

# **THE AGRIFOOD RESEARCH ENVIRONMENT IN MONTENEGRO**

Podgorica, January 2009.

## EDITOR'S NOTE

The aim of this report is to describe and estimate the state and performance of agrifood research in Montenegro. This report is a country-specific synthesis of the available statistical information. The main source of information was the available statistics (MONSTAT-Montenegrin Statistical Office). Interviews were used to identify key elements of agrifood research position in Montenegro. Besides on analysis the agrifood research strengths and weaknesses, opportunities and threats are identified.

In providing a more general context, this report is developed in January 2009 in cooperation with the Ministry of Education and Science, Ministry of Agriculture, Forestry and Water Management (MAFWMN) and Biotechnical Faculty.

The report provides a brief overview of the agrifood research environment in Montenegro. It includes key facts and figures concerning policy framework, current trends as well as short overview of main drivers of agrifood research in Montenegro.

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## 1. AGRICULTURE AND AGRIFOOD INDUSTRY

During the era of socialism Montenegro experienced a period of rapid urbanization and industrialization, but with big differences among individual regions (traditionally denoted as: developed coastal region, central industrial region and undeveloped northern region). Montenegro went through an accelerated process of industrialization that culminated with high growth rate of economic development in late 70s and at the beginning of 80s. Evident stagnation of economic development was happened in late 80s and during the 90s of the previous century (war in the surrounding countries, hyperinflation and so on). During its second year as an independent country<sup>1</sup>, Montenegro has proved to be a politically stable and economically viable state, which has the potential to grow rapidly over the medium term. The country has had some success already in creating a favorable business climate and in attracting reputable foreign investors, who can play a crucial role in signaling to others that Montenegro is an attractive investment destination. At the same time, many problems and weaknesses common to the region, not least the limited capacity of public administration, are present in Montenegro. In 2000-2008, the country is experiencing some positive trends significant for creating a more stable macroeconomic environment (tab. 1).

Table 1. Gross domestic product (GDP) in Montenegro

	2002	2003	2004	2005	2006	2007
GDP market prices, at current prices, mill.EUR	1.360,1	1.510,1	1.669,8	1.815,0	2.148,9	2.807,9
Population (in thous.) mid year estimate	615,9	620,3	622,1	623,3	624,2	626,2
GDP per capita in EUR	2.208,0	2.435,0	2.684,0	2.919,0	3.443,0	4.484,0

Source: Statistical Office of Montenegro- MONSTAT

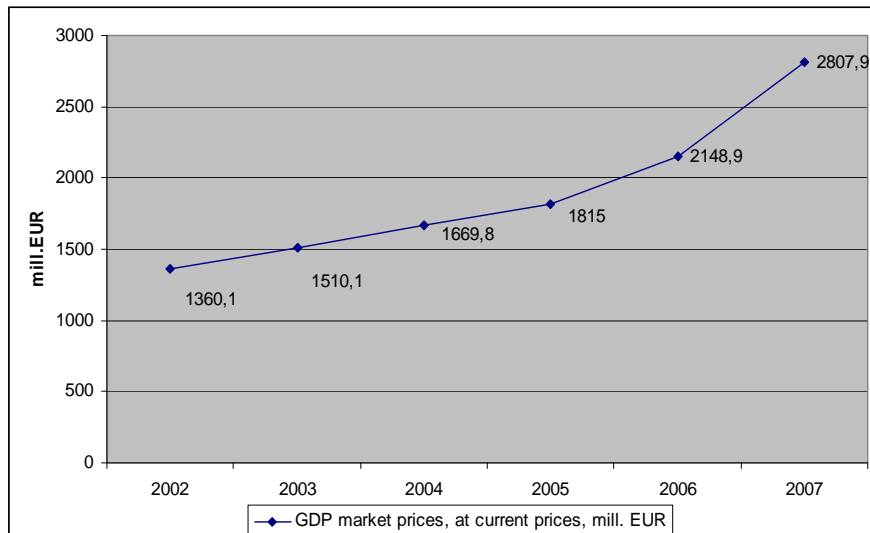


Fig. 1. GDP market prices (at current prices) mill. EUR

The per capita GDP in Montenegro in 2007. was 4 484 EUR (Fig. 2). Gross domestic product growth at constant prices in 2007 was 10,7% (Fig 3)<sup>2</sup>. But in 2006 the current account deficit widened to 26% of GDP, driven by the large increase in imports of goods triggered by strong domestic consumption and investment.

<sup>1</sup> Montenegro regained its independency on May 2006.

<sup>2</sup> Gross Domestic Product of the Republic of Montenegro by the production and expenditure approach for the 2007 year according to the international methodologies SNA'93 (System of National Accounts) and ESA'95 (European System of National Accounts). Gross Domestic Product of Montenegro in 2007 amounted in total 2 807,9 million EUR.

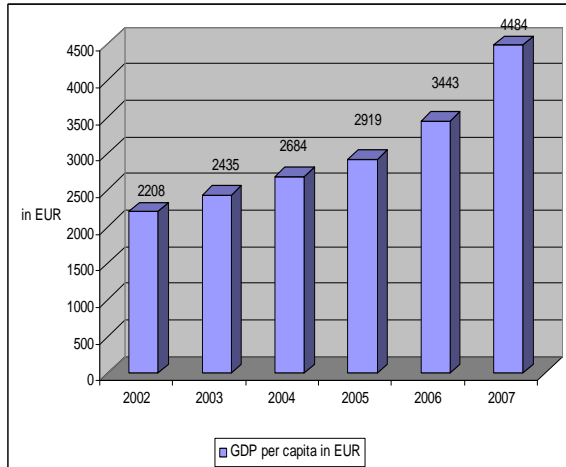


Fig. 2. GDP per capita in Montenegro in EUR

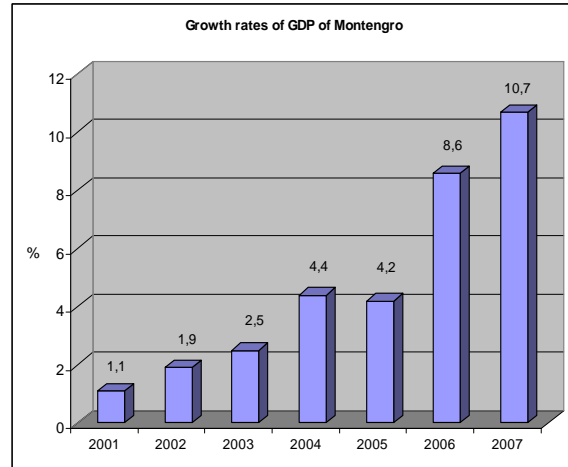


Fig. 3. Growth rates of GDP in Montenegro

The officially registered unemployment rate was down to 14.7% at the end of 2006, and fell further to 11.8% by end-August 2007. Employment grew by 3.8% in 2006, and continued expanding in July 2007 at a year-on-year rate of 4.2%. Unemployment among young people is high (20.1%), and a significant proportion (58.2%) of job seekers are long-term unemployed<sup>3</sup>. The share of GAO of six main sectors in Montenegro was 71% GDP.

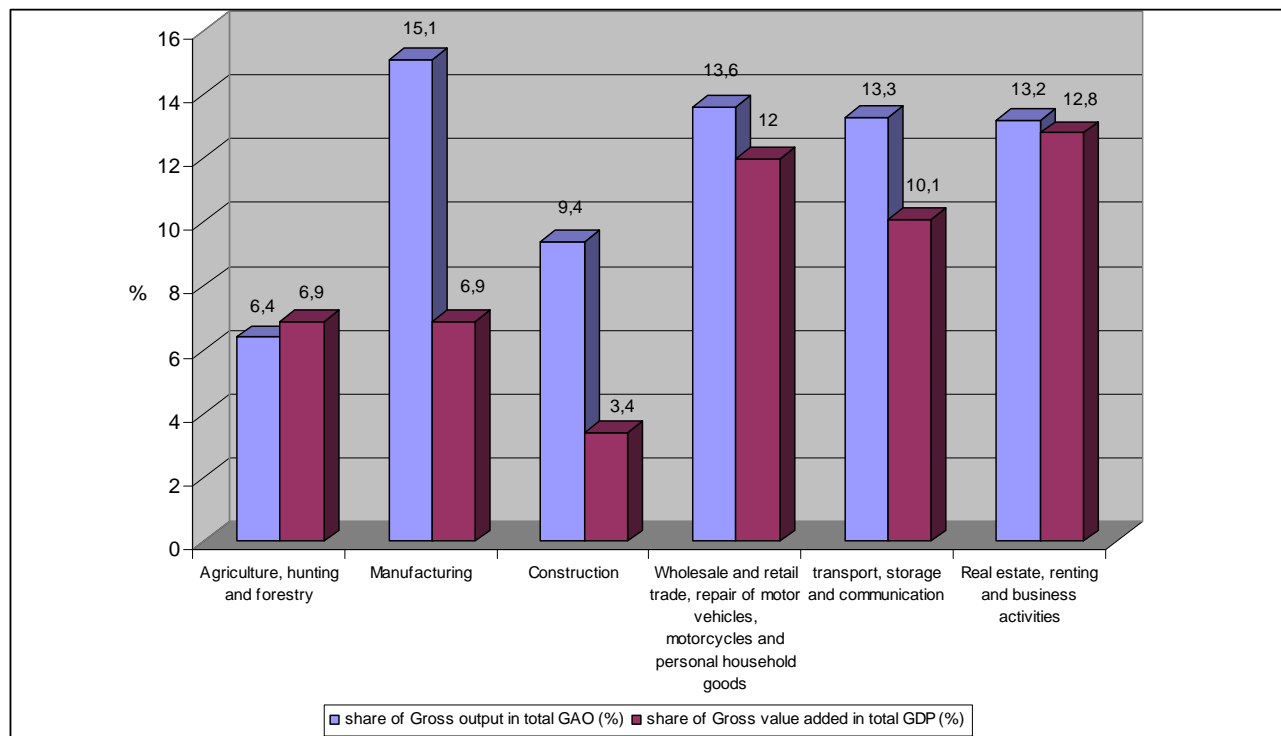


Fig. 4. GROSS output according to NACE and GDP at current prices, 2007.

