

Full length Research Paper

Agricultural production factors intensification in North-Eastern Montenegro

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The paper discusses the factors of intensification of agricultural production in north-eastern Montenegro, for example the municipality of Berane, Andrijevića and Plav. Replacement of worn-out machinery and provision of enough high-performance tractors and other modern agricultural machinery necessary for the farms is the determinant for the smooth and timely performance in Polish, and other works, which follow the activities in agricultural production. The rapid spread of pests and diseases threatening agricultural production, and it is not possible to save without adequate protective equipment. The process of introducing high-yielding varieties of crops and purebred livestock in agriculture proceeded with a delay compared to other parts of the country. Production potential of new varieties can be used only by applying the varieties crop management, training of producers and knowledge transfer in agriculture. Spatial distribution of different types of crop rotation is determined by size of household, crop structure and intensity of crop production. In the cultivation of agricultural land, reclamation could adopt measures, in order to improve properties of agricultural land in the subject area and to improve and maintain water-air regime of soil. Spatial distribution of available water for irrigation is very unfavourable. Contemporary and future use of land resources requires a new approach that should enable the application of scientifically based methods to use in the process and in the process of its protection.

Keywords: North-eastern Montenegro, agriculture, machinery, chemicals, selection, crop rotation, land reclamation.

INTRODUCTION

Intensification of agricultural production involves the use of various cultural practices to increase the volume of the total crop and livestock production and improve quality of agricultural products. In addition, the economic profitability of applied agro-techniques measures must be expressed through the total production agricultural (Rakitanov, 1970). If you would like to express all the social and economic reasons that have affected the entry and spread of technical progress in agriculture in this part of north-eastern Montenegro, then it certainly would not do better than Hayami and Ruttan (1971): "Progress in agriculture and technology arguably, a necessary condition for overcoming the limitations imposed where agriculture is inelastic offer social and economic factors". Technical progress in agriculture, has a complex character and includes the development and application of methods, they infiltrate and condition. The main forms of expression in agriculture are:

- Development of mechanization with the increasing use caused an increase in labour productivity and the creation of large scale agricultural production,
- broader application of chemicals in agriculture (fertilizers, pesticides and other products),
- Development of genetics, broad application of selection and crossing of crops and some livestock species, would lead to higher quality varieties of plants and breeds of cattle, with higher production and properties and potential applications,
- Other achievements of science and technology, such as better equipment of agricultural machinery and tools, the introduction of new methods of organization and agricultural management (Hayami and Ruttan, 1971). There is no doubt that the development of agriculture, both in Montenegro and in the considered area, so far primarily affected, the first two, the said form of technical progress. However, the further improvement of

agricultural production, it is improving all the technological achievements. State of technical and technological equipment of agricultural production in the north-eastern part of Montenegro is such that neither of these two basic forms of technical progress not represented in adequate measure, so that the third and fourth aspect may not even be mentioned. Given that the development of agriculture an integral part of the overall progress of the economy in the European Union, whose member in the near future we see and Montenegro, replacing worn-out machinery and provision of enough high-performance tractors and other modern agricultural machinery necessary for the farms, is the determinant for the smooth and timely performance of that field, as well as other works that follow the activities in agricultural production. Defining the strategy for the development of modern agriculture in order to activate the potential of rural areas, mountains and rivers which is the area considered rich. Just as agriculture in this part of north-eastern Montenegro could become an equal partner with other sectors of the economy and justify its primary role and economic importance (Rajović, 2010).

Without going deeper into the theoretical considerations, our research evidence clearly pointed to the first plan several obvious problems of agriculture:

- The first is related to the agricultural population, especially for labor and its aging,
- Second, that there is a strong migration populations whose intensive processes in the village to town, left behind an unfavorable structure of agricultural population-age and education, which is maintained at a negative development of agriculture and
- The third refers to the characteristics of land area, its small size and outdated processing, low technical capacity.

Related work

Our intentions are modest and the, scope for detailed analysis are limited. Therefore, do not pretend to exhaust these issues, but this text, we want to give a contribution to the study of agriculture in the north-eastern of Montenegro, the example of the municipality of Berane, Andrijevica and Plav.

