and market segments that could offer relatively high price for products with added value and high quality.

Recommendation

The East planning region, together with the administrative municipalities that are part of it, possess a solid capacity for collecting forest medicinal and aromatic plants. This part of the study contains information and contents that would be beneficial for further development of organic production and improvement of the use and utilization of forest plants.

It is important to mention that these plants have a huge importance for many industries and for the local population that produces traditional products of them, like juices, compotes, jams, teas, honey etc.

This branch for use and production of aromatic and medicinal plants is in constant growth, and as main actors are the industries, the regional entrepreneurs and the local population. For proper development and economical benefit, a contribution should be made by regional, national representatives of the government, relevant institutions and all interested parties.

From the stated information, as biodiversity, directions and principle for use, storage, harvest and maintenance of these plants, the basic information on volunteer plants, processing and so on, a general image on forest products in the East planning region can be obtained. With their proper treatment, they represent a constant raw material and potential in the process of organic production.

The imperative is to start a conversation with subjects that currently make purchase

for them or third parties, but have undefined legal status. Process for regulation of their legal status can start with conversations, and therefore they can acquire the right to use the means from the National agriculture development programme, means from the IPARD instrument, as well as the right to participate in cross border programmes (Cross Border Cooperation). Moreover, it is necessary to organize detailed research on the potentials of the medicinal and aromatic plants by scientific institutions and organizations, therefore the total potential of the region can be documented and the interest of the industries and business sector to increase the production of these plants would be aroused at the same time, which would finally increase the economical benefit for the poor region.

Overview of the enterprises that deal with purchase of volunteer plants

Several enterprises are registered for purchase of volunteer plants, regardless of the fact if this is about forest fruits, aromatic or medicinal plants. Sadly, none of them has certified areas for collecting volunteer plants of organic origin. However, this can serve as point of reference for further development of that activity.

In the following table, the overview of enterprises that are registered for purchasing place at the territory of the East planning region is given.

Ord. No.	Name of the subject	Purchasing place	Field of operation	Representative	Object of purchase
1.	Intermak Veles	Delcevo	Kocani-Berovo-Delcevo	El Mak Ltd.	Fresh and dried mushrooms, storage on +4°C, cut up by machine and dried in dryer
		Village Orizari, Kocani	Kocani Berovo Delcevo	Dani Komerc	Fresh and dried mushrooms, storage on +4°C, cut up by machine and dried in dryer
		Berovo	Kocani Berovo Delcevo	Meteora DJ Ltd.	Fresh and dried mushrooms, storage on +4°C, cut up by machine and dried in dryer
2.	Fungi Flora	Ratevo	Ratevo		
		Rusinovo	Rusinovo		
		Berovo	Berovo		

3.7.6. Apiculture

Organic apiculture is a type of production that is practiced in ecologically clean regions where intensive agricultural production is not applied. Natural materials, methods and food are used in organic apiculture, while using conventional veterinarian methods and pesticides is avoided, synthetic medicines and synthetic food for feeding bees are not used.

As a result of the proximity with the nature, the honey of bees, obtained by organic apiculture, has much better taste, nutritive and medicinal qualities. By application of the principles on organic production, all possible ways for contamination of the honey and bee products are eliminated.

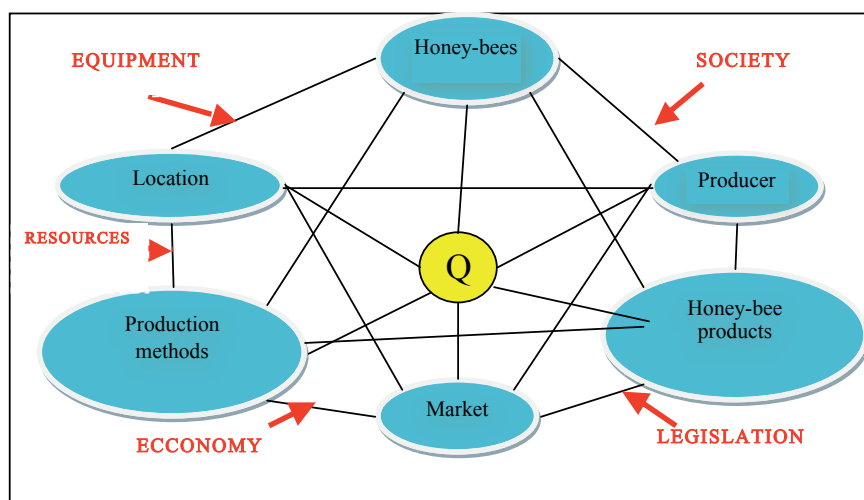


Image Nr. 53, System of organic apiculture

This diagram illustrates the main relations and connections in the organic apiculture and shows the parameters that contribute to quality of the honey and other bee products.

The products obtained by organic apiculture are:

- Organic honey
- Organic pollen powder
- Organic bee's milk
- Organic bee's wax
- Organic propolis

Organic honey and organic bee products are obtained by certified apiaries, where severe requirements are applied.

The advantages of the organic honey are the following:

- Organic honey is natural product of high quality.

- By its production and storage, all contamination agents are being eliminated and therefore the organic honey does not contain harmful substances.
- Organic honey has delicious taste and curative properties

Location of apiary

As most important condition for organic apiculture is the proper treatment of apiaries, as well as their location. It should firstly be appropriate to apiculture regarding the position of beehives, regarding the exposure, inclination of the terrain, winds, water and bee pastures with sufficient amounts of pollen and nectar for nutrition and production of young bees. The location should be on places that are not subjected to any

kind of chemical contamination (industrial objects that emit gas, landfills, fields where intensive agricultural production is practiced, GMO) or other kinds of pollution that can provoke contamination of honey and other bee products. On three kilometers radius, the nectariferous vegetation should be ecological or volunteer. It is allowed to exist fields where crops that do not correspond to this regulation are cultivated, but they should not prevent the ecological quality of the apiary products.

As above stated, for organic apiculture, it is necessary to select the appropriate location where bee hives can be placed. It is more convenient this location to be inclined to east, to which direction the openings of the hives should be directed, for this reason the bees would begin their fly to pastures much earlier in the morning. On the other hand, when the sun shines the most, the openings are already in the shadow of the hive. The shading is even bigger if the terrain is more inclined to east. Positioning of the hives in the apiary can be in one or more rows. The ideal positioning is zigzag, therefore the bees will not obstruct one another and it is the easiest way to handle them. In order to prolong the lifetime of hives, it is necessary to lift them up on supports (wood, metal, concrete etc.). For most of the apiaries here, concrete blocks are used, as convenient, not very expensive and long-term solution.

The number of apidae (bee families) in one organic apiary should correspond to the bee pasture. However, the number of bee families for each location is individually determined. According to the conditions for most of the nectariferous pastures in Macedonia, one apiary should not contain more than 120 families. In organic apiary, bee keeping can be performed in any type of hive, but it is essential the hive to be made of natural materials and not to contaminate



Image Nr. 54, Organic apiary (near Berovo, Petar Kletnikoski)



Image Nr. 55, Positioning of beehives on inclined terrain (2010, near Berovo, Petar Kletnikoski)

bee products. In order to improve the offer of the apiary, regarding rural tourism, it is necessary to integrate primitive beehives in the apiary.

The treatment with herbicides is not allowed in organic apiculture. Therefore, the location of the apiary should not be treated

with herbicides as well. Before deciding upon the location of the apiary, the area should be cultivated, a mix of grass and clover with short growth should be sown that does not seek constant mowing. On the places where grass is already planted, a timely mowing is performed, in order to prevent a situation where grass is so high over the opening and hinders the flying of bees and food seeking.



Image Nr. 56, Locust in bloom (2010, Vasko Zlatkovski)

Inspection procedure

1	Examination	Of the organic apiculture plan and its implementation
2	Terrain inspection	Visit of all apiaries as well as migration areas of bees focusing on: <ul style="list-style-type: none"> • Origin of bees • Materials used for construction of hives, containers and tools • Environment (vegetation and contamination sources in 3km radius around apiary) • Prevention from diseases and pests, veterinarian treatments • Feeding • Colonies management
		Visit of honey super and storage rooms, and possibly of the processing units, focusing on: <ul style="list-style-type: none"> • Convenience of containers and tools • Appropriate separation of not-certified products • Labeling and traceability • Contamination sources after collecting
3	Records keeping	<ul style="list-style-type: none"> • Regional maps (not smaller than 1:50.000), marking the sides of the apiary, the important vegetation, contamination sources (roads, industry, landfills, conventional fields etc.) as well as clean water sources • Accounts for buying bees, beehives, painting, food, bee's wax, veterinarian products, honey • Diary of apiary (contains information on wax changing, feeding, veterinarian treatments, removing honey, beehives repositioning, general management) • Books on storage and/or protocols for processing and packing (if necessary) • List of products used for cleaning, disinfection and pests control • Keeping records on all sales of bee products



Image Nr. 57, Locust in full bloom (near Probistip 2010, Vasko Zlatkovski)

Organic apiculture in Macedonia

Apiculture in the Republic of Macedonia, as certified organic production, has a growing tendency. Only two apiarists with total 110 beehives were certified in 2005, and the number was raised to 6 apiarists with total 505 beehives in 2006. That contributed to drastically increasing the number of bee families from 11.709 in 2007 to 15.455 in 2008.

From the data we can conclude that the number of bee families, certified as organic food is rapidly increasing with the years.

However, for having official indicators and certified bee families for organic production, we shall make detailed analysis for the period 2005-2009 from the data that we receive from governmental organizations²⁶ and the Ministry of agriculture, forestry and water management.

Table Nr. 32, Dynamics of development of bee families as organic production for the 2005-2009 period

Years	Number of bee families	Base indexes base 2003		Chain indexes	Chain indexes
		indexes	Percentage amount		
2005	110	1,00	100 %	/	/
2006	505	4,59	459 %	4,59	459 %
2007	1.832	16,65	16.654 %	3,63	363 %
2008	11.709	106,45	106.450 %	6,39	639 %
2009	15.455	140,50	140.500 %	1,32	132 %

Data of the table Nr. 32 indicate that the number of certified bee families in the Republic of Macedonia, for the analyzed period is rapidly increasing with 1,32 to 6,39 times coefficient with years.

²⁶ Source, Ministry of Agriculture, Forestry and Water Management

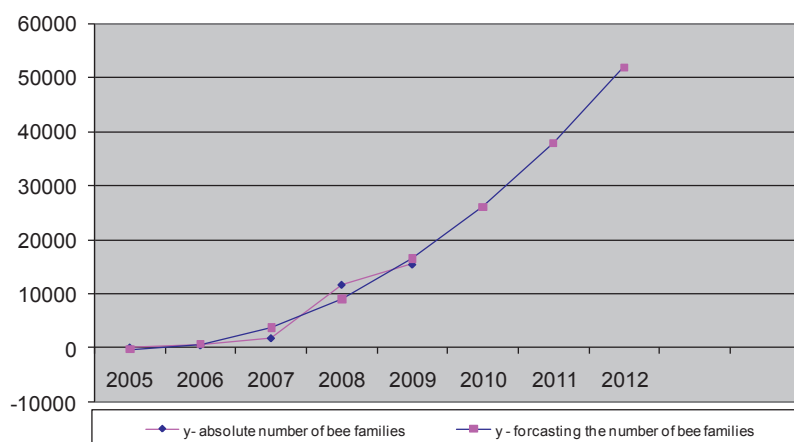


Image Nr. 58, Developmental tendencies of the number of bee families in the Republic of Macedonia (exponential trend line)

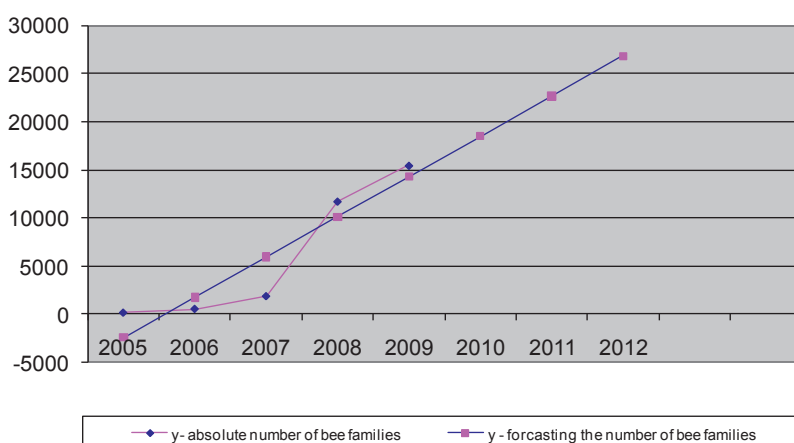


Image Nr. 59, Number of bee families in the Republic of Macedonia (linear trend)

Likewise, the graphical display of the parabolic and rectilinear trend for the future period (2010 – 2012) shows that a rapid increasing of the number of bee families certified for organic production is predicted.

Organic honey represents one of the products with greatest potential for export on world markets, as a result of its quality that derives from its high nutritive and medicinal qualities. However, the insufficient amount for appearance in the market is a limiting factor.

Therefore, it is recommended the organic apiarists to be grouped in associations in order to provide sufficient amount of organic honey and to be competitive on the world markets.

East planning region, especially Malesevsko – Pijanecki and Probistipski region, dispose of excellent climatic and ecological conditions for development of organic apiculture and production of organic honey and other bee products.

3.7.7. Animal husbandry

The development of animal husbandry, organized on organic principles, is necessary conditioned by several preconditions. Hence, according to the rules for organized livestock production, before the process of animal farm certification begins, the livestock farm should dispose of sufficient land to satisfy the need for animal feed. Therefore, it is necessary to take care of the livestock density on two basis:

- number of livestock on area unit;
- capacity for accommodation of the livestock.

According to the above stated points, the pastures entered in the registry of the Public Enterprise for Pastures indicate a sufficient potential for development of animal husbandry and this type of agricultural land, regarding the fact that measures for melioration and fertilization have not been taken for years, can in short notice go through the transitory period and acquire a certificate for organic origin.