Montenegro is a net importer of agro-food products. Total trade in agro-food products grows continuously. Along with the increase in imports and exports the deficit grows as well. The major export products are wine and tobacco. Export-import coverage amounts to 28%.

<sup>3</sup> Source: MONTENEGRO 2007 PROGRESS REPORT accompanying the COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL Enlargement Strategy and Main Challenges 2007-2008 {COM(2007) 663 final}.

Trends in foreign trade register a simultaneous growth of import and export of goods and services, with more dynamic import and export of goods and services growth in period 2000-2007 (fig.5).

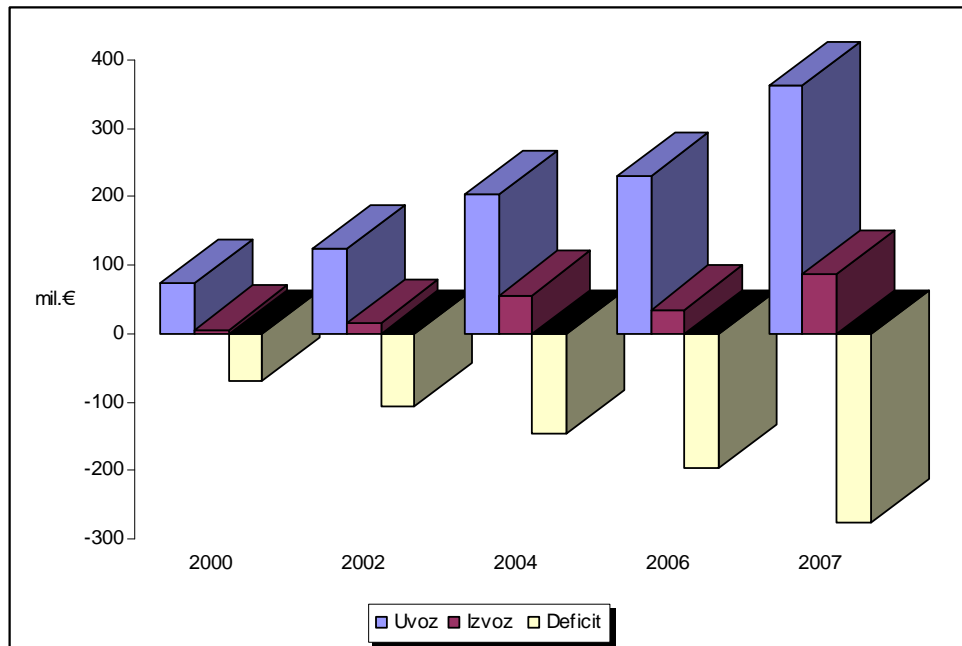


Fig. 5. Foreign trade (export, import and debt) of agriculture products of Montenegro, 2000-2007.

As far as the exporting/importing destinations are concerned, Montenegro's most important market of agro-food products is Serbia. Serbia participated in the total imports with more than 50,0%, and in export with more than 80,0%. Trade with EU amounted to 23,5% EU members are important partners especially in import (29,4%), while their share in export is moderate (2,4%). A relatively great share is with Bosnia and Herzegovina (6,8%), and import of the group *other countries* exceeds (7,4%). Positive trends with foreign markets occurred only in trade of agro-food products with Albania and Russia, due to the fact that the export volume with those countries was very low. Import/export coverage was relatively high in trade with Bosnia and Herzegovina (83%). The rate of export/import coverage with Serbia was 42,9%, while with the other EU countries it was only 2,3%<sup>4</sup>.

Generally speaking, food production and agriculture still play an important role in the economic development of the Republic of Montenegro. The share of agriculture, hunting and forestry in total GDP of Montenegro is 6,4 % (2007), share of Gross value added in total GDP is 6,9% (2007)<sup>5</sup>.

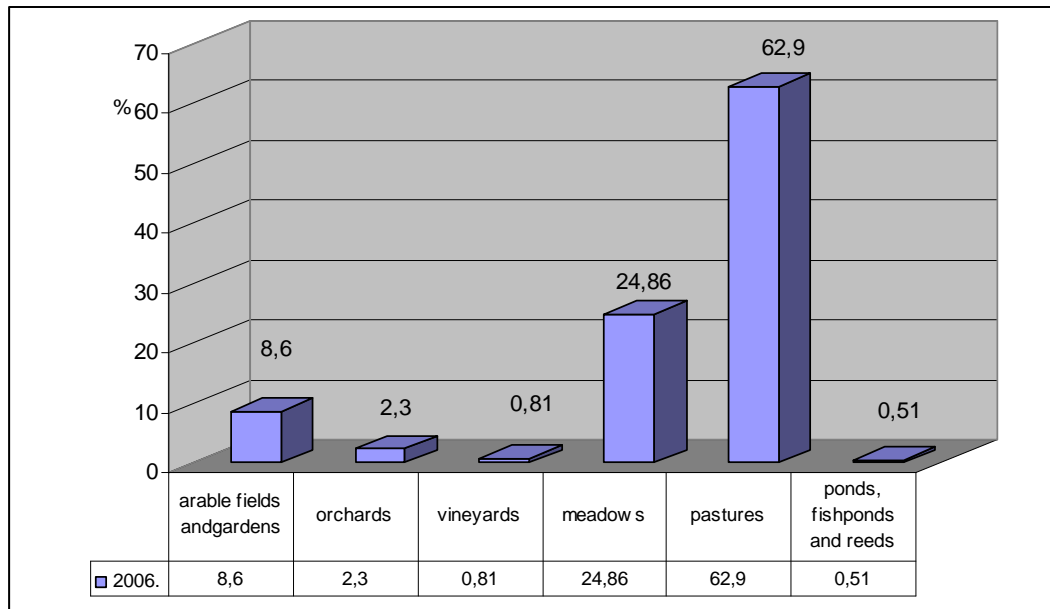
Some tendencies of labour market movement and structure of the active population are presented through data on the share of active agricultural population in total number of active population. According to these data in period between 1961 and 2003, the share of the active agricultural population in the total number of active population has been reduced from 53,6% to 8,8%. There are also considerable changes in labour force structure, as well as large-scale migrations of population from rural to urban areas of Montenegro, economically motivated, above all. There are 60,000 agricultural holdings in Montenegro.

Agricultural area in Montenegro covers 38% of total surface area (2003). Agricultural land resources, with a total area of 518.067 ha or about 0,84 ha per capita, represent an important economic attribute. However, in

<sup>4</sup> Source: MONTENEGRO'S AGRICULTURE AND EUROPEAN UNION, Agriculture and Rural Development Strategy, 2006.

<sup>5</sup> Source: Statistical Office of Montenegro- MONSTAT

the structure of the agricultural land, extensive grassland and pastures, which are not adequately used, prevail. Arable land, orchards and vineyards occupy only 58.262 ha or 12% of total agricultural area.



*Fig. 6. Structure of agriculture land in Montenegro*

One of the structural characteristics of Montenegrin food production is the higher share of agriculture in gross domestic product, than of the food processing sector. This indicates a low level of finalization of agricultural products, a significant share of subsistence of the rural population with food, as well as emphasized sales of agro-food products through unregistered trade channels.

Montenegro does not fully use its production potential. Commercial market production, except from wine and partly milk sector, is at the very beginning. In crop production, the production of wine (the only important export product) is commercially significant, as well as vegetable production (tradition and favourable conditions), and partially potatoes (only for domestic consumption). The production of cereals is negligible.

A significant part of the Montenegrin agricultural production value is generated from livestock production, within which the most significant products are cow, sheep and goat's milk and the production of lamb with traditional breeds. In beef meat production the most important category are calves. In the last few years, poultry production is being commercialized, while the production of pig meat is used mostly for self-subsistence. The only export potential for now is found in lamb production.