Although the social need for the study of agriculture in our country, unchallenged, not in the plan is able to meet its own current and other needs. In this respect, as the country is far behind the European and even neighbouring countries. Namely, agriculture considered space, starting from the beginning of the sixties, has suffered many negative impacts, because the period of industrialization in the last 15 years of isolation, the social and economic crisis and lack of long whether born economic development strategy, stopped its social, technical and technological development. Through agriculture at the same time many authors have analyzed

and its economic importance. They are the complex natural and economic process, looked at from several angles, either directly, or in the analysis of the overall socio-economic trends. In defining the objective of the paper we have taken the view that current basic agricultural research was mainly oriented to the larger spatial area (the former Yugoslavia, Montenegro), and less in regions or specific areas. Conducted research that involved the north-eastern Montenegro, had been more partial character as was done in the other analysis, or were limited in their scope to only some aspects of agriculture (theoretical basis of agriculture in economic development, changing socio - economic structure of the agricultural population, agricultural production capacity, the structure of land use, changes in ownership structure, production and economic characteristics of farms, the development of commodity production in the country, the income of individual farms and the like.). This has certainly created a rich scientific basis necessary for their commitment to further research. In the above situation, it seems that any research funded work in the field of agriculture research, is welcome, therefore, believe that, in this context, and this modest contribution will be useful.

Searching sources of information, literature and the Internet, found the descriptions of similar studies and studies on climate as the value of agricultural regions in the former Yugoslavia, and developed European regions. Numerous studies have posed and successfully deal with issues about the importance of climatic conditions for agricultural development, with the research using different methodologies. Far would lead us listing of such research, therefore, in this paper we limit only to the research carried out in Montenegro, and related agricultural north-eastern of Montenegro, the example of the municipality of Berane, Andrijevica and Plav.

Lutovac (1957) addresses the natural, social and economic conditions Ivograd (Berane) basin. The author analyzes the characteristics of agriculture and municipality of Berane. Analysis of natural conditions and their comparison determines the value of the agricultural economy of the municipality of Berane.

Obuljen (1962) the author notes that the air element of recognition and zones phenomena, coastal, continental and mountainous regions of Montenegro, as well as different plant communities. And thanks to the climate, many places in Montenegro, has been developed in the familiar and easy recognizable agricultural and tourist centres. The author states that the north-eastern region of Montenegro, which include the considered space, characterized by continental-mountainous climate with long, strong and snowy winters, late spring and early autumn frosts. Thermal crops are different, depending on the altitude height and exposure, but areas up to 1000 m above sea level, may be characterized as favourable for growing all kinds of continental plants. Mean annual precipitation ranges from 92.7 to 108.4 days, the mean duration of the growing season 160 to 180 days, and

winter frosts reaching up to -30°C . Continental character of this area gives the highest average mode rainfall. The average amount varies between 700 mm and 1000 mm, but they are spaced evenly throughout the year, which is particularly favourable for agriculture. Forward the data showed (Obuljen 1962) relating to the North East of Montenegro, which includes not only the Municipality of Berane, Andrijevica and Plav, but also of Bijelo Polje and Rožaje.

Marović (1999) deals with the livestock in Montenegro in the period 1860-1953. The author points out that the most important agricultural farming activities on farms in Montenegro. The main factor influencing the orientation of this production is the structure of agricultural holdings of land and the way they are exploited. In addition to the analysis of livestock in this part of the paper, the author points out the natural features that are suitable for development of livestock production.

Group authors (1970) deal with measures of accelerated development of underdeveloped municipalities in Montenegro. The results suggest the extent to which agriculture will serve as the basis for faster development of the overall economy, pointing to the climatic characteristics. The article also cites social factors not suspicious importance for economic development and transformation of agriculture in Montenegro in modern forms of work. Of course, the text displays and technical - technological base of agriculture.

Group authors (1975) give a projection of agricultural development in Montenegro for the period 1976-1985. Presented research, developed a framework for agriculture development, citing the effects of natural conditions, the subsequent socio - economic trends, it is extremely important from the standpoint of scientific knowledge for the proper conduct of all social actions and measures of overall agricultural policy.

Kalezić (1976) points to the structural changes in the Montenegrin village of the twentieth century. U essence, the work seems a modest attempt to be based on socio - economic trends and influential factors, pointed to certain laws in these developments and the prospects related to agricultural development issues in the Montenegrin village.

Raznatović (1981) deals with measures to promote agriculture in Montenegro, and believes that, from the construction of rural infrastructure, improving agricultural extension services and preserving and improving land, as the basic factors of agricultural production depends on the further development of agriculture. Also the author emphasizes the potential opportunities of agricultural development and emphasizes that in the present circumstances it is illusory to expect the farmers to become producers of commodities, bearing in mind the problems in providing basic infrastructure changes, inadequate organization of advisory and veterinary services, and insufficient use of agricultural land and presence of inadequate protection.