Regarding the feed supply, the convenient relief in the region enables horizontal joining of the farmers from the region. Namely, if Malesevko-pijanecki region disposes of quality areas for grazing, but it is faced with one limiting factor – the climate. If we carefully analyze the data on the weather in this region, we can notice an early winter with large number of snowy days that prevent the livestock to find its own feed. These conditions seek timely supply of sufficient amounts of hay and fodder, in order for the livestock to spend this period easier. Having this information in mind, opportunities for the farmers in the plain of this region are opened, to organize the production of crops for production of livestock feed (forage, cereals...). Farmers in the plain have lack of animal manure to improve the soil quality, therefore it comes to closed circle of mutual need and benefit.



Image Nr. 60, Meadow (by the road Delcevo-Pehcevo, Vasko Zlatkovski, 2010)



Image Nr. 61 Livestock farm (by the road Probistip-Krupiste, 2010; Vasko Zlatkovski)



Image Nr. 62, Herd of sheep grazing, near the village Smojmirovo, Berovo (by the road Berovo-Vinica, 2010, Vasko Zlatkovski)



Image Nr. 63, Sheep grazing, above the village Negrevo-Pehcevo (Vasko Zlatkovski, 2010)

3.7.8. Advisory service

Advisory component plays significant role in the development of each sector of the society as well as in agriculture. The beginnings of the development of this service dates back in the end of the 60s of the previous century, with the Assembly of the Socialist Republic of Macedonia, based on analyses that the yields of agricultural crops in the private sector is drastically different compared to the public sector. Additional analysis suggested a possibility that the existence of educational staff in Agricultural-Industrial Complex²⁷ is a tool in the chain that makes difference, as a result of the decision reached for foundation of pilot-projects for the municipalities to form a Fund for individual agricultural development, which would finance the Professional services for promotion of individual agriculture. These services mostly employ people with long-time experience in Agricultural-Industrial Complex, who had good relations with the local population and enjoyed a good reputation. The first results from functioning of these Funds and Services were quite positive, so in 1972 the Republican Center for promotion

of individual agriculture "Application"²⁸ was founded, as a form for organization of 30 municipal Services/ Centers for promotion of individual agriculture.

The organizational structure, means and methods for operation of these services went through transformation in accordance with the changes in the society and after the independence of the Republic of Macedonia, the advisory component undergoes through radical changes. Namely, since 1993, series of transformations of the state advisory service began, from institution managed by the state to institution that is managed by farmers as well. The series of changes and directions for transformation ended in 1998 by adoption the Law on foundation of the Agency for promoting the development of agriculture²⁹.

Nowadays, APDA on the territory of the East planning region operates with over 1 regional center, 6 working units and 7 outpost offices in Karbinci, Leskovica, Lakavica, Cesinovo-Oblesevo, Zrnovci, Makedonska Kamenica and Pehcevo.

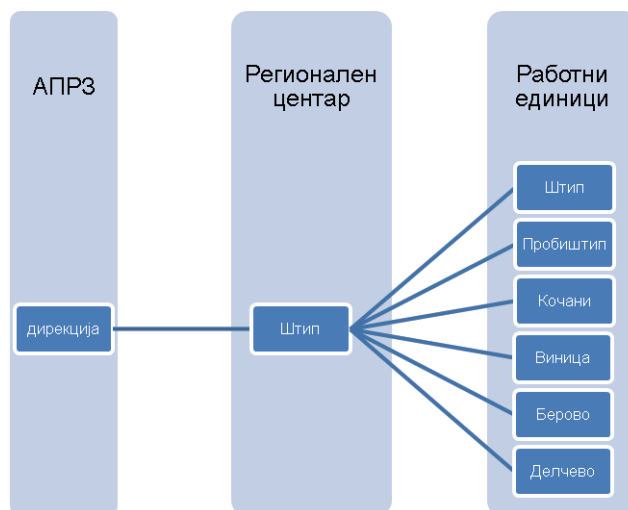


Image Nr. 64 Organization structure of APDA and RC Stip

²⁷ AIC (ЗИК) -Agricultural-Industrial Complex

²⁸ Republican Center for promotion of individual agriculture

²⁹ Official Gazette.3/98

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From organizational point of view, the coordination between the working units and the head office is performed by the Regional center in Stip, which has a double role - collecting data from the working units, their

systematization and forwarding to the head office, and introducing the working units to the decisions reached by the manager and head office.

Table Nr. 32 Overview of the number of advisors in RC Stip and educational structure ³⁰

Working unit	Number of executors	Expertise
Stip	5	Viniculture and fruit growing – 1 Crop production – 3 Animal husbandry – 1
Probistip	2	Viniculture and fruit growing – 1 Animal husbandry – 1
Kocani	3	Viniculture and fruit growing – 1 Crop production – 1 Animal husbandry – 1
Vinica	2	Viniculture and fruit growing -1 Crop production– 1
Berovo	2	Animal husbandry– 2 Crop production – 2
Delcevo	4	Viniculture and fruit growing – 2 Crop production – 2

Sadly, there is a lack of coordination between the regional center and the working units of APDA with the Center for development of the East planning region and municipalities. Each subject adopts his own plan and programme for the following year, without holding coordinative meetings where the possibilities for cooperation would be discussed, which would improve the conditions to most of the segments of the rural development to larger extent, and the organic farming as part of it.

Regarding the type of advisory services APDA is focused on transfer of knowledge in the field of technology, the type of services that it offers are free of charge, most of the activities in the recent years are fulfilling printed forms for farmers that apply for the state Programme for financial assistance of agriculture. On the other hand, the private advisory subjects focus their activities on elaboration of business plans for application to IPARD and Rural development programme.

³⁰ Source: APDA RC Stip

Table Nr. 33, Overview of the activities in the public advisory service 2008-2009³¹

Year	Working unit	Number of advices			passed km
		Terrain	Office	Phone	
2008	Stip	275	292	643	11.508
	Probistip	824	368	0	9.875
	Kocani	323	1.377	716	6.776
	Vinica	1.063	1.104	150	4.322
	Berovo	268	990	4	2.365
	Delcevo	1.071	1.906	825	7.594
2009	Stip	209	326	44	8.088
	Probistip	767	312	0	7.188
	Kocani	969	2.467	727	9.568
	Vinica	813	900	84	3.710
	Berovo	697	2.405	0	4.371
	Delcevo	1.507	2.584	592	14.851

However, on initiative of the Project for support of the individual agricultural producers³² a foundation of private advisory incentive was promoted, which marked the beginning of the pluralism of these types of service in the agriculture of the Republic of

Macedonia. Sadly, as a result of the weak financial power of farmers, this private incentive was terminated when the Project ended, leaving behind a potential that is managed by the consulting houses in the sector of agriculture nowadays.

Table Nr. 34, Overview of the activities in the private advisory service 2008-2009

Year	Subject	Number of advices			Passed km
		Terrain	Office	Phone	
2008	Agrokonsalting - pro	38	40	-	2.500
2009		30	50	-	3.000
2008	Ltd. "Agrokonsalting Plus" - Zrnovci	35	40	15	2.300
2009		20	25	10	1.500

Besides the above stated, some other providers of advisory services play an important role in widening the knowledge of farmers:

- Companies that deal with sale of repro-material, where agricultural pharmacies

and producers of seed and planting material belong;

- Processing capacities, where the following groups belong: buyers and processors of milk products, suppliers of feed for livestock and reproductive

³¹ Source: APDA RC Stip

³² Project of the Ministry of agriculture, forestry and water management and the World Bank

livestock, veterinarian services, bakery industry that plays only passive role without specific interest for managing role in the selection of species and finally the buyers of garden products that, though in the beginning phase, still play an important role in the quality of production that they want to have in order to sell their product to their business partners;

- Educational institutions, where secondary schools for agriculture and high

school institutions belong, with their experimental fields, research activities, projects and occasional workshops for transfer of technologies, have a great influence on the selection of farmers.

Advisory services are still not developed enough to satisfy the needs of the producers, especially the needs of processors and traders (exporters), therefore great attention should be paid on this sector for its professional qualification so it can successfully meet the challenges.

3.7.9. Control/certification bodies

Development of organic farming is impossible without the presence of independent body, which shall guarantee that the producer would stick to the principles of organic farming.

The presence can be provided in accordance with two principles. Firstly, domestic control/certification body should exist anyway. The first step that this institution has to do is to approach the adopting of working methodics in accordance with the international rules for work of the control/certification bodies. The next step is requirement for accreditation from domestic institutions, so in the end an entry in the Register of institutions that perform inspection supervision/certification in the Republic of Macedonia could be required. With the entry in the register, this body has the right to perform inspection and to issue certificates that are valid in the territory of the Republic of Macedonia. If is necessary the certificates to be valid abroad, the body addressed to the competent authorities in the countries where the certificates need to be valid.

Second case is foreign control/certification body to register affiliate company in the Republic of Macedonia with one employed at least. In that case, the foreign control/certification body firstly submits requirement to the competent authority for issuing accreditation to work, and than it can be entered in the Register of institutions that perform inspection supervision/certification in the Republic of Macedonia. Certificates, which this body issues, are valid in the territory of the Republic of Macedonia as well as in the territories of all countries, where it has a working license.

Two control/certification bodies are registered so far. "Balkan Biosert" Ltd. is an older body, which obtained its license immediately after adoption of the first Law on organic farming in the Republic of Macedonia, in 2005. It is an affiliate company of Balkan Biocert Ltd. with a seat in Plovdiv, the Republic of Bulgaria, which is a daughter-company of the Swiss IMO³³.

Until 2009 it was the unique certification body that performed certification activities, and than a second control/certification body

³³ Institute for Marketecology

“Procert” was registered, therefore the Republic of Macedonia joined the rest of the countries of the West Balkan with pluralism in the market of certification services.

According to the data from the official Internet web-sites of the two certification

bodies, they issue certificates in accordance with the following standards:

- EU Reg. 834/2007 and 889/2008
- NOP³⁴
- JA³⁵
- Bio Suisse³⁶

3.7.10. Overview of the neighbor countries' experiences

Bosnia and Herzegovina

In one of the two federal units (Republika Srpska), in the city Prnjavor, more than one decade successfully functions the family company “Simuena”. It determined its development path for food production on old-fashioned way, as the population of that region did centuries ago, and which, according to them brings positive results: healthy family, healthy individual, healthy and normally grasping the world and the life in it.

With its production programme it is currently unique on that market, regarding the fact that it performs the whole process from sowing to serving.

On around 20 ha arable land, cereals and vegetables are cultivated, and as completion of the whole process, bread and baked goods are prepared. As recognition of the good work, the Ministry of agriculture there awarded them with 20 ha area more under concession.

The full production programme is based on native customs, and the production of bread and baked goods is performed in accordance with the production rules, without application of additives and preservatives, which makes this enterprise easily recognizable on the market and its products have high quality.



Image Nr. 65, Part of the production assortment

³⁴ National Organic Program (USA)

³⁵ Japanese Agricultural Standard (Japan)

³⁶ Switzerland, Israel, Argentina, Australia have/introduce their own regulations on organic production in accordance with the Regulation of EU (EC) N° 834/2007

The enterprise has 9 permanent employees and in accordance with the needs it employs seasonal workers as well.

There are pupils from secondary schools in the production process as well, who participating in the production process acquire their first experiences in earning for live while preserving the traditions of the ancestors.

The enterprise "Simuena" begins with test production on the territory of Knezevo municipality this year, on the area of 1050 m altitude above sea level.

Acquiring knowledge that the rural tourists unselfishly involve themselves in performing the work activities of the economies, they hope that by their promotion on international markets they will spread their successful story abroad and that the tourism will make its own contribution to revive this area.

As they emphasize, by developing their own rural areas, they want to participate in eradicating poverty, creating new workplaces and they will try to give young people a chance for long-term life perspective.

Won prices:

- Special recognition for production of natural healthy food, Competition for most successful enterprises in Republika Srpska for 2004.
- Award of "Glas srpske", HIP 2000
- Recognition from the Association of innovators in Banja Luka
- Recognition from the Association of citizens in Republika Srpska
- Award for preserving the tradition and entrepreneurship, Fair of education, finances and entrepreneurship in 2005.



Image Nr. 66, Participation on domestic exhibitions

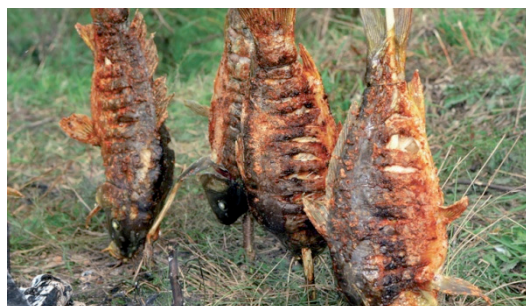


Image Nr. 67, Rural tourism

Greece

Near Florina, Greece, there are many farmers that, in the last three years, seek opportunities for improvement of the financial effect of their work, so they started the application of organic agriculture. Main products are organic wine and meat obtained by the livestock raised in accordance with the principles of organic farming.

Conditions for organizing this type

of production in that part of Greece are convenient, regarding the absence of heavy industry, pollutants of the environment, but there are excellent natural conditions as well, so the implementation of separate procedure in the transitional period is not necessary, and the number of consumers that take care of their health is in constant growth.

Serbia

According to the data of Sergej Ivanov³⁷, there is a business entity with larger number of livestock in central Serbia:

- 150 herds of cattle
- 40 donkeys
- 80 goats.

Cattles are raised in accordance with the cow-calf principle and they originate from the local breed of cattle Busha, which is present in the territory of the Republic of Macedonia as well. The rest of the livestock belongs to the autochthonous species and breeds that contribute to preservation of biodiversity. The livestock grazes in the pastures with 800-1600 m altitude above sea level and no other additives are used for feeding. In 2010 the total transitional period is over and the whole livestock has an organic status. The placement of products is planned to be realized on the markets and trade network in Belgrade, where the biggest opportunity for absorption of this type of production exists.

Influence on the environment

Unlike the other systems for organizing agricultural production, the organic farming is based on relations between biocoenosis and non-living part, i.e. on holistic approach for organization and utilization of biocoenological potentials.

Furthermore, the whole approach in balancing nutrients in the soil is not based on simply adding dissolved nutrients in the soil (as artificial fertilizers), but by adding minerals that with assistance of microorganisms will be transformed in a form available for the plants. Moreover, the total number of livestock that can be kept in certain area is directly depended on the amount of nitrogen that the livestock releases when moving on the area. Stated amounts are significantly lower, compared to the maximal allowed livestock amount that can graze on certain area, and is not subjected to the principles of organic

farming. Therefore, besides removing the danger of destroying the phytocoenologic communities, it contributes to reducing the danger of one significant element for the environment - the water. Namely, the nitrates are ones of the easiest soluble forms that go through the thicker soil layers and pollute the under soil waters and therefore represent potential danger as pollutants of the water that serves for water-supply of the populated areas.