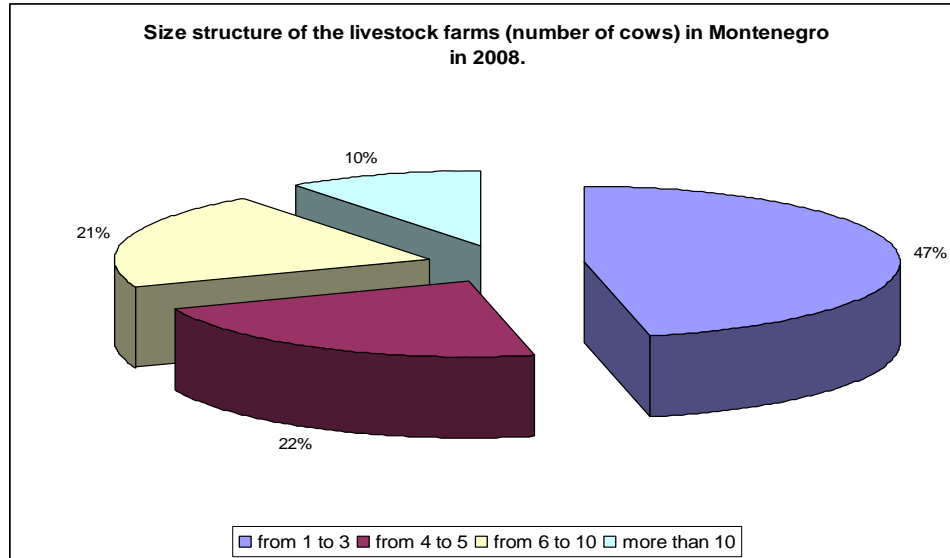


Fig.7. Size structure of the livestock farms (number of cows) in Montenegro in 2008<sup>6</sup>.

The structure of Montenegrin agriculture could be divided into two parts: 65% of livestock production and 35% of crop production (fig. 8).

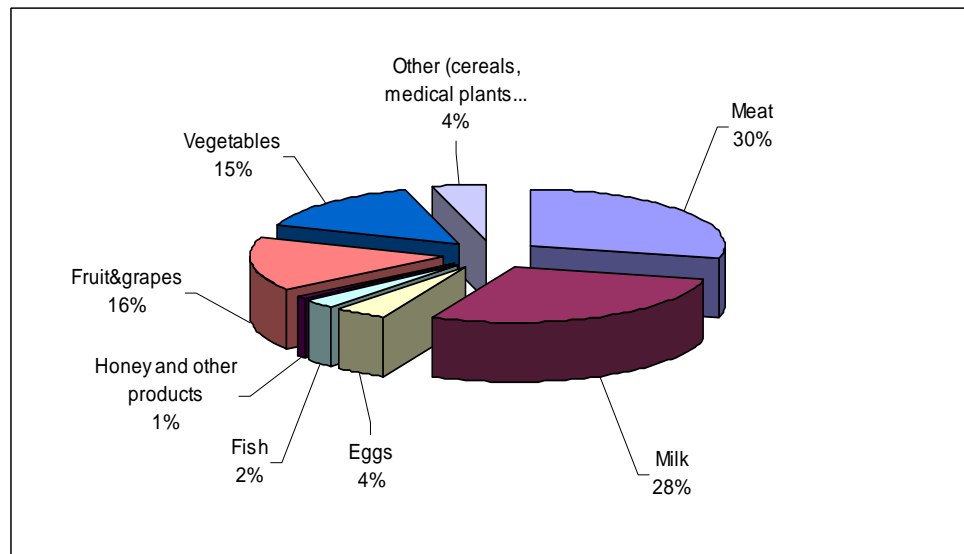


Fig. 8. Agriculture production structure in Montenegro

About 86% of the original social and state owned capital in Montenegro has been privatized. Montenegrin agro-food industry has significantly privatized with unfavourable size structure of enterprises. It is found that about 70% of enterprises in the sector employ less than 15 workers, and only four enterprises more than 250. Such size structure of enterprises and unfavourable technical level influence competitiveness of agro-food industry negatively. The problem, mainly caused by inadequate technical equipment of agro-food operations in Montenegro, is that the hygienic and sanitary conditions do not comply with international standards. During the last few years Ministry of Agriculture initiated financial support to Montenegrin enterprises to introduce HACCP standards (food safety is a very important recent issue in Montenegrin agrifood companies).

<sup>6</sup> Source: Veterinary Directorate of Montenegro.

There are 321 of agro-industrial enterprises<sup>7</sup>. Employed in food processing industry was 4.544 or 2,91% of the total employment number (33,1% women)<sup>8</sup>.

The share of Montenegrin agriculture, hunting and related services investment in fixed capital in 2007. was only 1,44%<sup>9</sup>.

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<sup>7</sup> Meat processing 104, grain processing 68, milk processing 32, egg production 50, production of alcoholic beverages 3, juices and nonalcoholic drinks 7, processing of medicinal herbs 2, tobacco 2, salt 1, others 52. Source: Survey MAFWM

<sup>8</sup> MONSTAT.

<sup>9</sup> Source: MONSTAT.

## 2. Agrifood research capacities

### 2.1. Institutional structure and policy framework

In Montenegro no private business was identified as an organization that conducts agrifood research.

Table.2. Number of agrifood research groups in January 2009.

	Num. of research Groups*	Response rate (%)
University/higher education research institutions	11	78,6
Public Research Institutes (Academy of Science, government research organizations, etc.)	2	14,3
Private non profit institution	0	0
Business Enterprises	0	0
Others <sup>10</sup>	1	7,1
Total	14	100,0

\* 8 research groups are organized at the Biotechnical Faculty of Montenegro Podgorica- Centres and 1 of them is Institute for Marine Biology (Kotor). Source: University of Montenegro.

Total number of agrifood research groups in Montenegro is 14 (11 of them or 78,6% are organized at the University of Montenegro and other 2 or 14,3% of the total number of research organizations belong to Public research institutions). The detailed list of organizations can be seen in the Annex II.

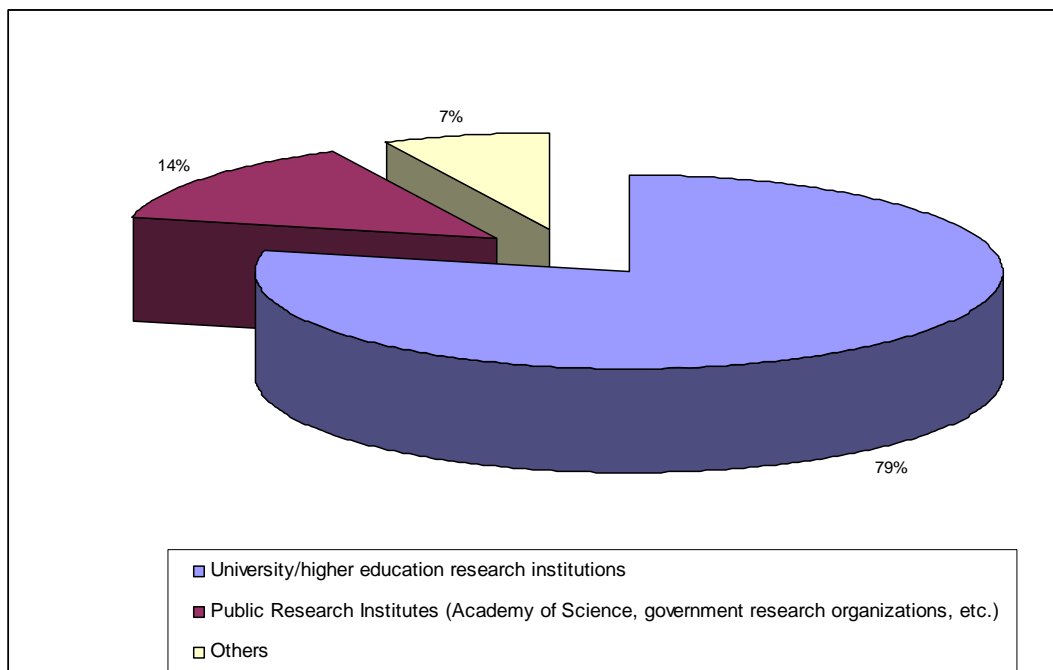


Fig.9. Agrifood research groups in Montenegro identified by tipe (%)

There are few very important institutions that are in a charge for science and research activities: Ministry of Education and Science, Ministry of Agriculture, Montenegrin Academy of Science, University of Montenegro and other institutions in area of high education, research institutes and other public institutions.

During the reform process Montenegro has adopted several important laws, significantly compliant with Acquis Communautaire of EU.

<sup>10</sup> In category others, there is a Institute for Strategic Studies and Prognoses (ISSP), as a first independent economic institute in Montenegro.