Group authors (1983) points to the social problems of the Montenegrin village and the current problems in agriculture. It is therefore necessary in the opinion of the author, take measures to promote agricultural production and placement, reconstruction and strengthening of rural infrastructure, development and promotion of rural areas, environmental protection and rural areas, development and promotion of organic agriculture. That is, all that life in the country and engaging in agriculture do not only worthy of a modern man, but also attractive, so that the rural areas of Montenegro would not provide an example of depopulated areas.

Group authors (1989) points to the possibility of development of a specific commodity production in Montenegro and its adjustment to modern conditions. The authors emphasize that agricultural land has the highest economic value, but warn that no matter how much potential agricultural land were large; they are not unlimited and inexhaustible. Therefore, their use must be planned and rational. More so because in terms of agricultural land and premises considered, is facing four major problems: the extensive land use with extensive planting structure, the relatively small size of the possession of private households (with an average of about three hectares), reduced input of organic matter and low to use organic fertilizers, especially manure, and soil degradation.

Đerković (1992) points to a strategy of agricultural development in regional development. Analyzed in great detail and natural, climatic conditions for agricultural development in Montenegro. From the point of agro climatic zoning observed that, with the altitude significantly deteriorate the characteristics of climatic regions.

Bulatović (1999) presents models of livestock production on family farms of the northern part of Montenegro. In analyzing these phenomena, the author points out the effects of size of estate as an essential condition for income on the family farm.

Rajović (2005) addresses the geographic basis of economic development in the Upper Polimlje. Based on the properties of terrain, climate and hydrological conditions, soil types, the representation is singled out, three relatively homogeneous regions, the economic development of the Upper Polimlje. Results showed that the economy, including agriculture, is in agreement with the available natural conditions.

Despotović et al.(2002) deal with natural conditions and manner of use of agricultural land, as determinable by them affects the abundance, structure and intensity of cultivation of certain types of livestock. High share of meadows and pastures has caused to cattle and sheep are major types of livestock. On the other hand, modest arable land, unable greater presence of pigs. In the future the authors, it is possible to increase livestock production by increasing the number of cattle on production per head, with the help of certain institutional technical -

technological and organizational - economic solutions.

Stanković (2003) deals with the issue of agricultural and food industry in Serbia and Montenegro. The above mentioned sectors of domestic economy at the same time exercise and increase their exports and imports, but with the ever present trade deficit in foreign trade, which is characteristic of almost all countries in the transition period. As agriculture and food industry has export potential, it is expected that these resources are in the future to fully valorise.

Birovljev (2003) points out that family farming have a very important role in agriculture. Many years of family farms were and still are the real prospects for development. All government investment and the benefits were reserved for state farms, general agricultural cooperatives. The social sector is usually more efficient and more technologically advanced than the private sector.

Radmanović and Potrebić (2003) indicate that over the past few decades, agricultural policy of the Federal Republic of Yugoslavia, that is Serbia and Montenegro, was basically compatible with the agricultural policy of the European Union, for the development of productivity, income increase, stabilizing the market and consumer protection. However, the results are not as in the European Union, primarily due to low budgetary support to agriculture development. The paper presents parameters to illustrate the lag, but exact understanding, need further and more comprehensive analysis, including the parity price, income, and in particular, costs of production.

Despotović et al. (2004) indicate that in specific areas and, together for the development of agriculture, animal husbandry in the scope and value of production takes first place. Particular importance is that livestock, which utilizes the less productive land - pastures and meadows, which dominate the total agricultural land. This paper presents the status of cattle and sheep in the mountain - the mountain area of Montenegro, as well as the possibility of its improvement.

Lutovac (2007) shows the framework of agricultural and rural policy, as an important factor in generating economic development strategy of the municipality of Berane. The first follows a general overview, then a short speech about agriculture and the municipality of Berane situation in rural areas. The author stresses that agriculture, though still dominant in rural areas, however, can not provide the comprehensive development of rural areas of the municipality of Berane.

Rajović (2009a) consider climatic conditions for agricultural development. Climate of this area is temperate continental character. Combining the favourable and limiting factors, outlines three agro climatic regions which differ by level of benefits of climate conditions for the development agricultural. Also, the author makes the process of project development in organic agriculture and emphasizes that its planned

implementation can be achieved if it is effectively coordinate the project objectives, through: Establishment of institutions for certification of agricultural products through the establishment of facilities for primary processing of fruits, vegetables, herbs, wild herbs, wild fruits and the revitalization of derelict land and enlargement of agricultural lands.