In order to obtain a product that would acquire appropriate valorization, it is necessary to cultivated it from the plant that during vegetation period was not subjected to economically important diseases and pests. Those fruits have distinctive size, great color and characteristic taste. When we began with study, in the chapter for Introduction, we stated that on the start of any activities for beginning of organic production, it is necessary to undertake extensive researches in order to avoid dangers from diseases and pests of the plants. Hence, with the right choice of plant species, and afterwards of the sorts, a preconditions for cultivation of healthy plants are provided, which would under conditions of normal growth and development give fruits of high value, without endangering the environment in the meantime.

However, if comes to their manifestation, as a result of the convenient conditions for development of diseases and pests, there are series of phytopharmaceutical preparations without harmful effect on the environment. Finally, the fight against pests is organized by application of so-called favorable and unfavorable neighbor crops, appropriately elaborated scheme of crop rotation, but by cultivation of plant species that serve for growth and development of predators as well.

Although in the scientific circles of the world, there is still a fierce debate on the

³⁷ Sergej Ivanov, sivanov@ptt.rs

danger, i.e. utility from the use of genetically modified organisms, a greater attention is paid in the seed companies, therefore different sorts of plant species can be found in the market, whose producing was assisted by modification of their genetic code. Following the trends present in the countries of the Union, the Republic of Macedonia declared itself as a country free

from GMO. We should have in mind that the general principles of organic farming clearly emphasized the prohibition for GMO application; therefore any kind of threat for possible application of this type of organisms is being eliminated.

Hence, organizing organic farming is not only without danger for the environment, but it serves for its protection and improvement.

4. Risks and limiting factors

Several factors that influence the sustainable agricultural farming in the East planning region. They belong to several groups, over which the sector has its influence, but other kinds as well that act independently from the determination of the sector. Furthermore, on the basis of the origin, the listed factors can be divided to anthropogenic, created by and influenced by the man and natural factors, that the man still has a small (partial) influence on them.

In the first group - anthropogenic factors belong all activities created by the man with his everyday activity. There are some factors in this group that can be controlled, but some that are impossible to control as well. Part of these factors were discussed in the chapter SWOT analysis, where the forces (factors) on which the sector has its influence are described. Having in mind the stated, as additional factors with limiting role, which can be derived from the conducted poll of agricultural holdings in the region are the following: the age of the population that should deal with this type of production.

- personal belief of what is organic farming, which is very different from the real sense of it;
- sureness that this type of production is impossible to be organized;
- lack of institutional assistance for obtaining more information;
- absence of information system,

where interested parties (producers, processors, buyers) could gain information from;

- absence of educational system for widening the knowledge of primary producers, but for advisory institutions as well that give support to them;
- ignorance of techniques and technologies for processing of production after harvesting;
- depopulation tendency of the rural areas;
- lack of purchasing enterprises in the territory of the region;
- absence of accurate evidence on the area and condition of pastures in this planning region;
- negligence of pastures;
- reducing the number of livestock.

Descriptively, the thing that concerns the most is that many farmers have unclear ideas of what organic agriculture means and which are its advantages regarding the traditional and contemporary agricultural production. Lack of adequate information is a basic risk factor for development of organic farming in the region.

None of the developing processes can keep its continuity without adequately competent subjects. The farmers are the basic tool for development of organic farming here as well. However, the low level of awareness affect this sector emphasizing

the following questions:

Do farmers know what organic farming is?

Are farmers properly informed of the outcome from this type of production?

Do farmers have information on expansiveness of organic farming in other European countries?

If communication bridge of information between the farmers is enabled and if its level is raised?

The low level of approach to educative material is limiting as well as the absence of easily comprehensible and acceptable educative material for farmers, which leads to lack of functionality of the sector. The ignorance of certain phenomenon leads to lack of interest of the agricultural sector for beginning of something risky for improvement, for introduction of something "new" in the method of production. The low level of understanding of good agricultural practice, and much less of organic farming, only increases the palette of limiting factors that negatively influence the development of organic farming.

On the other hand, farmers that are interested in organic farming and that use the little number of available information and that are acquainted with the process, do not have institutional support at all for enrichment the capacity for understanding the organic farming. Practically "terrain support" does not exist in the region. The problems that farmers are face with on the field, remain unsolved without institutional support.

But the problem is not always in the unavailability and absence of adequate information and educative material on organic farming. The structure of agricultural sector is one of the most important factors that condition the development of organic farming. A special emphasis is added to the age structure of farmers. Data of the poll (983 agricultural holdings in the region) show

that people, who deal with agriculture in the region are on the age of 40-50 years. This surely shows that the younger population is not sufficiently present in the process of agricultural production. Age structure of agricultural producers (if it is about older generation), is significant risk having in mind:

- Disinterest for new trends of production,
- Possessing old mechanization, as a result of the weak economic power from one hand, but weak interest for visiting fairs, disinterest for investments on the other hand.
- Weak interest for renewing the capacities for agricultural production, new agro technical measures, classification of products etc.

The unused part of the huge natural capacities in the region is due to lack of information on their convenience for development of organic farming.

The development of heavy industry in this planning region is on relatively low level. However, several incidents with severe consequences in the biosphere, indicate to dangers from pollution of the soil, air and water. From the conducted researches and established levels of pollution with heavy metals in the soil and water, it is not recommended to organize organic farming from Probistip to the drainage basin of Zletovska River in Bregalnica. Than on the flow of Kamenicka river and the flow of Kriva Lakavica, from the drainage basin of Madenska river in the river Kriva Lakavica by the village Lakavica.

Last but not least, the absence of investments or investment intentions in processing capacities of organic food in this region, in comparison to the huge potential as source of raw material, lack of developed product with protected origin that could be simply improved by application of production in accordance with organic principles, would make difficult the accomplishment of sustainable development to larger extent.

5. Development directions and project concepts

Regarding the fact that since 2005 the Republic of Macedonia is candidate-country for EU membership without specified date for beginning of the accession negotiations, it is necessary conditioned to follow the directions of the Union to improve the rural development. We should have in mind that the agriculture and its activities are not individual sector anymore, not only in the Union, but in the world as well, they are part of one holistic approach known as Rural development.

- Development of organic farming in the Union is based on Strategic guidelines of the Rural development council 2007-2013³⁸, where it is stipulated that Guidelines for rural development would contribute to: Finding and adjusting the fields where the application of the measures for support of EU have the greatest effect (on EU level);
- Joining the main priorities of EU (Lisbon and Gothenburg) and their translation in the politics of rural development;
- Accomplishing consistency with the rest of the EU policies, especially the rural development policy
- Assistance in conducting new market-oriented Common agricultural policy (CAP³⁹), as well as in the necessary restructuring in the new and the old member-states.

According to the principles of the Common agricultural policy, adopted in Gothenburg, Sweden on 15-16.06.2001, Strong economic development should be adjusted to:

- Sustainable use of natural resources and reducing the amounts of waste;
- Preserving the biodiversity;
- Maintaining the ecosystems;

- Reducing the danger from destroying the living beings;
- Sustainable use of natural resources and reducing the amounts of waste;
- Preserving the biodiversity;
- Maintaining the ecosystems;
- Reducing the danger from destroying the living beings;
- Emphasizing and promoting the production of healthy, high-quality products;
- Production methods that do not endanger/pollute the environment.

Incorporation of organic production;

- Use of renewable energy sources;
- Protection of biodiversity

The current Union's policy for rural development is based in three fields:

1. Economics of agricultural working
2. Human environment
3. Rural economy and rural population.

The new generation of strategies and programmes for rural development shall be focused on 4 axes:

1. Series of measures shall refer to the human capacity and natural potential
2. Protection and promotion of natural potentials
3. Assistance for development of local infrastructure and human capacities in the rural areas, for promotion of the conditions for creating work in all sectors
4. Based on the Leader principle (LEADER), application of "new" approach in the management through locally based and base-oriented approaches.

From the stipulated above, Axis 1 should be directed towards influencing human and physical potential in agriculture, food and forestry (through promoting transfer of

³⁸ Official Journal of the European Union L 55/20 од 25.2.2006., (2006/144/EC)

³⁹ Common Agricultural Policy

knowledge and innovations) and receiving qualitative product. Axis 2 should provide measures for protection of natural resources as well as for preserving the high value of European agriculture-forestry production systems. Axis 3 should assist in the development of the local infrastructure and human potential in rural areas, for improving the conditions for development and creating employment in all sectors. Axis 4 is based on Leader (LEADER) experiences, promotes opportunities for good management, base-set approach in the rural development.

The fulfillment of the policy's goals will be performed through:

- Investment in human capacities, know-how and means (funds);
- Accomplishment of win-win services in the environment;
- Creating a large number and more quality employments, especially for women and young people.

In 2007, the Ministry of agriculture, forestry and water management submitted a strategic document to the Government of the Republic of Macedonia, Strategy for development of agriculture and rural development 2007-2013, a document which was revised on 12.04.2010 and it is known as Law on agriculture and rural development⁴⁰.

The policy for increasing the competitiveness of agricultural production, and though it the organic as well, is directed towards:

1. Promoting knowledge and improving the human potential in the rural areas through assistance intended for:
 - training and information of agricultural producers,
 - assistance of young farmers for starting their own agricultural activity,
 - assistance for leaving the agricultural activity and

- advisory services for development of agriculture;
2. Restructuring and development of the physical potential and promoting innovative practices through support of investments for:
 - modernization of agricultural holdings .
 - increasing the economic value of forests,
 - processing and marketing of agricultural products and
 - infrastructure for creating preconditions for development of agriculture and protection of natural resources and
 3. Quality improvement of agricultural products through support of economic association of agricultural holdings for mutual performing of agricultural activity for:
 - application of common agricultural practices for adjustment with the quality standards of the agricultural products,
 - production of agricultural products with higher quality,
 - establishment of group of producers and
 - organization of informative and promotional activities for agricultural products.

Moreover, the assistance for training agricultural producers is intended to organizing and holding courses and informative sessions for improvement and qualification of agricultural producers especially for:

1. successful organization and management of the agricultural holding;
2. introduction of additional activities for the agricultural holding;
3. introduction and use of modern technological achievements and innovative practices;
4. transfer of knowledge for the achieved scientific-research results;
5. use of information technologies for agricultural production;

⁴⁰ „Службен весник на Република Македонија“ бр.49/2010

6. application of prescribed standards in the field of environmental protection,
 7. protection and health of people, protection and health of plants, protection and wellbeing of animals and application of sanitary practices;
 8. application of measures for support of performing agricultural producing practices for protection and promotion of the environment and rural areas and
 9. introduction of agricultural production by application of higher standards for quality.
- From the exposed concept of complementarity of domestic with international regulation, we propose the following columns for project activities that should contribute to creating conditions for sustainable development of organic farming:
1. Researches for existence of necessary preconditions for organization of agricultural production on micro regional level:
 - Pedological, climatic, hydrological (ground and above ground waters)
 - Inventorization of pastures in the region and determination of nutritive value in grass structure;
 - Researches of the autochthonous sorts features;
 - Mapping of autochthonous plant species and sorts (according to micro locations);
 - Description of their availability during the year;
 2. Construction of system for transfer of knowledge, technologies and information:
 - Elaboration of programme for raising the knowledge on organic farming at:
 - Farmers;
 - Advisory institutions;
 - Population;
 - LED teams;
 - a. Directing an appropriate number of people for specialization in the fields of:
 - Processing;
 - Market researches and market approaches;
 - Organizing production of medicinal and spice plants;
 - Rural development;
 - Nutritionism (proper/healthy nutrition);
 - b. Internet overview of producers of agricultural products in the region and the amounts of products that they dispose of;
 3. Properly elaborated market approach:
 - Holding annual meetings for promotion of organic farming in the region (it can happen as part of regular manifestation);
 - Elaboration of informative material in electronic or printed form;
 - Starting and maintaining cooperation with the bigger trade chains in the country;
 - Starting and maintaining cooperation with the catering capacities of the region and the country;
 - Regularly attending the public calls for submitting project-proposals from domestic and foreign financing sources;
 - Properly elaborated touristic offer.
 4. Organizing organic farming:
 - Cereals
 - Forage crops
 - Fruit crops
 - Garden crops
 - Spice and medicinal plants
 - Planting aromatic (odorous) plants for apiculture
 5. Construction of catchment and watermill for grinding flour (it can be part of existing programme for development of rural tourism)
 6. Supply and installation of capacities for drying on micro regional level:
 - a. Fruit
 - b. Spice and medicinal plants
 7. Elaboration of standard for acquiring product with protected origin of:
 - a. Bread and baked goods
 - b. Milk products

8. Development of palette of products under protected trademark ("Natural guarantee"), which could be label of the region.

In the plain part, especially on the areas where an opportunity for irrigation exists, as the largest parts of the municipalities Stip, Kocani and Vinica, we recommend that priority should be given to labor-intensive crops that agricultural producers have long-time tradition for cultivation. Most of the garden crops and some of the perennial forage and grapevine-fruit crops belong here.

The selection of crops that the producer decides to cultivate depend on above mentioned factors with presented production parcels, and the crucial role will have his possible orientation towards subsequent use of the products as fodder, different types and levels of finishing (drying, different types of processing, silage, preservation etc.) Carrying out the cultivation of garden crops on smaller areas, in accordance with the principles of organic production, where there are conditions for it, is recommended to be performed in protected place (plastic covered greenhouses and glasshouses), due to the lower level of risk from diseases and pests in the protected place.

In the mountainous municipalities, in Malesevoja and others in this region, a priority is given to traditional fruit crops (quetsches, currant, apple, blackberry, raspberry and chokeberry as newer alternative crop) to traditional and alternative cereals (rye, oats, triticale), potato, bean (especially autochthonous sorts) as well as to larger number of forage crops and grass-leguminous mixtures for setting up artificial meadows and pastures. The optimal altitude above sea level for cultivation of these crops is between 300-800 meters, although most of them can be successfully cultivated on 1200 m altitude above sea level.

In the two sub-regions, the production of traditional crops is supported, which besides human nutrition, after processing can be used for obtaining cooking oil with organic origin and fodder, as sunflower, pumpkin (similarly to the organic olive oil, that reaches extra high prices on the markets).