The Ministry of Education and Science is responsible for overall scientific policy in Montenegro has regulated this issue with further legislative. In 2005 Montenegro introduced Law on Scientific-Research Activities (Official Gazette of Montenegro, No.71/2005) as a most important legislation in this area. According to the proposal of the Law on Scientific-Research Activities, Montenegro established the National Council for Scientific-Research Activities and prepared the Strategy for Scientific-Research Activities (2008-2016) which define annual budgetary increase, as a % of GDP, allocated to R&D until 2016. New Law on Higher Education was adopted in October 2003 and was created in line with Bologna objectives. The objective of the reform is a four fold one: to eliminate rigidity from university structure, prevent a brain-drain process, to comply with the standards in the European network of higher education and enable a full participation in ongoing mobility schemes. The Ministry of Education and Science is responsible for the research in Biotechnical faculty and education in secondary school. There are 4 schools for agriculture, food processing and veterinary in Montenegro. One of them is vocational school (high school in Bar), and other are mixed schools.

As regards research, the government is fully aware of the importance of science and technology (S&T) and, accordingly, in 2006 established a strategy for scientific research which sets priorities and indicates the annual budget for research aiming at a gradual increase.

Montenegro has increased the number of bilateral S&T cooperation agreements and/or research projects, mainly with regional partners. Montenegro is participating modestly in the sixth framework programme for research (FP6), and in the seventh framework programme (FP7). This will increase the research opportunities within Montenegro. Since February 2007, Montenegro has also been a full partner in the NATO science for peace and security (SPS) programme, with a representative from the Ministry of Education and Science on the SPS Committee. Cooperation priorities have also been decided<sup>11</sup>.

Some of the most important goals presented in the Strategy, oriented on economics development are:

- Increasing competitiveness and support for sustainable development of Montenegrin economy;
- Increasing and achieving innovation activities and transfer and implementation of knowledge and positive experience;
- Implementation of international standards and make the Montenegro as a useful area for scientific researches;
- Reform of Scientific-Research institutions;
- Improving connection between research society and clients;
- Increasing participation of researches and institutions in global Research- scientific network, especially in European research area-ERA,

The Ministry of Agriculture, Forestry and Water Management is responsible for overall agro-policy in Montenegro has regulated this issue with further regulative. Especially, during the last few years very good progress was made in the area of improving the administrative capacity to manage agricultural policy.

The “Strategy on food production and rural development – Montenegro’s agriculture and the European Union” (adopted in 2006) provides the basis for further major reforms and legislative work required for modernizing agriculture. In the field of agricultural policy, assistance measures and programmes for the agricultural sector are being adjusted to the new reforms of the CAP, in particular rural development policy.

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<sup>11</sup> *Ibid in 8.*

Efforts have been made to improve the administrative capacity of the Ministry of Agriculture, Forestry and Water Management, in the form of institution-building, training and equipping inspectorates and laboratories.

A substantial progressive opening-up of the Montenegrin market to agricultural products from the EU within five years has been agreed in the framework of the Stabilisation and Association Agreement (SAA). Within the new CEFTA, Montenegro has totally liberalized trade in agricultural products with Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia and Serbia (including Kosovo) and has agreed additional concessions with Albania and Croatia, which is a step further towards mutual liberalisation of trade. Montenegro has joined several international organisations, including the International Organisation of Vine and Wine (OIV), and has observer status in the Food and Agriculture Organisation (FAO). With the exception of the wine sector, comprehensive legislation on geographical indication and protection of indication of origin does not yet exist.

Some progress can be reported in the area of food safety and veterinary and phytosanitary policy. The veterinary framework law has been revised. A system for identification of bovines and registration of their movements is prepared. Identification of sheep and goats and registration of their movements is at an early stage. Inspection services and laboratories have been equipped, with EC assistance. Montenegro joined the World Organisation for Animal Health (OIE) in July 2007. Montenegro has adopted several laws in the phytosanitary sector, including laws on protection of plant variety rights, plant nutrition and forest reproductive materials. Montenegro needs to review the organisational set-up of its administration in the sectors concerned and assign clear responsibilities and powers to the individual departments. Control capacity needs to be reinforced.

The "Strategy for development of Montenegrin fishery and for capacity building regarding implementation of the Common EU fishery policies", adopted at the end of 2006, is being implemented. It aims at developing the legal basis for fisheries and food safety, including incorporation of the relevant acquis, strengthening institutional capacity to implement fish hygiene regulations and monitor food safety. Overall, progress in the agriculture and food safety, veterinary and phytosanitary areas should be maintained and extended. With regard to fisheries, the inspection and control services should be strengthened. Overall, preparations in the area of fisheries are at an early stage<sup>12</sup>.

New strategic document: MONTENEGRO'S AGRICULTURE AND EUROPEAN UNION – Food production and Rural Development strategy, adopted in 2006, defines new concept of sustainable development of the sector and foresees many tasks and challenges for the institutions in the agriculture. More specifically, the Strategy puts great emphasis on the role of Biotechnical Faculty (Institute) in providing sound institutional support for future sustainable development of agriculture and rural areas.

Law on Agriculture and Rural development is prepared for adoption in our Parliament. There are several very important laws and sub laws or rulebooks adopted in Montenegro from the 2001<sup>13</sup>. Agro-policy and further reforms are defined by new National program for food production and rural development.

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<sup>12</sup> Source: MONTENEGRO 2007 PROGRESS REPORT accompanying the COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL Enlargement Strategy and Main Challenges 2007-2008.

<sup>13</sup> In the field of legislation reform, the following laws were adopted and several important draft laws are in preparation over the last five years: Law on Amendments to the Law on Veterinary, Law on Identification and Registration of Domestic Animals, Law on Plant Varieties Protection, Law on Plant Nutrition Products, Law on Forest Reproduction Material, Law on Fresh-water

It will be very important to fully harmonized strategy goals in the field of education and research in agriculture with goals defined in Food production and Rural Development strategy.

The Society of Sciences and Arts of Montenegro was constituted in 1973 and it developed into the Montenegrin Academy of Sciences and Arts in 1976. Today it is the supreme institution in the field of sciences and arts in the Republic of Montenegro. It consists of Department of Natural Science, Department of Social Science and Department of Arts.

The University of Montenegro is comprised of seventeen faculties, three scientific institutes, the University library and several specialist departments. The University of Montenegro is the only public university in the country. On the other side, private high education is continually growing. Today, Montenegro has two private Universities: UDG University and Mediterranean University. The University of Montenegro is taking steps to upgrade its quality assurance system. The qualification assurance (QA) procedures are still relatively new in Montenegro, and there is currently a lack of trained professionals in this field. Standards and guidelines for accreditation of study programmes and HEI in line with QA standards and guidelines in the European Higher Education Area (ENQA standards) were adopted by the National Council for Higher Education on 15 February 2007. A new Law is introducing a transparent system of recognition and evaluation of foreign diplomas.

The Institute of Marine Biology (founded in 1961) is the only institution in Montenegro for scientific investigation, exploitation, control and protection of the sea. Staff: 9 PhD and 5 Master degree researchers. Approach to the research has an ecological character, with special attention to the Southern Adriatic and Boka Kotorska bay as a natural phenomenon. The institute has a fruitful international collaborations and numerous projects. Experience in international programs: EU FW5 MAMA, ADRIAMED, ADRICOSM, INTERREG C. (<http://www.ibmk.org>).

The Centre for Ecotoxicological Research of Montenegro is responsible for monitoring of air quality and air pollution of environment and working place, emission measurements; Monitoring of the surface, underground and marine water's quality and pollution sources; Toxicological investigations of soil's pollution and waste determination, Toxicological investigations of biological materials; Food and feed control of quality and safety. Radio ecological investigation, radon monitoring, Dozimetry, Noise and vibration monitoring POP-s monitoring Pollution control: air, water's, soil, waste, food, feed, radioactivity and noise

The Institute for Strategic Studies and Prognoses (ISSP) was involved in a few projects of Ministry of Agriculture Forestry and Water Management together with researchers from Biotechnical Faculty.

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*Fishery, Law on Wine, Law on Food Security, Law on Animal Welfare, Law on Plant Protection Products (pesticides); Law on Amendments to the Law on Maritime Fishery*

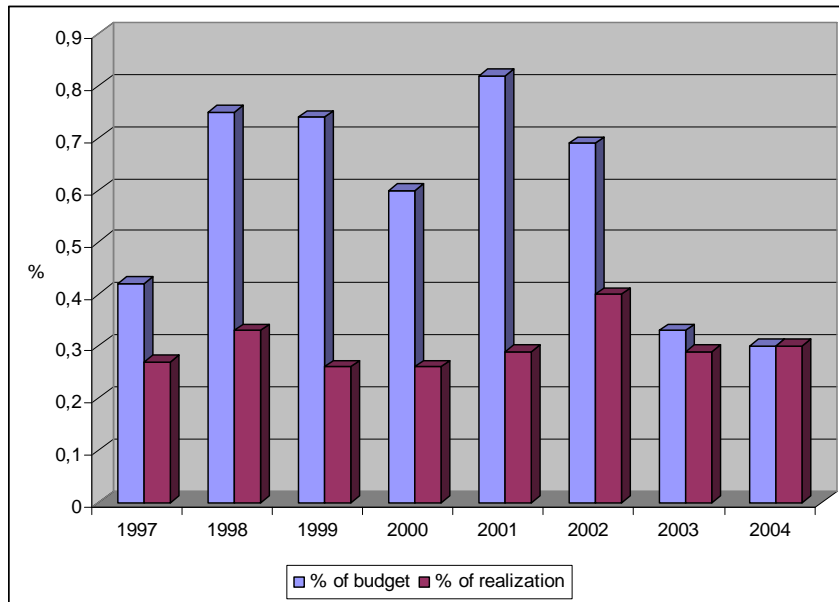
## 2.2. Financing agrifood R&D

The public expenditure in Montenegro for R&D was decrease from 0.42 % (1997), to 0.30% (2003), and remained at the same level in 2004.

**Table.3. Public expenditure on R&D for 1997- 2004** <sup>14</sup>

Year	1997	1998	1999	2000	2001	2002	2003	2004
% of budget	0,42	0,75	0,74	0,60	0,82	0,69	0,33	0,30
% realization	0,27	0,33	0,26	0,26	0,29	0,40	0,29	0,30

Source: Strategy for Scientific-Research Activities (2008-2016)



**Fig.10. Public expenditure on R&D in Montenegro for 1997- 2004**

Until 1997. godine Biotechnical (Institute) Faculty and Institute of Marine Biology are financed with 70% by the Ministry of Education and Science. Other 30% they had to provide on commercial bases.

**Table 4. The structure of the Ministry of education and science budget for 2005-2007** <sup>15</sup>

Year.	Total EUR	projects (equipment)	specialization	International cooperation
2005	722 000	47,00%	46,40%	6,60%
2006	600 000	57,16%	27,67%	15,17%
2007	900 000	57,78%	22,00%	20,22%

Source: Ministry of Education and Science

In 2000 -2005 institution financing (normative government subsidies) is the most important source of financing agrifood R&D in Montenegro. State supported salaries, overheads for the projects, investments, equipping of laboratories, information system building. Budget for 2005 was 1 050 900 euros. Ministry of Education and Science had two programs: Human resource development program and Scientific-research projects. Their overall budget was 718 531 euros.

<sup>14</sup> Source: Ministry of Education and Science.

<sup>15</sup> Source: Ministry of Education and Science.

Table 5. The overview of the annual research budget for R&D in Montenegro and EU- 25<sup>16</sup>

Godina	GBAORD				GERD			
	MNE	EU-25 <sup>17</sup>	Max	Min	MNE	EU-25	Max	Min
2002	0,06				0,14			
2003	0,05				0,08			
2004	0,08				0,18			
2005	0,03	0,74	1,5	0,09	0,16	1,86	3,7	0,37
2006	0,03				0,04			

Remarks: a. Government subsidies for R&D, as % GDP (GBAORD); b. Total consumption for R&D as % GDP (GERD)

In 2004. Ministry of Education and Science accepted 60 scientific projects from the field of biotechnical since. They are not financed and realized during the 2005. In 2005. Ministry of Education and Science is financed only two projects from the field of biotechnical science. Total amount for this two projects was 14.793,71 EUR. In 2006-2007. Ministry of Education and Science is interrupted financing of the projects. In 2008. Ministry of Education and Science accepted 15 projects from the field of biotechnical science. Total amount for first year of researches was 1.103.428,15 EUR or 210.848,15 € (19,10%) for biotechnical sciences.

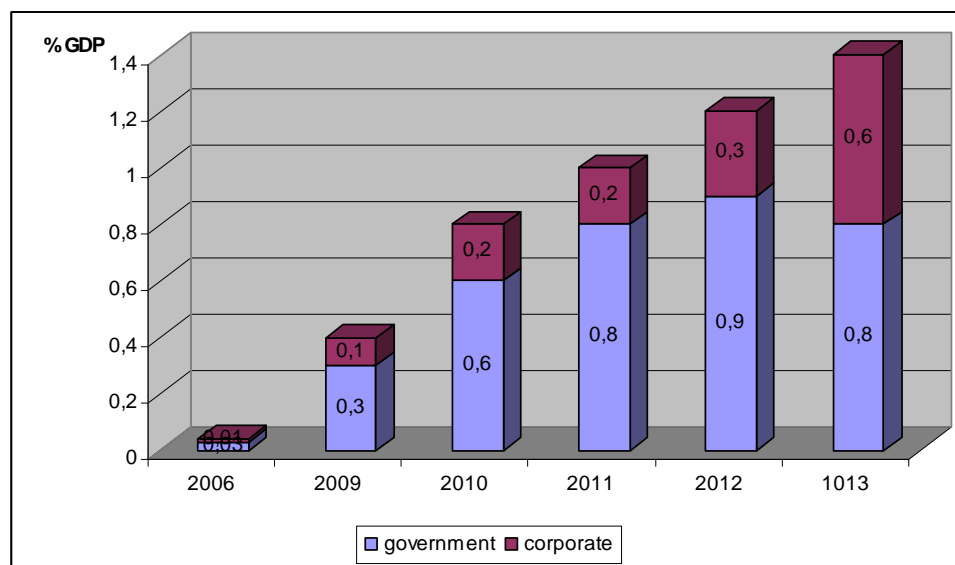


Fig. 11. Financing of R&D in Montenegro

On the other side, according to all criteria, budgetary support for agriculture in Montenegro is relatively low compared to the EU or candidate countries. In the EU-25 budgetary support for agriculture per capita amounts to €130. New member states, before the accession, had from €20 (Poland) to more than €80 per capita (Slovenia). Montenegrin agriculture currently operates at the support level of €12 per capita.

Agriculture by its nature, is a very sensitive sector that needs sound and efficient institutional support. In providing that institutional support, Biotechnical Faculty Podgorica plays main role, since it is the only research institution in the whole Montenegrin agriculture. The mission of Biotechnical Faculty is to be backbone of the institutional support to the agricultural sector by providing three type of activities: Research, High education and Services. In 2008 Faculty is financed by University of Montenegro 45%, Ministry of Agriculture Forestry and water Supply 40% and 15% on commercial bases.

<sup>16</sup> Source: Ministry of Education and Science according to official statistical data (MONSTAT);

<sup>17</sup> Eurostat, R&D Statistics – OECD MSTI 2006.

The share of the Biotechnical Faculty and Institute for Marine Biology in total agricultural budget was increase from 23,50 %(2005) to 30,95% (2008). A draft law on agriculture and rural development and a national programme for food production and rural development for 2009-2013 were adopted by the government in September 2008. In addition, the budget allocation for agriculture and rural development was increased by 25% compared with 2007 (table 6).

**TABLE 6.: THE OVERVIEW OF THE MONTENEGRIN AGRICULTURAL BUDGET 2005-2008.**

<i>Year</i>	<i>Agency for implementation</i>	<i>agricultural budget EUR</i>	<i>share in the total (%)</i>
2005	Biotechnical institute Podgorica, Institute for Marine Biology	7.649.382, 62	23,50
2006	Biotechnical institute Podgorica Institute for Marine Biology	9.700.000,00	23,05
2007	Biotechnical institute Podgorica Institute for Marine Biology	11.831.000,00	28,72
2008	Biotechnical faculty Podgorica Institute for Marine Biology	14.750.000,00	30,95

### 2.3. Human resources

According to the National statistics of Montenegro (MONSTAT), the total number of scientists-researches was increase from 602 (2003) to 671 (2007)<sup>18</sup>, but the total number of assistant researchers with higher education degree was decreased from 312 (2003) to 276 (2007). During the same period (2003-2007) the number of completed basic research works is increased from 3 to 4, developmental research works from 23 to 33. The number of completed applied research works is decreased from 166 to 7. By January 2009, 8 agrifood research organisation units belonging to one research institution- Biotechnical Faculty<sup>19</sup>. Therefore, the number of researchers on a Full Time Equivalent (FTE) basis in the Montenegrin agrifood sector is approximately 80 (57 at Biotechnical faculty- 32 employees are researchers with PhD,14 with Master degree and 11 technicians in R&D; 14 at Institute of Marine Biology- 9 employees are researchers with PhD,5 with Master degree and others are researchers employed at the ministries and business sector).

Biotechnical Faculty engages 170 employees in total, 32 employees are researchers with PhD and 14 with Master degree. In addition to the respectful human and technical capacities, it should be stressed that Faculty, as the only research entity in this field, plays crucial role in the institutional support to Montenegrin agriculture. Similar like in neighbouring countries, during the last fifteen years, there have been two processes affecting the R&D sector: “brain-drain” and “brain-waste”. At the same time, some of the researchers emigrated to seek employment opportunities abroad and some specialists leave their professions for better paid jobs in the private and/or informal sector of the economy

<sup>18</sup> Source: MONSTAT.