Within the frameworks of the Ministry of agriculture, forestry and water management (hereinafter MAFWM), by teams of experts during 2007, Guidebooks on organic production are elaborated for 10 species of agricultural crops, four of them for garden crops (tomato, cabbage, potato, pepper), five of them for fruit species (cherry and sour cherry, olive, plum, apple, and strawberry) and one for grapevine. During 2009, one additional Guidebook on organic production of soya is elaborated.

These guidebooks are completely available for each visitor of the website of MAFWM and Rural development office; the preconditions for organic production are described in details as well as the selection of planting material, techniques for sowing and planting, principles for protection in organic farming, time and method of harvesting with additional material and photographs of diseases and pests. In this part of the study, extracts from some of the guidebooks are presented, that in our opinion are especially useful for possible producers that would opt for production of some above mentioned crops.

From the alternative methods of production and species of crops that are rarely included in crop rotations for plain as well as mountainous areas, as regular and cover crops in perennial plantations, we recommend the following mixed crops for organic method of production.

These methods of cultivation have a special influence on the diversity of plant species (biodiversity), on the production of optimal amounts of nutrients as well as on



Image Nr. 68, Flax crop (Prof. Ljupco Mihajlov, Ph.D, 2006)

recycling and preserving of the soil. At the same time, they contribute to increasing the level of microbiological processes in the soil, reducing the dependence on external access of nutrients and increasing the sustainability of the soil.

As convenient mixtures, especially for more sandy and steeper (areas with biggest gradient), the following crops are recommended:

- Barley autumn or spring (*Hordeum sativum* or *Hordeum vulgare* L.) with field pea (*Pisum sativum* L.) or broad bean (*Vicia faba*);
- Triticale (*Triticale*) with field pea (*Pisum sativum* L.)
- Spring barley (*Hordeum vulgare* L.) with lupine (*Lupinus angustifolius* L);
- Mixed crops represent an important production system in organic agriculture, especially the common cultivation of maize (*Zea mays*) and bean (*Phaseolus vulgaris* ssp. *Volubilis* – green bean or the local term of the population from Malesevija “bob pritkar”), for the large amount of albumin in the bean and the possibility of the maize to be used as quality raw-material for silage for the needs of organic livestock family farms of ruminants. The level of the

natural agro biodiversity in the East planning region is high, as the most adequate example in this context we would list the local names of different bean's varieties (*Phaseolus vulgaris* ssp. *Volubilis*), which can be cultivated together with the maize:

Phaseolus vulgaris ssp. *Volubilis*

High

Local name

Saren

Bel

Ploskac

Tetovski

Kordar-piliskar

Krem

Germanec

Bel bubreg

Siv

Some of the traditional crops that could be successfully included in the system of organic production are already extinct from our fields. The crops could contribute to greater diversity in the crop rotation.

A special attention should be paid to neglected crops as flax and chickpea for more mountainous areas.

6. Dynamics of project realization

	Goal	Measure	Explanation / description	Justification	Time-table	Source of resources	Administrator	Indicator
I. Primary agricultural production:								
			1. Increase of the use of natural opportunities in the region 2. Production of sufficient amount and sufficient assortment of organic products in the region 3. Strengthening of the existing ones and encouraging the foundation of new farmers' associations					
1.1	1, 2	Researches of pedological, climatic and hydrological conditions of the region	Defining the conditions that dominate in the region, according to micro locations /municipalities regarding: - Climate - Pedology - Hydrology	Non-defined conditions that influence the agricultural production can contribute to starting production by producers, when there are not opportunities for it. It can lead to disappointment by producers and radically prevent the use of opportunities that the natural conditions of the region give.	2011 – 2014	MAFWM ⁴¹ - National programme for support of agriculture. CDEPR ⁴²	MAFWM, Department of organic agricultural production Hydro Meteorological Directorate "Goce Delcev" University – Faculty of Agriculture	Precise maps elaborated on the stated conditions and recommendations given for favorable species, sorts/ types for cultivation
1.2	2	Inventorization of pastures in the region and determination of nutritive value in grass structure	Establishment of the condition by the presence of grass species in the pastures, the condition of waterers, reed enclosures and other objects	There is not a scientifically elaborated study on the capacity of pastures, and therefore the danger of their destruction is increased, as a result of uncontrolled grazing or negligence because of the reduced number of livestock, which endangers the quality and capacity of the pasture	2011-2015	National programme for support of agriculture (MAFWM), CDEPR ⁴³ , MEPP ⁴³ ,	"Goce Delcev" University – Faculty of Agriculture, MAFWM Public Enterprise for pastures,	On the basis of the established conditions, the recommendations are given on the livestock density for grazing on

⁴¹ Ministry of agriculture, forestry and water management⁴² Center for development of the East planning region⁴³ Ministry of environment and physical planning

1.3	3	Researches on the volunteer, spice, medicinal and fruit species and autochthonous animals according to municipalities (mapping and weather)	Field researches on the presence of stated plant and animal species, calendar of the presence, elaboration of digital map and publication on Internet through the municipal and Internet web-site of CDEPR	One of the principles of organic production is preserving the local biodiversity. Besides that, the rural tourism can experience significant development if there is information on available spice, medicinal and volunteer fruit species in localities and time table	2011-2015	MAFWM - National programme for support of agriculture. CDEPR MEPP, Municipal budget, Projects for cross-border cooperation, CHB ⁴⁴	MEPP, LED offices NGO "Goce Delcev" University – Faculty of Agriculture, MAFWM LED Offices, NGO	one pasture, and on livestock breed On the Internet web-site of municipalities and CDEPR, informative material on time-table for availability and amounts is posted
1.4	3	Registering products with protected origin, recognizable for the buyers	Elaboration of standards for production of selected traditional products. Elaboration of register of producers that accepted the conditions for accession and stick to the conditions.	Valorization of the quality production will not be possible if measures for their protection are not undertaken. Higher price on the market is not only accomplished by organic products, because the certificate of organic production does not simply imply quality, but it needs to be proven that the products are produced in accordance with some technology (procedure), moreover if it is based on some tradition.	2013 – 2016	Private entrepreneurs, CDEPR Municipal budgets,	LED Offices	Registered products with protected origin, Elaborated packing that reflects the products and the region
1.5	3	Encouraging the foundation of trade companies within the	Improvement of the effect of economies' work through organized	The price of repro-materials when purchasing greater amounts is often significantly lower in comparison to retail,	2014 – 2016	Municipal budget, Budget of APDA	LED Offices, APDA	Number of founded associations and

⁴⁴ Netherlands development organization

		frameworks of the associations	purchase of repro -materials and sale of finished products	which has a direct effect on the cost price of products. At the same time, it is possible to obtain the right of VAT refund when purchasing machines, tools and other working devices		CHB		enterprises within their frameworks
1.6	1, 2	Organizing seed production for the main crops that are cultivated in the region	Without quality seed material it is not possible to obtain a quality yield	By the use of mercantile material, the risk of yields' diseases is increased, and the crops are consisted of bad quality grains	2012-2016	Resources of interested entrepreneurs,	Entrepreneurs, Public-private partnership	Registered areas where seed production is organized

Goal	Measure	Explanation / description	Justification	Time-table	Source of resources	Administrator	Indicator
II. Construction of system for transfer of knowledge, technologies and information:							
1. Improving the knowledge of organic farming of:							
	a. farmers;						
	b. advisory institutions;						
	c. local population						
	d. LED teams						
2. Capacity construction at hotel-catering capacities for including organic menu in their offer							
3. Promotion of the opportunities in the region for production of organic agricultural and farming products							
2.1	Programme for transfer of knowledge on organic farming for different target groups	Through appropriately elaborated approach, adapted for each target group, the understanding of organic farming shall be improved, as well as its role in preserving biodiversity, the proper use of natural conditions and environment as well as taking care of their preservation	The poll conducted on 983 people in the region showed a low level of knowledge on this type of production. If the necessary steps for improvement of the knowledge are not undertaken, the planning of sustainable development is not possible, regarding the fact that this type of production seeks higher level of understanding of the influences from different factors on agricultural production. Besides the farmers, the consultants should be included as well, regarding the fact that Macedonia has recently began to explore the organic farming, as a part of the regular study programme of the faculties. The local population on the other hand, should have the accurate information on the	2012 – 2016	CDEPR MAFWM - National programme for support of agriculture. Budget of APDA CHB CDEPR Projects for cross-border cooperation	"Goce Delcev" University – Faculty of Agriculture APDA Private advisory institutions; LED Offices	Number of registered farmers that deal with organic agriculture. The area registered for certification by control/certification bodies Lists of evidence for the held trainings

2.2	2	Researches for traditional meals, a feature of every micro-region	At each of the 11 municipalities of this region, there is a real treasury of the methods for meals preparation, which are unknown to the wider public	importance of the use of healthy food in the efforts of preserving its own health. Until today, there is not a research conducted for the method of meals preparation, which is a special characteristic of certain region. None of the catering objects contains food of organic origin in its menu. Recently, the emphasize is on investments in accommodation capacities of smaller settlements, with ideal conditions for development of rural tourism, which would include the food as well.	2012 – 2015	Municipal budget, Projects	LED Offices, NGO "Goce Delcev" University - Faculty of tourism and catering industry	Agricultural products bought by the catering capacities. Published collection for preparation of national meals in this region
2.3	2	Organization of "Week of healthy food and meals in EPR" ⁴⁵	In 5 months time, two times a month, in two municipalities, organization of traditional meals preparation from organic agricultural products shall be organized.	By organization of this activity, which can take place in the calendar of touristic offer, an opportunity for promotion of the cultural heritage of the region is opened, and the consumption of organic agricultural products is encouraged	2014 – 2018	Municipal budgets, CDEPR Public-private partnership Donors	LED Offices	Turnout on manifestations
2.4	3	Elaboration of informative material in electronic or printed form;	Integrating the stated measures in informative format, which would serve for planning of the activities of	Without adequately elaborated informative material, it is not possible to inform the target group that seeks a type of services, which are part of the rural tourism, healthy food and preserving the environment	2013 – 2014	Municipal budgets, CDEPR Donors	LED Offices, Marketing agencies Touristic agencies	Visits of Internet web-sites of the municipalities, CDEPR, touristic agencies

⁴⁵ East planning region

[illegible]

	Goal	Measure	Explanation / description	Justification	Time-table	Source of resources	Administrator	Indicator
3.1	1	Acquiring finished products from agronomic crops	Joining primary production with the sale	In more developed countries, the fastest development of organic production is noticed at crops whose cultivation is the most simple and can easily be included in the crop rotation. Hence, in order to prevent the loss of producers, as a result of lack of sale, it is necessary to encircle the process and the valorization of the raw-material through obtaining finished product (flour), which could then become a primary product, or raw-material for other products.	2012-2014	Private investors Associations of farmers Municipal budget	LED Offices,	Constructed catchments and watermills Amount of grinded and sold flour Increasing he areas where cereals are cultivated
3.2	2	Obtaining	Creating products	The character of production of	2012-2015	Private investors	Associations of	Improved

		finished products of spice and medicinal plants and fruit crops	with added value and longer expiry date	above mentioned plant species is of very short time-period. Besides that, when being fresh, part of them do not have the features they manifest when being dried.		Public-private partnership MAFWM, Programme for rural development	farmers Private investors	offer of organic teas and spices in the market
3.3	3 a	Improvement of the offer of finished products from cereals and creating preconditions for development of touristic services	Improvement of the financial effect from the work of the economies.	The raw products never had sufficiently high price, besides that, the bought raw product is returned, but in processed from. Moreover, the bread, baked goods and other types of farinaceous foods are the basis of the Macedonian meals.	2012 – 2016	Private investors Public-private partnership	Private investors	Improved offer of organic products Increased areas where rye, wheat, maize are being cultivated
3.4	3 b	Improvement of the offer of healthy food from animal origin	Improvement of the nutrition of the youngest category	The human organism is not capable of synthesizing part of the materials mandatory for his survival, and therefore he consumes products of animal origin. Milk products of organic origin have a high healthy value, because the animals feed on natural way, without adding concentrates with artificial vitamins and different additives, which by the process of biological potentiation could highly increase their content in the milk of animals.	2015 – 2020	Private investors Public-private partnership	Private investors	Occurrence on the market of milk products Increased number of livestock that passed the transitional period and became certified organic.

7. Budget

Measure number	Measure	Source	Time-table	2011	2012	2013	2014	2015	2016	Total
1.1	Researches of pedological, climatic and hydrological conditions of the region	MAFWM, National programme for support of agriculture, CDEPR		Climate: 3.000+12.000 t°:	Pedology: Delcevo 3.000.000,00	Pedology: Vinica 3.000.000,00	Pedology: Kocani 3.000.000,00	Pedology: Probistip 3.000.000,00	Pedology: Stip 3.000.000,00	Climate: 300.000,00
				rainfalls: 3.000+12.000						Pedology: 18.000.000,00
			2011-2016	wind: 3.000+12.000	Hydrology of whole region: 1.500.000,00					Hydrology: 1.500.000,00
				Pedology: Berovo 3.000.000,00						19.800.000,00
1.2	Inventorization of pastures in the region and determination of the nutritive value of grass structure	MAFWM, National programme for support of agriculture								
			2011-2016	Berovo:	Delcevo:	Stip:	Probistip:	Kocani:	Kocani:	
		Public Enterprise for pastures CDEPR		1.500.000,00	1.000.000,00	2.000.000,00	1.200.000,00	700.000,00	700.000,00	
		MEPP			Vinica: 600.000,00					5.200.000,00

1.3	Researches for the existence of autochthonous sorts of oleiferous and volunteer, spice, medicinal and fruit species and autochthonous animals according to municipalities (mapping and weather)	MAFWM, National programme for support of agriculture CDEPR MEPP Municipal budget 2015 Projects for cross-border cooperation, mapping and weather)	Digitalization of GPS data and elaboration of map			Catalogues, printing on bilingual sample, design of Internet web-site and posting on Internet	2.700.000,00
			Berovo	Vinica	Stip		
			300.000,00	300.000,00	300.000,00	600.000,00	
			Delcevo	Kocani	Probistip		
1.4	Registering products with protected origin, which shall be recognizable for consumers	Private entrepreneurs CDEPR 2011-2016 Municipal budgets	80.000,00	80.000,00	100.000,00	120.000,00	500.000,00
1.5	Encouraging foundation of trade companies within the frameworks of associations	Municipal budget Budget of APDA CHB 2014-2016				60.000,00	180.000,00
						60.000,00	

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2.3	Organization of "Week of healthy food and meals in EPR"	Municipal budgets CDEPR Public/Private partnerships	600.000	600.000	600.000	
		Donors				1.800.000
2.4	Elaboration of informative material in electronic and printed format	Municipal budgets CDEPR Donors	300.000	300.000		
						600.000
3.1	Acquiring finished products from agronomic crops	Private investors Association of farmers; Municipal budget	1.800.000	1.800.000		
						3.600.000
3.2	Obtaining finished products of oleiferous, spice and medicinal plants and fruit crops	Private investors Public/Private partnerships MAFWM	600.000	600.000		
						1.200.000

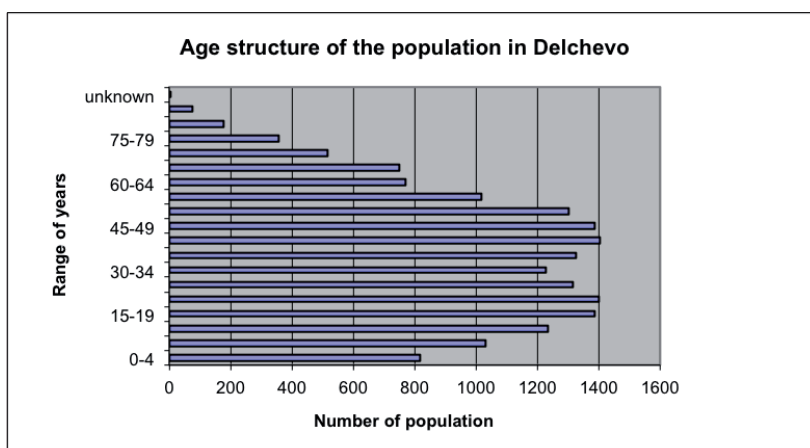
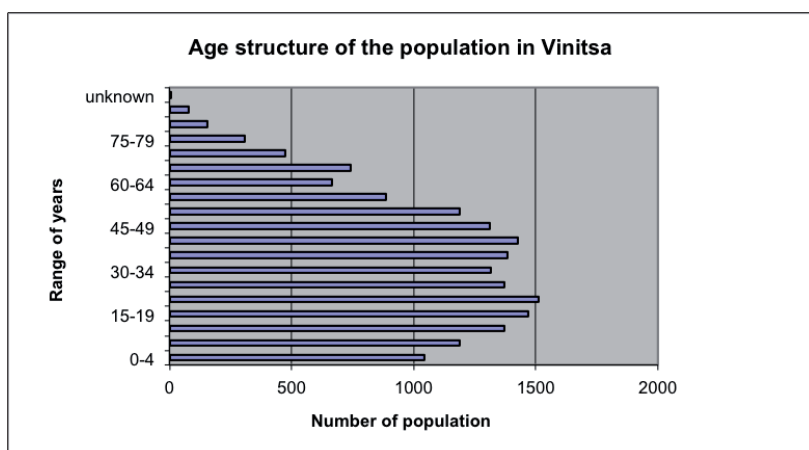
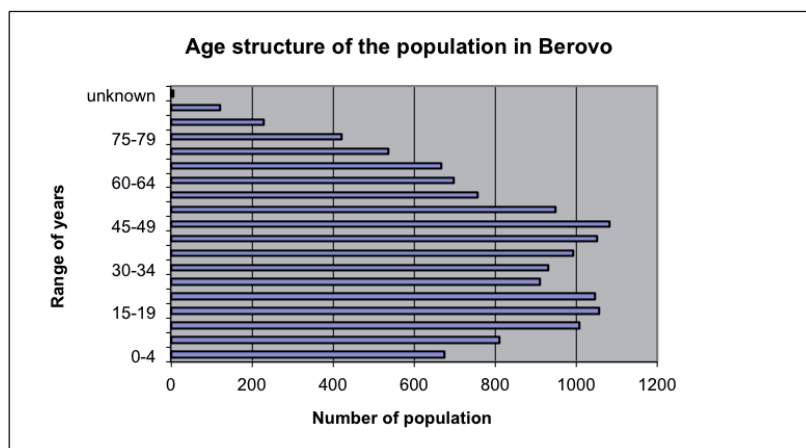
	Private investors Public/Priv	2.000.000	18.450.000	
	Improvement of the offer of finished products from cereals and creating preconditions for development of touristic services			
3.3	MAFWM Program for rural development; 2012-2016			
			18.450.000	20.450.000
	Private investors Public/Priv			
	Improvement of the offer of healthy food from animal origin			
3.4	partnership 2015-2020			
				18.450.000

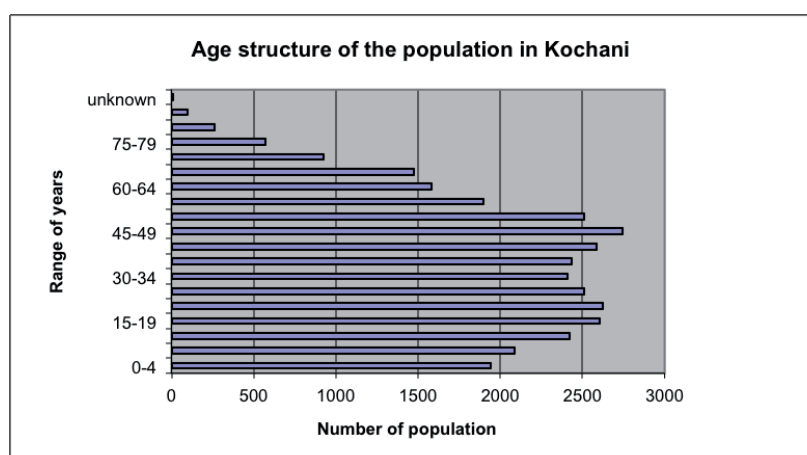
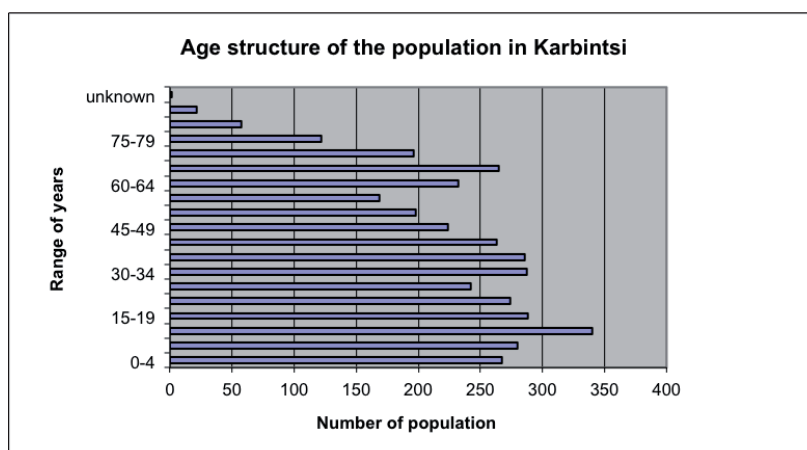
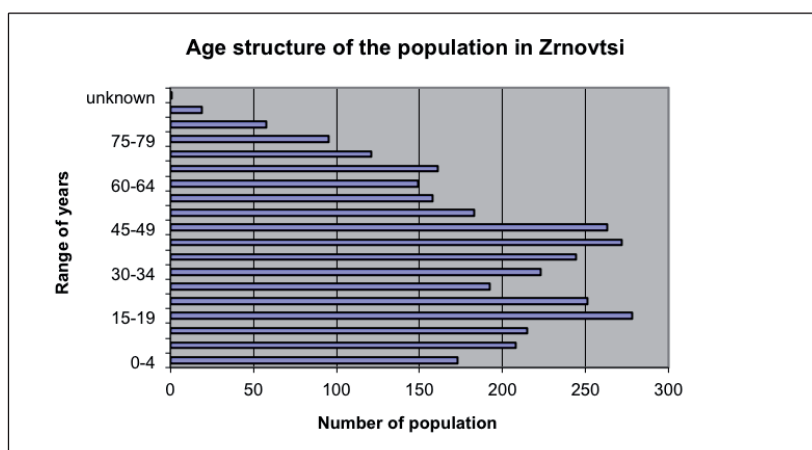
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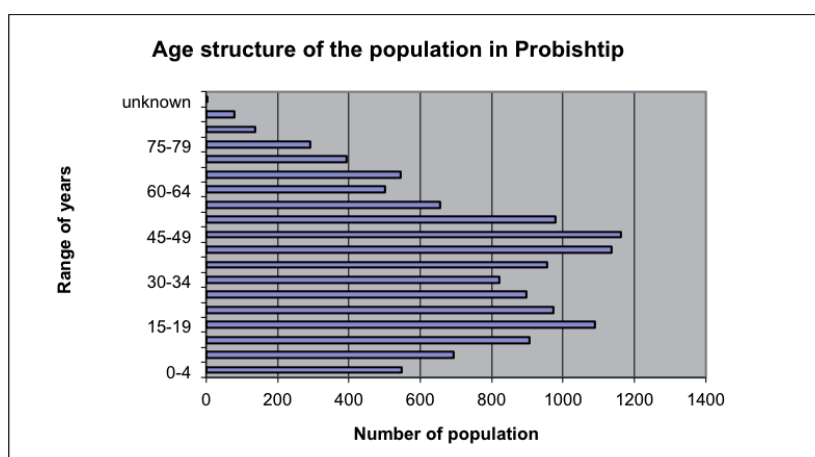
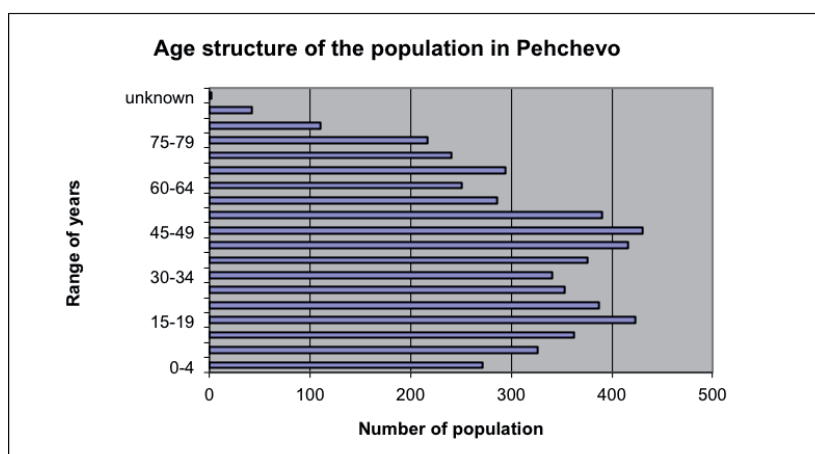
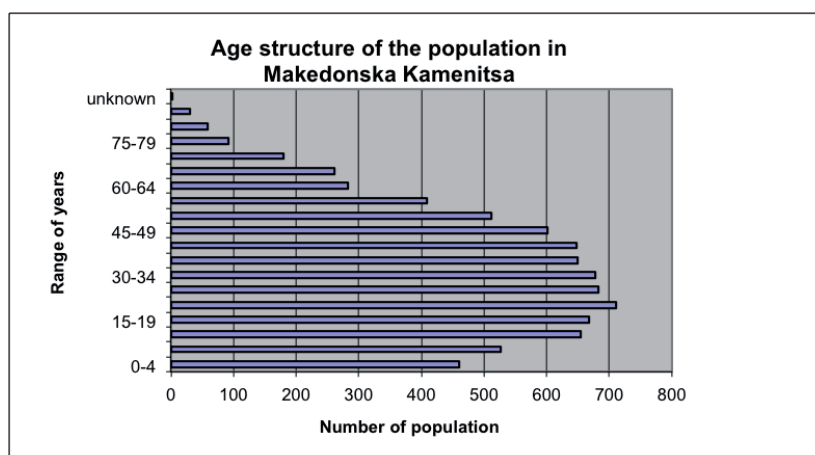
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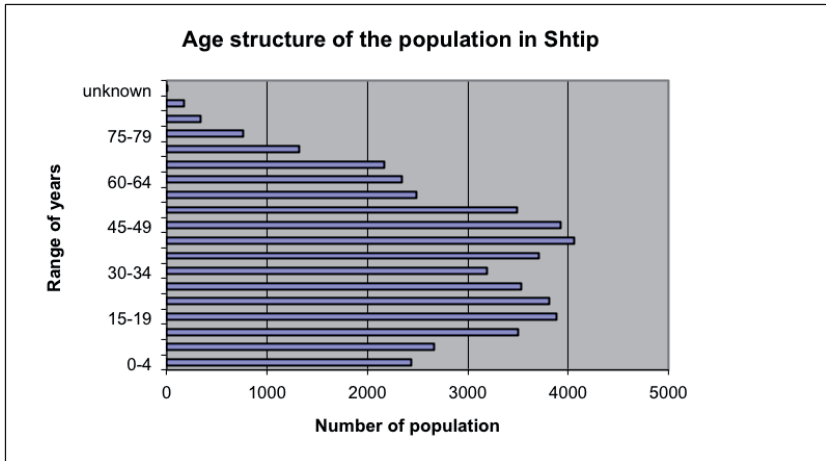
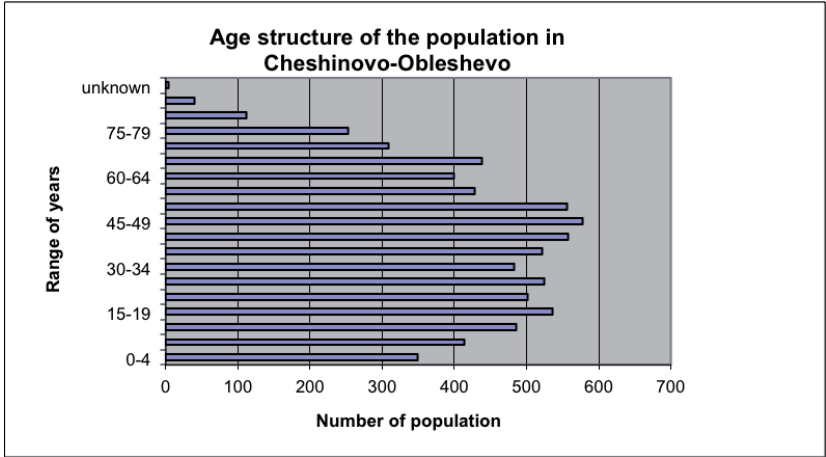
9. Annexes