<sup>19</sup> Biotechnical Faculty in Podgorica is the oldest scientific-research institution in Montenegro. Biotechnical Faculty covers areas of bio-technical sciences (Agriculture, Veterinary medicine and Forestry). It is organized into ten scientific- research units.

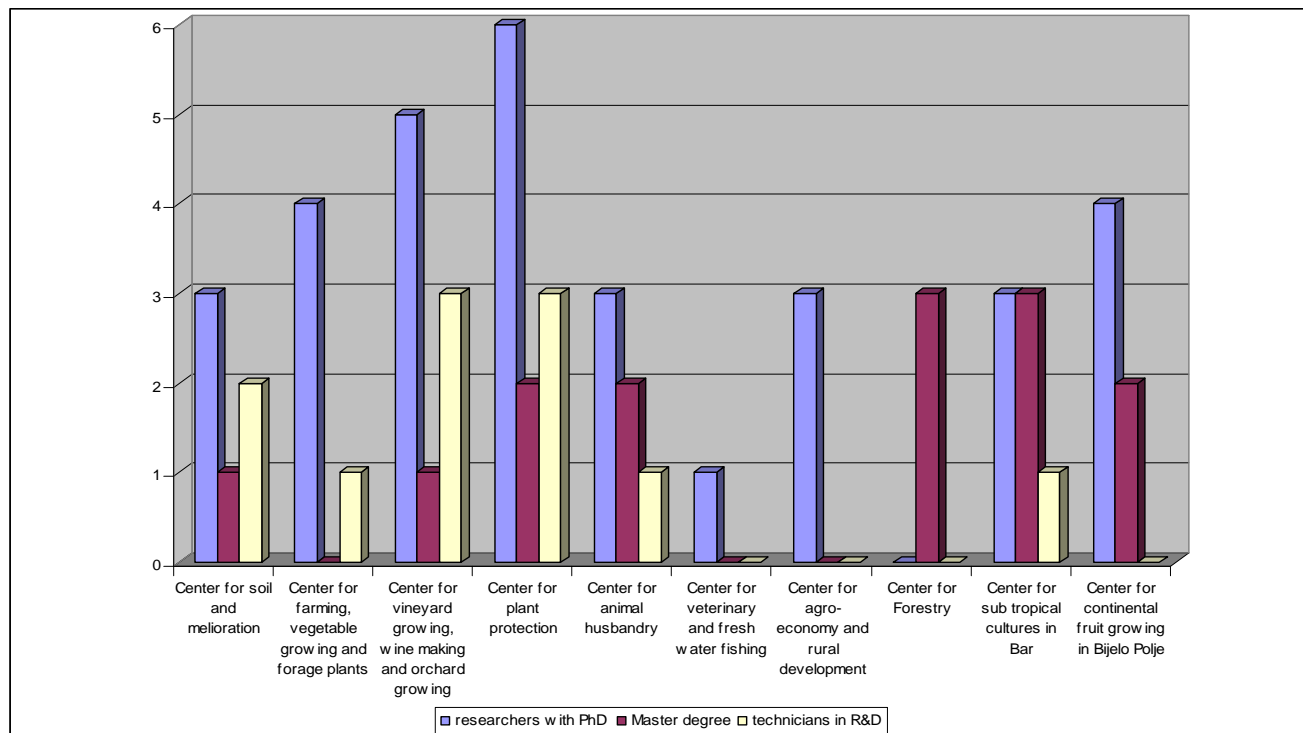


Fig.9 Number of employees (researchers) at the Biotechnical faculty (2009, FTE)

More than 2/3 of the research personnel work on scientific fields: vineyard growing, wine making and orchard growing, sub tropical cultures and continental fruit growing.

Animal sciences seem to have a low share compared to the importance and potential of animal husbandry in the country. Similar situation is for economic, social and political sciences, forestry, veterinary etc.

## 2.4. Research infrastructure

While agriculture remains a key economic sector in Montenegro, it is the least developed in terms of productivity and market orientation. There is a significant lack of know-how, capital and production efficiency in the whole agro-food chain and agriculture has to meet international standards both in terms of competitiveness and of food safety. Nonetheless, there is significant opportunity for development. Agriculture plays a key role for economic and sustainable development in rural areas and for regional development as well as supporting others activities such as tourism.

The EAR supported rehabilitation of the food safety laboratories in the Biotechnical Faculty (Institute). Development of a laboratory examination role in food control in accordance with the EU concept of official control will be further supported. The idea is to enhance the capacity of the laboratories to fulfill that role in an economically efficient manner through improved technical performance and accreditation.

Biotechnical faculty is recognized by its research and results achieved so far. The activities of Faculty are carried out through the organization of fundamental, applied and developmental research in many field of agriculture. Organizational chart is corresponding to the main research activities. Thus, the Faculty consists of ten research centers: Centre for agricultural economy; Centre for Land and Melioration; Centre for Forestry; Centre for Plant Protection; Centre for Field crops and Vegetable production, Centre or Livestock

production, Centre for Veterinary, Centre for Vineyard and Fruit production, Centre for Subtropical fruits and Centre for Continental fruit growing, accompanied by the laboratories and two experimental station in vine and fruit production. Beside above named Centers in Bio-technical institute there are also three specialized Services: Cattle selection Service; Dairy laboratory; Advisory Service in plant production. Research component of the BIP is the oldest one not only in the Institute but in whole Montenegrin science society. BIP is recognized by its research and results achieved so far. BIP activities are carried out through the organization of fundamental, applied and developmental research in many field of agriculture. High education is newest component of the Faculty (Institute) activities, third generation of the students enrolled last September. High education is performed in accordance to Bologna declaration /process, organized in two divisions: Plant production division; and Livestock production division. The services provided by the Institute to the farming sector are twofold: Extension services are provided through two so called "sister" services: Livestock Selection Service and Plant Production Extension Service. Laboratory's services play very important part of the Institute activities. There are several labs functioning in the BIP: Plant protection lab; Milk lab; Lab for agro chemistry and soil sciences; Wine (Oenology) lab; Pomology labs; Seed and seedlings lab; Feeds control lab in establishing. The role of these labs is more and more important. Some agrifood researches have done in above mentioned institutions.

Generally speaking, investment in new equipment, facilities and industrial services is needed across the whole scientific community in Montenegro, especially in many field of agriculture.

### 3. Agrifood research performance

#### 3.1. Innovative and scientific output

During the last 70 years Faculty (Institute) had continuity in scientific research and fruitful results recognized through many different activities and developed organisations units which covers all segment in Agriculture, as well as through respectable number of research staff, among which there are lot of young and enthusiast researchers.

Openness of Montenegrin society and economy, since 2000, has had positive reflections on the Biotechnical Faculty (Institutes) activities: young researchers have started to go more and more abroad in order to acquire new knowledge and experience, to establish connections with partner institutions in the Region and EU countries. There have already been many attempts to participate in networks or consortiums for Framework Programme of EC. Until now BIP has got participation in the consortium lead by Euroquality (France) on project: Enlargement Network for Agripolicy Analyses, with expectation that few other applications will be accepted. One of the main priorities of the faculty have been focused on establishment, maintaining and development of international cooperation in agriculture and forestry sector with similar scientific institutions, Universities and international organisations. It is particularly important that international contacts and projects have been noticeably strengthened in recent years.

Biotechnical research staff being trained and additionally educated on many prestigious European Universities and scientific institutions in Italy, Greece, Slovenia, Germany, Norway, Sweden, the Netherlands and recently more in the USA (Norman Bourlag Program).

Biotechnical Faculty (Institutes) has fruitful and various cooperation with similar institutions in the region, and has already started participating in wider research area: out of three FP7 projects which University of Montenegro got, one belongs to the BIP ("Agri-economic policy analysis of the accession and the candidate states and the western Balkan countries"); currently we are in the process of preparing an application for the another FP7 Project; Biotechnical Faculty is already involved in ERA with two projects (SEE-ERA.net-

“Development of Molecular Tools for FIG Genetic resources Characterisations and Preservation in WBCs”, “Landscape and Regional Context of Insect Agrobiodiversity in Southeastern Europe: a Pilot Survey of selected Hemipteron Pests, their Parasitoids and Predators and Bee Pollinator Diversity”), the TEMPUS-“Support Network for Improvement of the Strategic Planning”); the SEEDNet project for agrobiodiversity preservation in south eastern Europe is also ongoing one; finally BIP researchers are involved in several international projects - two FAO projects (from the field of organic agriculture and rural development). Moreover, the real position and importance of the Biotechnical Faculty in development of the agricultural and forestry sector in Montenegro has been recognized by EC who funded Project for modernizing of the Milk Laboratory and in a recent time, additionally through EAR which funded projects for strengthening of the phytosanitary and veterinary service in Montenegro and Food Safety Laboratory. Currently, there is IPA PROJECT-DEVELOPMENT OF FOOD SAFETY SERVICES, where are the participants: Biotechnical Faculty; Marine Biology; Institute for Public Health.

Without sound research activities and firm scientific results, it is not possible to manage transition of the Montenegrin agriculture successfully and to contribute to its sustainable development.