Detailed age structure of the population in the municipalities of the East planning region









Annex II, Statistics of the East planning region

ДЕМОГРАФИЈА	Берово	Виница	Делчево	Зрновци	Карбин- ци	Кочани	Македонска Каменница	Пехчево	Проби- штип	Чешиново - Облешево	Штип	ВКУПНО
Население - вкупен број	13.941	17.914	17.505	3.264	4.012	33.689	8.110	5.517	12.765	7.490	47.796	172.003
Урбано население	7.002	10.863	11.536			28.330	5.146	3.237	10.826		43.652	120.592
Рурално население	6.939	9.075	5.969	3.264	4.012	9.762	2.964	2.280	5.367	7.490	4.144	61.266
Возраст												
0-4	676	1.042	818	173	267	1.944	461	271	548	349	2.439	8.988
5-9	812	1.188	1.031	208	280	2.085	527	326	694	414	2.664	10.229
10-14	1.008	1.369	1.235	215	340	2.420	655	362	905	486	3.497	12.492
15-19	1.057	1.470	1.386	278	288	2.602	667	423	1.089	536	3.885	13.681
20-24	1.046	1.510	1.401	251	274	2.626	711	387	972	502	3.811	13.491
25-29	910	1.373	1.315	192	242	2.512	683	353	898	525	3.527	12.530
30-34	930	1.314	1.228	223	287	2.407	678	341	820	483	3.194	11.905
35-39	992	1.383	1.327	244	286	2.432	650	376	956	522	3.712	12.880
40-44	1.051	1.425	1.404	272	263	2.585	648	416	1.136	557	4.060	13.817
45-49	1.082	1.311	1.386	263	224	2.742	602	430	1.163	578	3.925	13.706
50-54	949	1.189	1.303	183	198	2.509	511	390	977	556	3.491	12.256
55-59	756	888	1.019	158	169	1.900	409	286	656	428	2.490	9.159
60-64	699	664	771	149	232	1.579	283	251	502	399	2.343	7.872
65-69	668	743	751	161	265	1.476	261	294	546	438	2.165	7.768
70-74	536	474	515	121	196	927	180	240	394	309	1.320	5.212
75-79	422	307	356	95	122	570	92	217	292	252	760	3.485
80-84	230	155	178	58	57	264	59	110	137	112	338	1.698
85 и повеќе	122	78	76	19	21	99	30	42	78	40	170	775
непознато	5	4	5	1	1	10	3	2	2	4	5	42
Пол												
машки	7.006	9.173	8.977	1.696	2.034	16.957	4.254	2.795	6.493	3.867	23.920	87.172
женски	6.935	8.741	8.529	1.568	1.978	16.732	3.856	2.722	6.272	3.623	23.876	84.832

	Berovo	Vinica	Deloevo	Zrnovci	Karbinci	Kocani	Makedonska Kamenica	Pehcevo	Probistip	Cesinovo- Oblesovo	Stip	TOTAL
Education												
Still in the process of education	10	21	13	2	8	26	10	6	7	4	17	124
Without education	189	895	594	192	481	1.433	435	101	457	311	442	5.530
Incomplete education	2.250	2.496	2.237	526	875	3.678	1.179	1.058	1.362	956	1.328	17.945
Elementary school	3.729	5.074	4.836	1.061	1.076	8.227	2.389	1.464	3.171	2.122	5.045	38.194
Secondary school	4.182	4.851	5.499	831	639	11.067	2.136	1.568	4.720	1.742	9.947	47.182
Higher school	422	391	490	32	29	1.030	105	146	319	74	1.039	4.077
Faculty, academy	654	555	746	24	17	1.744	209	214	572	63	1.660	6.458
Master degree	6	5	6	-	-	26	3	1	8	-	38	93
Doctor degree	3	-	-	-	-	9	1	-	2	-	15	30
Settlements												
Urban	1	1	1	-	-	1	1	-	1	-	1	7
Rural	9	14	21	3	29	17	9	7	26	14	43	192

Forested area according to municipalities expressed in ha

	Number of households that possess forest	Forest, total (ha)	Deciduous forests Total (ha)	Oak (all types) (ha)	Beech (all types) (ha)	Other deciduous types (ha)	Coniferous forests Total (ha)	Pine (ha)	Fir (ha)	Other coniferous plants Total (ha)	Mixed forests (ha)
Berovo	2.480	4.088,81	2.809,77	1.424,88	1.293,03	91,86	715,91	684,16	34.973	20,8	563,13
Vinica	1.075	1.508,37	1.450,13	1.352,56	87,29	47.027	33,28	33,22	0,06	-	24,96
Delcevo	2.882	5 056,28	4.419,67	4 204,81	184,23	30,63	424,51	423,94	0,37	0,2	212,1
Zrnovci	17	52,01	51,71	51,28	0,18	0,25	-	-	-	-	0,3
Karbinci	125	69,45	68,85	48,22	40,458	13,53	0,3	0,3	-	-	0,3
Kocani	930	1.412,43	1.353,83	967,90	351,84	34,09	32,65	29,65	44.197	29.221	25,95
Makedonska Kamenica	1.104	1.211,83	950,51	847,13	100,83	20,121	157,26	156,56	0,2	0,5	104,06
Pehevo	617	703,56	437,62	389,31	43,70	22.737	216,68	216,23	0,45	-	49,26
Probitip	1.444	1.143,48	1.056,86	791,7	231,15	34	66,68	64,5	0,27	33.239	19,94
Cesinovo-Oblesevo	63	74,15	69,35	36,20	24,98	42.948	18.295	18.295	-	-	10.990,00
Stip	655	789,13	722,52	610,28	49,35	62,89	22,87	20,71	29.221	0,36	43,74

Woodcutting in and outside the forest area

	Number of households that possess forest	Total cut timber for own needs (m ³)	Total cut timber for sale (m ³)	Total cut timber in the forest (m ³)	Total cut timber outside the forest (m ³)
Berovo	2.480	23.029	5.291	28.110	210
Vinica	1.075	5.424	400	5.761	63
Delcevo	2.882	24.712	3.418	28.007	123
Zrnovci	17	129	54	183	-
Karbinci	125	1.984	181	2.135	30
Kocani	930	5.998	3.251	8.833	416
Makedonska Kamenica	1.104	7.322	501	7.710	113
Pehcevo	617	3.568	258	3.668	158
Probitip	1.444	17.144	640	17.753	31
Cesinovo-Oblesevo	63	272	173	445	-
Stip	655	16.949	274	17.123	100

Afforestation of municipalities

	Households that possess forest	Total number of seedling used for afforestation	Total afforested area (ha)	Number of used seedlings for afforestation of forest area	Afforested area of forest land (ha)	Number of used seedlings for afforestation of other land (ha)	Afforested area of other land (ha)
Berovo	2.480	175.585	59.10	106.000	39.29	69.585	19.81
Vinica	1.075	117.035	22.68	46.035	15.52	71.000	42.552
Delcevo	2.882	144.100	42.18	132.750	40.08	11.350	40.453
Zrnovci	17	-	-	-	-	-	-
Karbinci	125	900	0.28	400	0.08	500	0.20
Kocani	930	22.180	25.112	19.470	35.977	2.710	25.600
Makedonska Kamenica	1.104	9.640	40.392	9.640	40.392	-	-
Pehcevo	617	22.070	13.667	4.530	15.401	17.540	34.731
Probitip	1.444	28.090	40.281	12.050	40.336	16.040	35.916
Cesinovo-Oblesevo	63	1.040	0.70	1.040	0.70	-	-
Stip	655	3.675	46.082	3.675	46.082	-	-

Overview of areas with fruit crops

	Berovo	Vinica	Delcevo	Zrnovci	Karbinici	Kocani	Makedonska Kamenica	Pehcevo	Probistip	Cesinovo-Oblesevo	Stip
Cherries total number of trees	564	555	459	181	467	1.310	303	107	450	239	7.033
Cherries (ha)	1,43	1,08	1,21	0,60	1,01	2,94	0,91	0,47	1,02	0,44	16,68
Sour cherries, total number of trees	2.403	10.745	20.439	2.267	14.358	17.698	720	40.041	8.907	1.302	37.152
Sour cherries (ha)	4,00	11,61	28,61	3,26	18,14	15,01	1,39	48,11	11,36	1,94	64,54
Apricots, total number of trees	32	974	572	336	419	1.897	64	280	640	495	4.202
Apricots (ha)	0,10	1,90	1,32	0,77	0,82	3,79	0,21	0,48	1,91	1,05	10,43
Apple, total number of trees	9.271	12.104	10.414	816	1.341	9.242	6.233	2.372	6.410	2.168	8.570
Apple (ha)	30,54	22,21	30,06	2,18	2,69	17,76	14,57	9,91	16,30	4,36	17,54
Pears, total number of trees	1.900	3.153	1.941	594	603	3.438	1.961	383	4.070	860	4.900
Pears (ha)	5,74	5,42	5,93	1,45	1,17	7,01	4,87	1,47	9,43	2,09	10,79
Plums total number of trees	113.804	21.141	131.080	1.508	1.619	14.854	22.771	74.619	6.050	1.718	20.131
Plums (ha)	289,21	38,33	349,77	3,05	3,23	33,73	56,86	205,91	11,67	4,08	44,16
Peaches, total number of trees	91	1.910	249	620	512	2.344	64	44	1.070	620	2.550
Peaches (ha)	0,32	3,00	0,65	1,27	0,83	3,88	0,20	0,16	1,90	1,20	5,25
Walnuts total number of trees	1.950	1.816	2.017	88	342	3.563	1.247	474	1.112	423	2.457
Walnuts (ha)	11,05	13,72	20,03	0,43	2,57	17,38	6,22	4,99	7,41	3,04	16,73
Almonds, total number of trees	16	394	7	30	6.095	192	10	19	100	18	2.817
Almonds (ha)	0,06	1,16	0,04	0,05	6,23	0,41	0,10	0,11	0,17	0,07	9,03

Overview of the number of big and small livestock in the East planning region

	Berovo	Vinica	Delcevo	Zrnovci	Karbinci	Kocani	Makedonska Kamenica	Pehcevo	Probistip	Cesinovo- Oblesevo	Stip
Horses	617	702	322	356	144	420	96	162	338	251	124
Cattle (total)	2.290	2.032	3.672	580	3.971	2.318	1.745	1.839	2.443	2.117	2.438
Heifers	106	138	216	63	133	131	95	87	113	131	161
Young heifer	88	72	142	18	159	110	22	77	62	159	91
Milk cows	1.063	769	1.705	296	1.127	962	797	793	869	1.058	957
Sheep (total)	26.226	9.255	8.558	1.385	13.506	6.664	4.067	10.647	15.180	10.385	31.283
Two yerasold sheep	19.260	6.727	5.711	1.104	8.048	4.950	2.999	7.235	9.695	6.908	22.449
Goats (total)	3.379	6.494	6.684	826	2.688	4.426	3.208	926	2.653	1.237	2.441
Female goats headages for breeding	2.008	4.275	3.774	577	1.523	2.977	1.769	532	1.755	875	1.551

	Berovo	Vinica	Delcevo	Zrnovci	Karbinci	Kocani	Makedonska Kamenica	Pehcevo	Probistip	Cesinovo- Oblesevo	Stip
Pigs (Total)	3.623	4.409	4.763	1.254	2.193	7.513	2.688	1.112	2.954	7.638	3.886
First-farrow sows	60	102	28	14	48	165	19	13	38	125	57
Sows	519	319	375	106	271	593	192	75	210	1.005	409
Boars for stud	20	39	19	14	20	77	27	7	48	123	47
Poultry	12.422	19.693	19.752	7.262	13.003	20.666	9.586	6.105	17.015	26.745	17.601
Rabbits	1.033	1.265	1.184	495	695	2.397	86	704	1.373	969	898
Beehives	2.619	2.132	1.380	140	315	2.017	1.349	1.079	2.302	586	3.672

Overview of arable areas in the East planning region

In ha	Berovo	Vinica	Delcevo	Zrnovci	Karbinci	Kocani	Makedonska Kamenica	Pehcevo	Probitip	Cesinovo- Oblesevo	Stip
Plough field, vegetable garden and household garden	2.148	2.426	2.206	882	2.878	3.809	466	1.187	2.451	4.161	4.412
Cereals	1.027	1.829	1.684	594	2.279	3.086	309	796	1.873	3.478	3.342
Industrial plants	49	131	53	11	122	29	3	18	209	12	52
Forage	63	65	197	100	133	177	10	113	133	282	311
Vegetable	898	257	185	145	94	452	138	144	83	166	185
Aromatic and medicinal plants	-	-	-	-	4	2	-	-	-	-	8
Flowers and ornamentals	4	7	2	-	3	16	1	1	5	5	9
Seed and seedling	-	-	-	-	-	-	-	-	2	-	1
Fallow and other uncultivated areas	108	137	85	31	243	49	5	115	147	218	505

Areas of cereals in the East planning region

In ha	Berovo	Vinica	Delcevo	Zrnovci	Karbinci	Kocani	Makedonska Kamenica	Pehcevo	Probitip	Cesinovo- Oblesevo	Stip
Cereals	1.027	1.829,25	1.683,85	593,78	2.279,43	3.085,71	308,52	795,97	1.872,52	3.477,63	3.341,58
Wheat	423,24	723,41	664,57	254,52	1.094,31	1.434,96	119,63	314,94	1.003,21	955,80	1.710,09
Maize	67,97	496,40	552,99	177,41	150,07	515,93	88,91	65,44	221,25	304,99	170,10
Barley	100,00	417,51	367,59	132,77	743,91	297,23	61,77	171,53	590,78	672,23	1.269,38
Rice	11,30	97,96	1,00	4,97	225,64	783,00	1,20	14,52	8,25	1.452,46	37,07
Other cereals	424,49	93,98	97,69	24,11	65,51	54,59	37,01	229,54	49,03	92,14	154,93