For Montenegro, as small country with certain limitations, it is extremely important to use its institutional resources in effective and efficient way. To be leading research institution and main provider of scientifically proved services are the big challenges for Faculty. In order to fulfill this role, Biotechnical Faculty has to strengthen its human and technical capacities more intensively, especially by accepting and implementing principle and standards well established in recognisable EU research centres.

During all those period Biotechnical Faculty had an intensive international cooperation and projects realisation which were funded by UNOP/FAO, American, Canadian, Russian, Italian funds, as well as from domestic funds.

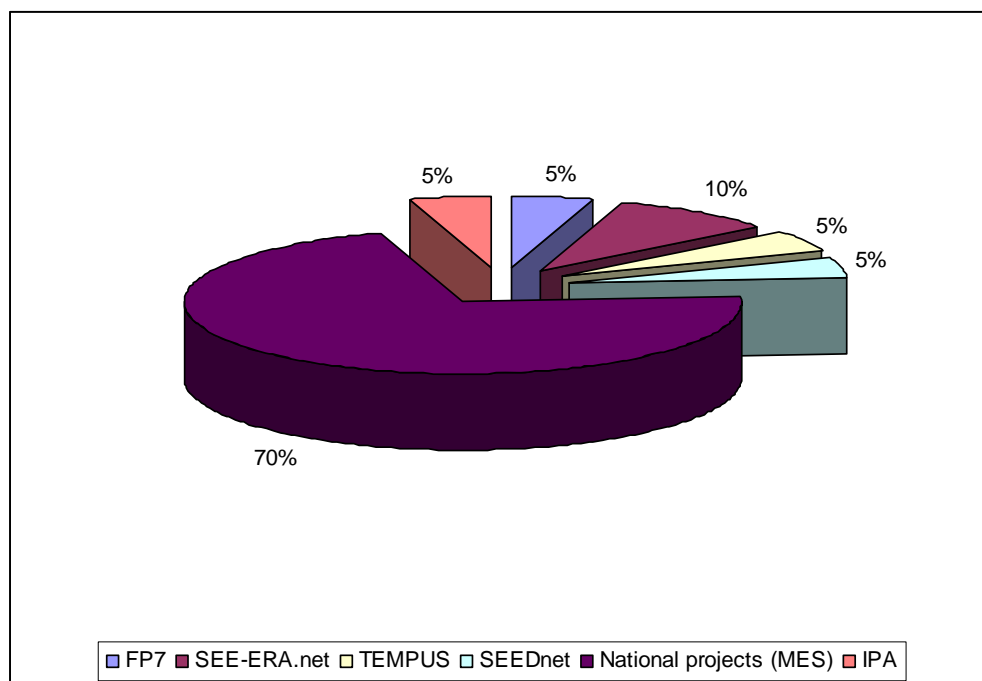


Fig.12 Agrifood research projects in Montenegro

numb er	Field of researches	period	1955-04. Number of articles
1.	Soil and melioration	1955-2003.	86
2.	Growing of vegetable crops and fooder crops	1955-2003.	231
3.	Growing of fruit and fruit processing	1955-2004.	221
4.	Viticulture, wine making and orchard growing	1955-2004.	82
5.	Plant breeding, production and protection	1955-2004.	187
6.	Animal production and husbandry, Fisheries	1955-2004.	193
7.	Animal health and welfare	1995-2002.	98
8.	Biology, Ecology, flora, fauna	1995-2002.	191
9.	Economic, rural development, social and political aspects	1995-2004.	128
10.	Science and Education	1995-1997.	22
11.	Engineering	1956-2003.	17
12.	Other	1956-2004.	419
	<b>total</b>		<b>1875</b>

*Source: "Agriculture and Forestry", Biotechnical (Agriculture) Institute, Podgorica.*

In last few years, 4 researchers from Biotechnical Faculty are published their articles in prestige international journals.

Nevertheless the most significant research areas in the Montenegrin agrifood sector by research activity less much are all above mentioned.

The exact number of patents regarding Montenegro is very difficult to reach because of the administrative system which follows the patent application. Based on some assumption the frame number of patents on University of Montenegro could be about 10-15 basically in the field of technical sciences.

There are some professors from other Universities have included in education process of students at Faculty of Agriculture (University of Belgrade and Novi Sad). The some of professors or academic persons from Biotechnical Faculty have included in realization of study program of education process of other Universities (University of Banja Luka and University of Mostar).

### 3.2. Research competence

As We mentioned in 2.2. and 3.1. and according to EU proposition Montenegrin agrifood R&D mostly means smaller projects. Projects financed by the Ministry of Education and Science are from € 12 thousand to € thousand. Very similar situation is in the field of international cooperation.

During the last 3 years, € 1.6 million was earmarked for financial support to civil society and € 3.1 million for minorities and refugee return. For 2007, € 1 million has been allocated from the IPA to support the development of civil society. Ongoing CARDS assistance is implemented by the European Agency for Reconstruction, but preparations are being made to

From 2007 onwards, Montenegro will receive pre-accession financial assistance under the Instrument for Pre-Accession Assistance (IPA). The 2007-2009 Multi-Annual Indicative Planning Document (MIPD) for Montenegro was adopted in June 2007. In 2007 a total of € 31.4 million was allocated to Montenegro. The main focus areas are public administration reform and rule of law, the business environment, transport, the environment, agriculture and food safety.

The EU OBNOVA and CARDS funded projects assisted the sector of Montenegrin agriculture with a total of €10 million committed between 1998 and 2006, covering institutional and policy developments as well as investment in structures and equipment for Veterinary and Phyto-Sanitary controls. The line Ministry of Agriculture has thus developed its capacity to formulate agricultural policy and is aware of the challenges linked with the SAA implementation and WTO membership, as well as European integration (please refer to the information about projects provided in the Annex II).

EU support to agriculture and rural areas is ongoing. Expertise will be deployed to assist Montenegrin agriculture in policy development and legislation. An animal identification system will be further developed (*IPA 2007: TA + investment*) while an integrated food safety system, veterinary disease control and support for the initial steps related to the rural development is planned under IPA 2008. Further support to the Fishery sector is planed under IPA 2009. Ministry of Agriculture Forestry and Water Management signed the contracts with following international institutions: USAID, MEDNEM Luxemburg, FAO, CARITAS, GTZ, World Bank (MIDAS); IBRD, GEF etc.

The following table illustrates the investment so far in the sector in million €:

OBNOVA			CARDS						IPA		
1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1.0	-	2.3	0.1	-	1.6	0.3	4.5	0.6	1.4	5.0	1.2
Total:											18.0

1. Source: EUROPEAN UNION DELEGATION OF THE EUROPEAN COMMISSION TO MONTENEGRO

Over the last year, Agriculture was one of the most important sectors in the integration process:

- Stabilization and Association Agreement (SAA) – it has been agreed on gradual Montenegrin market opening for agricultural products from the EU within 5 years, except for sensitive products, which will be liberalized within 5 years up to 50% of the current customs protection; preferential quotes for exports of Montenegrin products to the EU, that is wine 16.000 hl and baby beef of 800 t, have been agreed.

- Negotiations in the frame of the CEFTA, where agriculture played an important role, are concluded; Montenegro has totally liberalized trade in agricultural products with Bosnia and Herzegovina, FYRoM, Serbia and UNMIK Kosovo; while with Albania and Croatia, Montenegro has agreed additional concessions, which is a step further in mutual trade liberalization.
- Negotiations' regarding accession of Montenegro to the World Trade Organization is continued. Bilateral negotiations with WTO member states are concluded. Montenegro could become soon 154th member of the WTO. The session of the General Council of WTO has been scheduled for 3 February 2009. It is likely that the application of Montenegro to WTO membership could be a point on the agenda. Some minor changes in the legislation were necessary in Montenegro to fulfil the conditions for membership. Such changes would entail an additional amendment to the Law on excise. The deadline for adopting this amendment is 20 November 2008, and the government will ask the Parliament to adopt the documents which have already been prepared. The WTO requested the submission of three statistical reports on the ownership structure of all Montenegrin companies, their share in imports, and clarification of reports related to the degree of liberalization of foreign trade.

The procedure for accession to the most important international organizations was initiated. Accession to FAO and its subcommittees: November 2007; accession to the World Organization for Animal Health – OIE: August 2007; Montenegro became member of the International Organization of Vine and Wine – OIV. On the 11 of April 2008 the International Union for the Protection of New Varieties of Plants UPOV provides positive opinion and final decision after law adoption is expected.

Bilateral and multilateral S&T cooperation will give the possibility to Montenegro to create the link with internal RTD market, also much stronger participation in European research endeavors, thus enhancing research perspectives in bilateral and multilateral activities.

#### 4. Concluding remarks

Agriculture is an important economic sector in Montenegro, but investments in the agrifood industry remain low.

The sector is dominated by state-owned institutions (universities and public research units), which receive institution financing without linkages with industry. The number of researchers in the agrifood sector is estimated at 80 and most of them are at the Biotechnical Faculty.

For Montenegro, as small country with certain limitations, it is extremely important to use its institutional resources in effective and efficient way. Making agrifood research more market-oriented and competitive remains a challenge for a longer period of time.

#### References

MONTENEGRO 2007 PROGRESS REPORT accompanying the COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL Enlargement Strategy and Main Challenges 2007-2008

Eurostat, R&D Statistics – OECD MSTI 2006

World Development Indicators 2006 database

EBRD

MONSTAT

MONTENEGRO'S AGRICULTURE AND EUROPEAN UNION, Agriculture and Rural Development Strategy, 2006

## ANEX I: SWOT ANALYSIS OF AGRIFOOD RESEARCH IN MONTENEGRO

<p><b>STRENGTHS</b></p> <ul style="list-style-type: none"> <li>• High level of development</li> <li>• Fast growing rate after 2000</li> <li>• Education and learning in agrifood field</li> <li>• Stability in financing of agrifood research projects</li> <li>• Current structure of institutional set-up</li> <li>• Long term sustainability</li> <li>• Relations between main stakeholders</li> <li>• Existence of law and national bodies concerning the R&amp;D or S&amp;T framework</li> </ul>	<p><b>WEAKNESSES</b></p> <ul style="list-style-type: none"> <li>• Limited public expenditure for S&amp;T and R&amp;D purposes and education</li> <li>• Limits in human resources</li> <li>• Lack of financial resources in order to renew technologies</li> <li>• High imbalance on the external accounts (especially for agrifood)</li> <li>• Recognition of the role of science in the overall process of economic development</li> <li>• Lack of national standards in the evaluation of research activities and accreditation of R&amp;D organizations</li> <li>• Motivation of young scientists</li> <li>• Small number of realized research projects</li> <li>• Research infrastructure</li> </ul>
<p><b>OPPORTUNITIES</b></p> <ul style="list-style-type: none"> <li>• Increasing economic activity</li> <li>• International Funding Opportunities</li> <li>• Increasing research funding</li> <li>• Increased scientific support to policy making activity</li> <li>• Increasing networking opportunities</li> <li>• Interaction of the education institutions with the business sector</li> <li>• Linkages with the research systems of other countries</li> </ul>	<p><b>THREATS</b></p> <ul style="list-style-type: none"> <li>• Lack of agrifood researchers</li> <li>• Drop behind in integration processes and lack of support from the EU</li> <li>• Ratio between applied versus basic research</li> </ul>

## Annex II:

### SCIENTIFIC-RESEARCH CENTERS AND SPECIALIZED SERVICES OF BIOTECHNICAL FACULTY PODGORICA

Address : TRG Kralja Nikole bb

Town : 81000 Podgorica

Tel: (381) 81 268 429

Fax: (381) 81 268 432

Manager : Dr. Natalija Perovic, tél : (381) 020 268 437

E-MAIL: [BIOTECH@CG.YU](mailto:BIOTECH@CG.YU)

Center for soil and melioration .....	(381) 20 268 431
Center for farming, vegetable growing and forage plants.....	(381) 20 268 438
Center for vineyard growing, wine making and orchard growing.....	(381) 20 268 445
Center for plant protection.....	(381) 20 268 716
Center for animal husbandry.....	(381) 20 268 441
Center for veterinary and fresh water fishing .....	(381) 20 268 443
Center for agro-economy and rural development.....	(381) 20 268 435
Center for Forestry .....	(381) 20 268 434
Center for sub tropical cultures in Bar .....	(381) 85 312 157
Center for continental fruit growing in Bijelo Polje .....	(381) 84 487 005
Cattle selection service .....	(381) 20 265 337
Dairy laboratory.....	(381) 20 266 315
Advisory service in plant production.....	(381) 20 206 710
Experimental fields in Ljeskopolje .....	(381) 20 268 430

## ANNEX III: EU Support to the Montenegrin Agriculture

PROJECT TITLE	Contr. amount
<b>CARDS 2006</b> (€631,168.77)	
Supply of Vehicles for the Animal Identification unit	98,258.17
Supply of the Ear Tags & Pliers and Printed Products for an EU compliant Animal Identification system, Lot 1	117,283.60
Supply of the Ear Tags & Pliers and Printed Products for an EU compliant Animal Identification system, Lot 2	131,425.00
Programming and upgrading of rural development in Montenegro	182,650.00
Development of the Food Safety services in Montenegro	101,552.00
<b>CARDS 2005</b> (€4,428,753.15)	
Development and Implementation of an Animal Identification System	984,600.00
Supply of the Equipment for an EU compliant Animal Identification System – Lot 3	192,244.00
Rehabilitation of Food Safety Laboratories, Podgorica	776,558.54
Supply of Equipment for an EU compliant Animal Identification System, Lot 1	41,964.00
Supply of Equipment for an EU compliant Animal Identification System, Lot 2	6,517.00
Supply of Equipment for an EU compliant Animal Identification System, Lot 4	104,483.00
Supply of Equipment for an EU compliant Animal Identification System, Lot 3 & Lot 5	4,307.80
Audit & Valuation of EAR Counterpart Funds 2006	12,085.50
Legal Advice to the Agency on recovery related to "Modernisation of Equipment in the Dairy Sector" project	4,000.00
Animal Identification and Registration (I&R) – Phase II	23,702.90
Development of the Food Safety Services in Montenegro	101,552.00
Strengthening of the Fishery Sector in Serbia & Montenegro	177,748.08
Support to the Fishery Sector	1,079,118.00
Equipment for Fishery & Fishery Products Control, Lot 1	479,789.00
Equipment for Fishery & Fishery Products Control, Lot 2	259,800.00
Equipment for Fishery & Fishery Products Control, Lot 4 and Lot 6	51,287.83
Equipment for Fishery & Fishery Products Control, Lot 5	19,120.50
Equipment for Fishery & Fishery Products Control, Lot 7	90,000.00
Supply of Equipment for Fishery Inspectorates in Montenegro and Serbia, Lot2	19,875.00
<b>CARDS 2004</b> (€314,991.50)	
Equipment for Secondary Vocational School, Lots 5, 6 & 7	94,604.50
Equipment for Secondary Vocational School, Lots 3 & 4	54,365.03
Strategy of development of the Montenegrin Agriculture and Rural areas in compliance with CAP of EU	152,650.87
Audit and Valuation of EAR counterpart funds 2005 – Montenegro	13,371.10
<b>CARDS 2003</b> (€1,576,522.60)	
Strengthening of Veterinary and Phytosanitary Services TA	571,227.20
Supply of phytosanitary equipment to Plant Protection Department	269,989.44
Construction of Veterinary Laboratory Building, Podgorica	474,290.15
Supply of Equipment to the Phytosanitary Inspectorate of Monten	10,190.00
Equipment & Vehicles to the Phytosanitary Inspectorate, Lot 2	21,078.00
Supply of Vehicles for the Veterinary Sevices	27,051.00
Supply of IT Equipment for the Veterinary services	10,710.00
Equipment & Vehicles to the Phytosanitary Inspectorate, Lot 4	128,239.00
Monitoring of Dairy Sector Projects	63,747.81

OBNOVA 2001		(€133,697.31)
Kolasin – Katun Project		29,988.00
Kolasin – Cabins Furnishing for the Katun Project		4,025.24
Strengthening of the Veterinary and Phytosanitary Services in Mon		99,684.07

OBNOVA 2000		(€2,307,688.78)
Modernisation of Equipment in Dairy Sector		361,100.00
Supply of Equipment to Dairy Enterprises (Lot 2,3,4)		431,210.00
Supply of Equipment to Dairy Farmers (Lot 1 &3)		196,395.50
Modernisation of Equipment in Dairy Sector - Lot 1		87,000.00
Supply of Equipment to Dairy Farmers (Lot 2)		75,672.00
Modernisation of Equipment in Dairy Sector - Lot 2		13,704.00
Modernisation of Equipment in Dairy Sector - Lot 3		702,722.00
Modernisation of Equipment in Dairy Sector - Lot 4		19,433.00
Modernisation of Equipment in Dairy Sector - Lot 5 & 6		204,950.00
Monitoring of Dairy Sector Projects		120,433.37
Water Catchments		16,750.00
Sketch Project for the new dairy plant Podgorica		60,419.52
TA Livestock Expert		17,899.39

OBNOVA 1998		(€1,000,000.00)
Cattle import		1,000,000.00

IPA 2007-2009		(€7,600,000.00)
IPA 2007	Implementation of an Animal Identification System / II	1,400,000.00
IPA 2008	Rural Development	1,500,000.00
IPA 2008	Food Safety	2,000,000.00
IPA 2008	Control and Eradication of Rabies and Classical Swine Fever in Montenegro	1,500,000.00
IPA 2009	The Sustainable management of Marine Fisheries	1,200,000.00

Total EU (Obnova 98/99/00 + CARDS 2001-2006 + IPA 2007-2009)		17,992,822.11
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