Overview of areas of garden crops in the East planning region

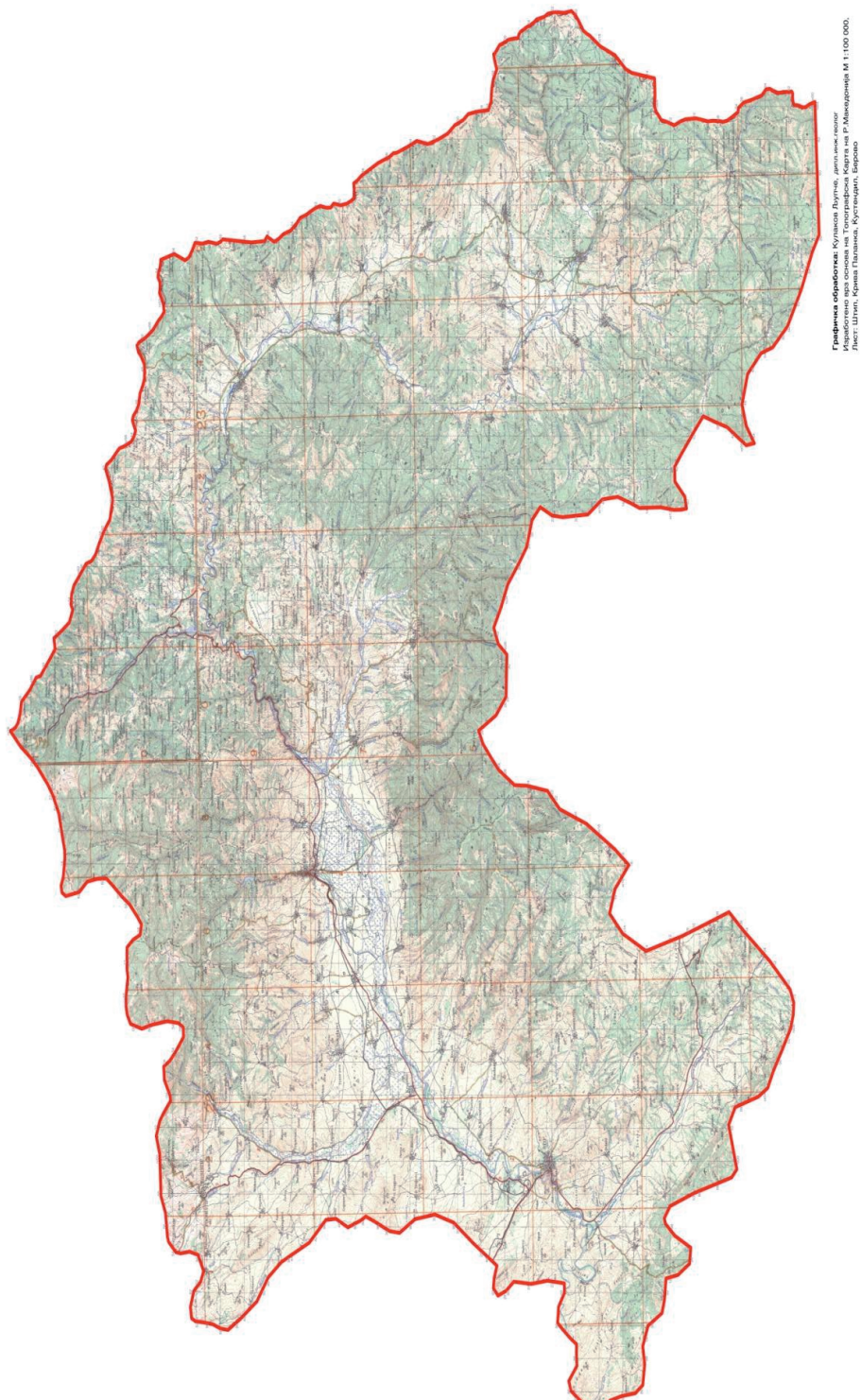
In ha	Berovo	Vinica	Delcevo	Zrnovci	Karbinci	Kocani	Makedonska Kamenica	Pehcevo	Probistip	Cesinovo- Oblesevo	Stip
Vegetable	897,94	257,20	185,33	145,23	93,51	451,80	138,33	144,04	83,10	165,85	184,88
Tomatoes	5,67	21,36	15,30	10,98	12,44	33,15	10,14	3,25	8,33	15,22	17,30
Peppers	6,58	33,35	18,68	86,12	15,56	212,96	10,44	2,52	6,77	87,11	14,70
Cucumbers	1,04	4,09	1,32	1,97	2,18	5,47	0,90	0,57	0,64	1,82	1,48
Bean	104,99	58,15	35,27	18,30	18,89	45,49	31,96	42,32	20,58	15,38	18,42
Potato	762,69	71,92	91,93	13,15	12,87	118,36	76,58	90,62	28,95	23,26	25,71
Onion	9,68	6,67	6,70	2,02	4,59	8,58	2,65	3,12	4,53	3,01	7,69
Garlic	1,12	3,32	3,60	0,79	2,02	3,36	1,61	0,53	2,96	0,76	2,55
Carrot	0,32	0,87	0,70	0,13	1,96	2,99	0,67	0,26	0,23	0,48	0,92
Cabbage	1,28	3,33	2,73	1,64	1,42	3,98	0,69	0,14	1,08	2,40	3,10
Watermelon	0,25	31,99	2,98	3,20	11,48	8,25	0,39	-	6,81	10,21	46,68
Melon	-	9,02	0,63	0,09	3,67	0,85	0,11	-	1,01	1,79	37,28
Strawberries	0,48	0,65	1,33	0,26	0,39	1,34	0,63	0,35	0,34	0,62	1,44
Other vegetable	3,85	12,47	4,17	6,58	6,05	7,02	1,56	0,37	0,86	3,78	7,61
Flowers and ornamentals	4,13	6,56	1,74	0,31	2,63	15,67	1,34	0,79	4,57	5,13	8,68

Overview of the areas of industrial crops in the East planning region

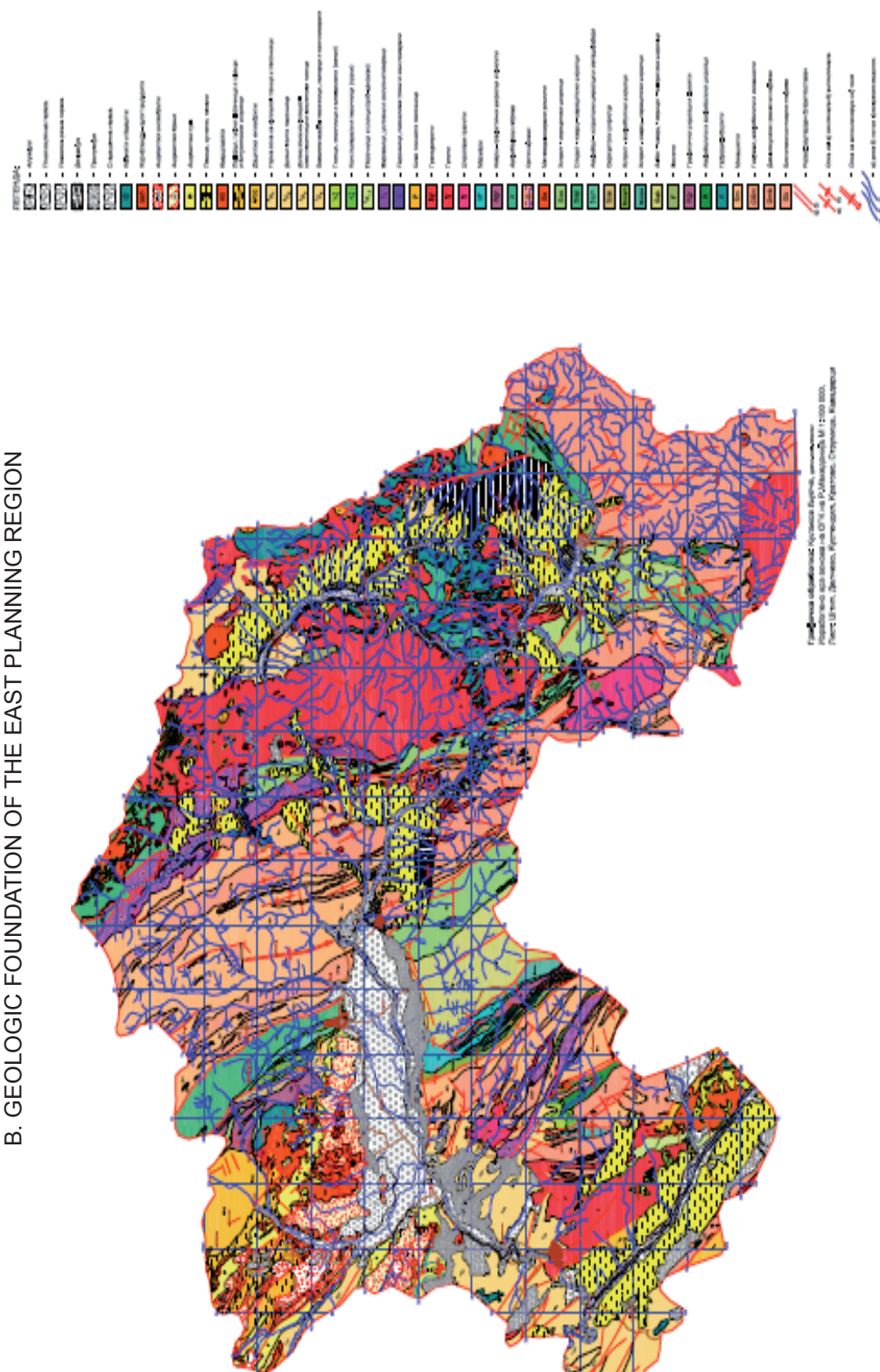
In ha	Berovo	Vinica	Delcevo	Zrnovci	Karbinci	Kocani	Makedonska Kamenica	Pehcevo	Probistip	Cesinovo- Oblesevo	Stip
Industrial plants	48,76	131,02	52,88	10,99	121,71	28,75	2,8	17,69	208,5	11,98	52,06
Soya	-	0,28	-	-	2,3	1,17	0,1	-	0,1	2,24	0,4
Sunflower	-	-	0,1	-	0,2	1	-	-	1,3	0,2	4,72
Oilseed rape	-	2,45	-	-	0,7	2	-	-	2,5	-	0,45
Tobacco	24,95	121,99	38,09	2,2	77,95	12,35	1,85	16,65	4,05	2,51	33,77
Sugar beet	0,05	0,45	0,1	-	1,02	1,11	-	0,3	0,05	1,1	-
Other industrial plants	23,76	5,85	14,59	8,79	39,54	11,12	0,85	0,74	200,5	5,93	12,72

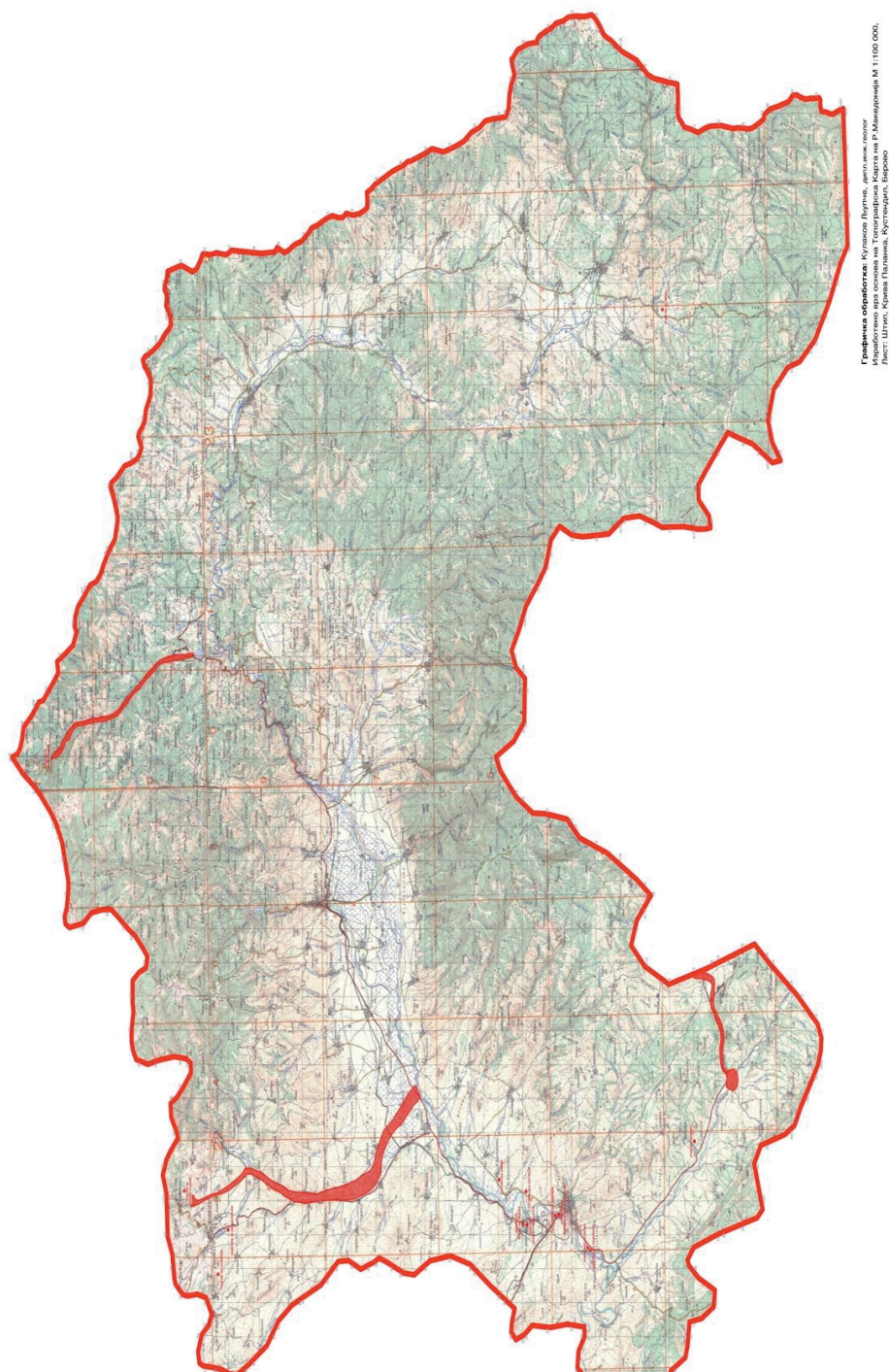
Annex III
Overview of favorable and unfavorable neighbor crops

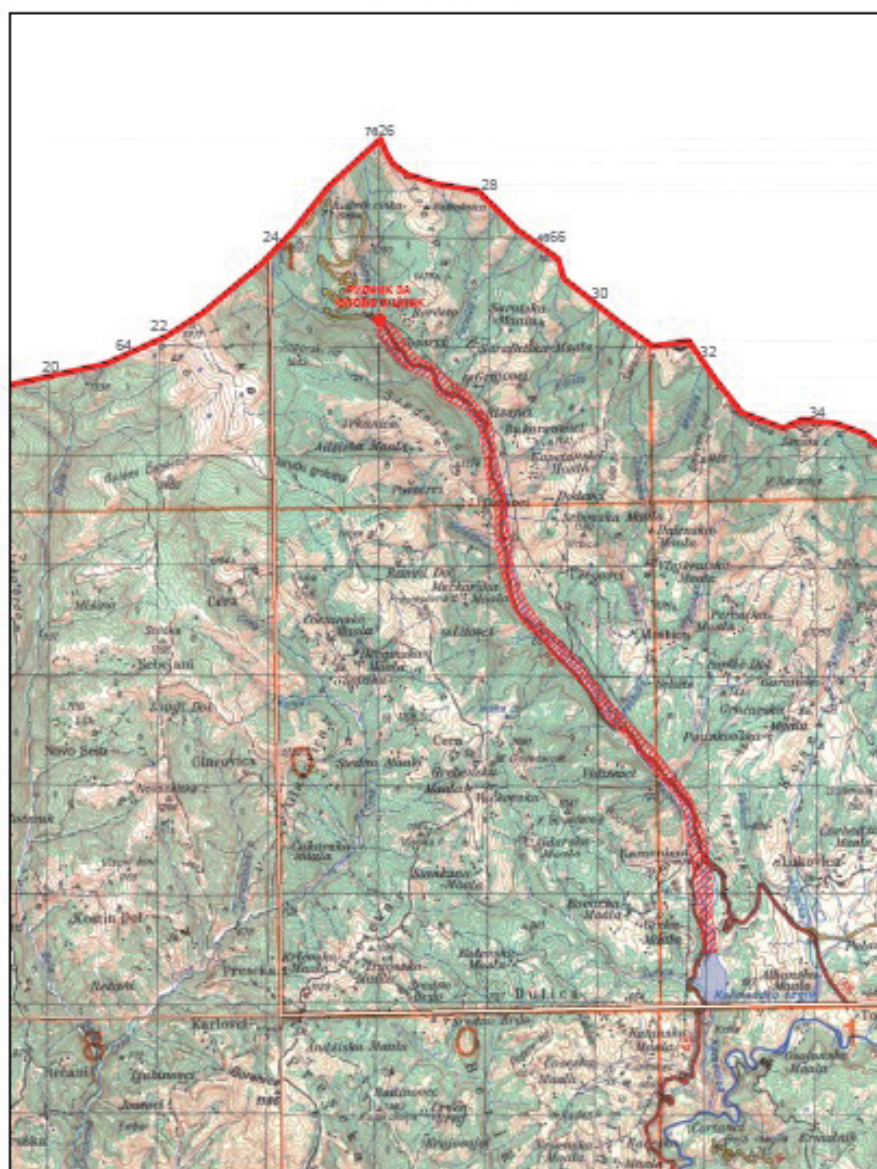
	Favorable neighbor crops	Unfavorable
Bean	Cucumber, basil, cabbage, radish, lettuce, tomato	Onion, leek, garlic, pea
Pea	Dill, carrot, cabbage, kohlrabi, lettuce, radish	Potato, leek, garlic, bean, tomato
Basil	Bean, different lettuce	
Potato	Kohlrabi, horse-radish, spinach	Pea, cabbage, celery
Lettuce	Bean, dill, pea, strawberry, cucumber, cabbage, kohlrabi, leek, radish, tomato, onion, basil	Celery, parsley
Garlic	Strawberry, cucumber, carrot, fruit crops, tomato	Bean, pea, cabbage
Around the base of fruits	Garlic, horse-radish, narcissus, kohlrabi	Plant that develop deep root system
Radish	Bean, pea, strawberry, carrot, cabbage, kohlrabi, lettuce, parsley, spinach, tomato	Cucumber
All types of cabbage family	Bean, pea, strawberry, lettuce, cucumber, radish, celery, leek, spinach, tomato	Potato, garlic, onion, all types of cabbage family
Dill	Pea, cucumber, carrot, lettuce, garlic, onion	
Kohlrabi	Bean, pea, potato, lettuce, leek, radish, celery, spinach, tomato, fruit crops	
Tomato	Bean, carrot	
Parsley	Radish, tomato	Lettuce
Leek	Strawberry, carrot, cabbage, kohlrabi, lettuce, celery, tomato	Pea, bean
Carrot	Dill, pea, garlic, radish, tomato, onion	
Spinach	Potato, cabbage, kohlrabi, radish, bean, tomato	
Strawberry	Garlic, cabbage, lettuce, leek, radish, onion.	
Cucumber	Bean, dill, onion, cabbage, celery, bean, onion	Radish, tomato
Onion	Dill, strawberry, cucumber, carrot, lettuce	Bean, cabbage
Celery	Bean, cucumber, cabbage, leek, tomato	Potato, celery
Nasturtium	Fruit plants, radish, bean	



B. GEOLOGIC FOUNDATION OF THE EAST PLANNING REGION







- Загадени земјоделски површини од работа на Pb - Zn флотација на рудник САСА

E. POLLUTANTS– ZLETOVSKA RIVER

1:100 000



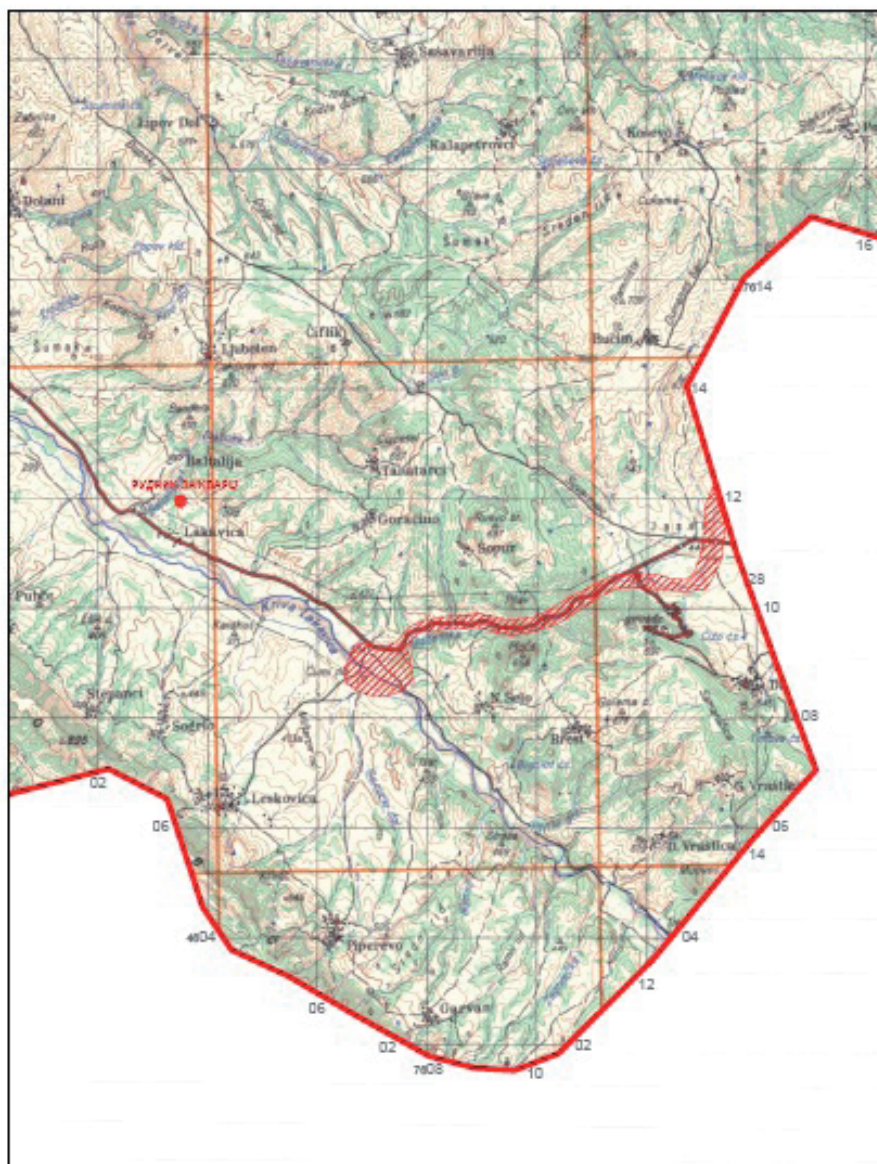
ЛЕГЕНДА:



- Загадени земјоделски површини од работа на
Pb - Zn флотација на рудник ЗЛЕТОВО

F. POLLUTANTS – MEDENSKA RIVER AND KRIVA LAKAVICA

1:100 000



ЛЕГЕНДА:



- Загадени земјоделски површини од работа на
Си флотација на рудник БУЧИМ

G. QUESTIONNAIRE FOR CREATION OF MUNICIPAL PROFILE
OVERVIEW
OF REQUIRED DATA FOR ELABORATION OF REGIONAL PROFILE

I. General data

Municipality	
Number of population	
Number of settlements	
Number of urban population	
Number of rural population	
Total area (km ²)	
Total arable area (ha)	
Patures (ha)	
Meadows (ha)	
Reed enclosures	
Waterers (Nr.)	
Settlement with potential of organic farming (list)	

I. Planting plans (ha)							
wheat		barley		rye		oat	
maize		alfalfa		pea		potato	
apples		plum		sour cherry		raspberry	
blackberry		blueberry		strawberry		chokeberry	
tomato		pepper		cabbage		bean	
other		other		other		other	

II. Number of livestock					
sheep		cows		goats	
horses					

III. Type of soil (describe the soil conditions of your municipality around the bigger settlements according to the division which is herewith)	clay	<input type="checkbox"/>
	loamy-sandy	<input type="checkbox"/>
	sandy-loamy	<input type="checkbox"/>
	sandy	<input type="checkbox"/>
	Sandy and silt	<input type="checkbox"/>
	silt and sand	<input type="checkbox"/>
	silt	<input type="checkbox"/>

IV. Agro0meteorological conditions				
Annual amount of rainfalls (mm)				
Monthly amount of rainfalls (mm)	January		February	
	March		April	
	May		June	
	July		August	
	September		October	
	November		December	
Average annual temperature (in °C)				
Average monthly temperature (in °C)	January		February	
	March		April	
	May		June	
	July		August	
	September		October	
	November		December	
First frost (spring, date)		Last frost (spring)		
First frost (autumn)		First snow		

V. Forest fruits, medicinal and volunteer plants (list which)		

H. QUESTIONNAIRE FOR ESTABLISHMENT OF KNOWLEDGE ON ORGANIC FARMING

I. GROUP GENERAL QUESTIONS:

Settlement:				Municipality:
Age: 20-30 <input type="checkbox"/>	30-40 <input type="checkbox"/>	40-50 <input type="checkbox"/>	> 50 <input type="checkbox"/>	Sex: male <input type="checkbox"/> female <input type="checkbox"/>
Education: Elementary <input type="checkbox"/> Secondary <input type="checkbox"/> Higher <input type="checkbox"/>				Status Individual agricultural producer: Yes <input type="checkbox"/> No <input type="checkbox"/>

II. INTRODUCTORY QUESTIONS

- What type of agricultural practice do you use in your production?
☐ conventional ☐ organic
- Do you know what organic farming is?
 Yes ☐ No ☐

If the answer is yes, please explain:

- Do you know who deals with organic farming?

:

- Who offers you professional assistance in your work?
 -
 -
 -

- List the crops that are mostly cultivated on the place where you live:

6. How much do the yields from the crops that you cultivate amount?
- a. kg/ha
- b. kg/ha
- c. kg/ha
- d. kg/ha
7. Which crops could be cultivated with organic farming in the place where you live?
- a.
- b.
- c.
8. Which forest fruits, medicinal and volunteer plants could be found near the place where you live?

9. Is there a practice for their collecting and drying?

Yes ☐ No ☐

10. Do you have manual for collecting medicinal, volunteer plants and other forest fruits?

Yes ☐ No ☐

11. Do you take care of the amount when you collect medicinal, aromatic, volunteer plants and other forest fruits?

Yes ☐ No ☐

12. List the buyers of medicinal, volunteer plants and other forest fruits from your region:

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III. GROUP OF QUESTIONS FROM THE FIELD OF AGROTECHNICAL MEASURES

13. Do you know what crop rotation is (explain):

14. What kind of seed material do you use?

- ☐ My own ☐ I buy it from agricultural pharmacy

15. When was the last time that you performed an agrochemical analysis?

- ☐ I haven't performed ☐ 2 years ago
☐ the last year ☐ this year

16. What type of manure do you use?

a. Animal manure kg/ha

b. Artificial manure

i. N:P:K kg/ha

ii. P:K kg/ha

iii. N kg/ha

17. How do you perform the manuring?

- ☐ I simply take it out of the stable ☐ I leave it on the field (in a pile)
☐ I throw it over the area of the field ☐ I plough it immediately

18. What do you do with plant residues?

- ☐ I burn them ☐ I take them out
☐ I compost them ☐ I plough them in

IV. GROUP OF QUESTIONS FROM THE FIELD OF AGROECONOMY AND MARKETING

19. Do you have data on the incomes and expenditures from your work?

Yes ☐ No ☐

If the answer is yes, explain of which data do you take evidence for:

Yes ☐ No ☐

21. How do you sell your own production?

- a. According to previously conducted procedure ☐
- b. In bags of 50 kg ☐
- c. In wooden boxes ☐
- d. To mediator ☐
- e. Individually ☐

22. Are you a member of some association?

Yes ☐ No ☐

23. Do you produce for some well-known buyer?

Yes ☐ No ☐

24. Would you accept to take part in the market together with other agricultural producers?

Yes ☐ No ☐