Rajović (2009b) paper discusses agrarian change under the influence of depopulation and the comparative advantages and limitations for the development of agriculture in north-Montenegro, for example the municipality of Berane, Andrijevica and Plav. The author stresses that the considered area has a high degree of depopulation, which has contributed to a series of social changes, particularly the decline in agricultural production. In general crop production, is required to meet the needs of households and the lower part of the intended market. Something better results were achieved in livestock production which is mainly oriented to obtain meat and milk.

Rajović (2009c) deals with the natural conditions for development of agriculture north-eastern Montenegro. Indicates that the climate of this area is temperate continental character and are represented by two types of soil automorphic and hydromorphic with variations. Combining the favourable and limiting factors on the morphometric characteristics of relief, climatic and soil characteristics, the author singles out three areas that differ in the degree of benefits of natural conditions for agricultural development. Stresses, that investigated area has agricultural resources. However, contemporary and future use of agricultural resources requires a new approach that should enable the application of scientifically based methods to use in the process and in the process of its protection.

Pencil et al. (2009) provide an analytical overview of statistics of continental and subtropical fruits and perspectives of development of the agricultural sectors in Montenegro in the period (2002-2006). The authors suggest that the limiting factor for fruit production complex and require a meaningful revitalization in terms of introduction in the production of different types the produced new varieties of fruit trees for the northern, central and southern parts of Montenegro.

Četković (2009) analyzed the possibility of primary grain production in Montenegro. The author notes that in the mountain region of Montenegro, there are favourable climatic conditions for growing small grains. Specifically, the mountainous region has around 50,000 ha of medium deep and shallow soil on level plateaus and gentler slopes, which the rational fertilization and reclamation of natural grasslands can provide high yields of grass and forage crops, and considerable areas are suitable for spring wheat and can be mechanized processing.

Koprivica et al.(2010) suggest that the mountainous north-eastern part of Montenegro is dominated by livestock production, which predominantly takes place on

family farms. Crop production is organized in the function of livestock, and the goal is to get as much feed produced on the farm. Improvement in feed production and require better equipment appropriate agricultural mechanization.

The path from idea to realization, in this study was not clear enough, but burdened with many aggravating circumstances. Hope and faith, that the results of this study represent a contribution to the development of agriculture, gave us the strength to persevere until the final goal. We hope that these results will stimulate further, more profound study of this complex and important issues and that this research, to achieve its purpose and be of benefit to all those who want to learn about the topics of agriculture north-eastern Montenegro.

The current farm programs in northeastern Montenegro are not respected enough specific geographical conditions and a constellation of factors territorial development in the region. Development problems and rational agricultural system, they maintained all technical and scientific statements, with no possibility that any concrete action to implement. Agriculture has been blocked and moved to the logic of their powerlessness. And then a look now, we were able to rise above statement. Therefore, the conclusion that it is necessary to develop specific agricultural strategy for innovative regional policy, adapted to the mountainous regions, which was passed and the northeastern region of Montenegro (Grčić, 1991).

METHODOLOGY

Agrarian-geographical study of agriculture in northeastern Montenegro until now negligible attention was paid to. Activities in this area are basically reduced to a partial consideration of this issue at some scientific meetings and publications in the field of agriculture, quality control, management and others. The research aims at exploring the professional and general public with basic factors of intensification of agricultural production in northeastern Montenegro. Objective of this study could be achieved by the combined use of different research methods. The core of the methodological procedure used in this paper makes the geographic (spatial) method. Specifically, in terms of administrative-territorial belonging, northeastern Montenegro comprises three municipalities: Berane, Andrijevica and Plav. Application of statistical methods was necessary to collect data on the basic factors of agricultural development. Comparative method allowed us to social and economic factors of agricultural development through comparative look at municipal level municipalities: Berane, Andrijevica and Plav. Permeated through the entire text of the analytical method and, thanks to which we were able to identify, define and assess possible limitations of agricultural development. Since work has essentially synthetic character, the results published in the International literature. Among

them this opportunity to emphasize this Bryceson (1999), Scoones (2009). Sporton, Twyman, Thomas (2009), Murphy, Woodsb, Blackbu, Manus (2011), Constatin and Ciobanu (2011).

RESULTS AND DISCUSSION

Technical equipment of agriculture

As an important production factor and an element of fixed capital, machinery has an important role in agricultural production. Its importance has both technical and socio-economic character, as the tractors and agricultural machinery had radically changed life in rural areas and manner of soil cultivation - increased labour productivity in agricultural production and reduce costs. In the preparation period for the integration of our country to the family of European countries, the technical equipment of agriculture reflected the basic component, the functionality of the new agrarian structure. Replacement of worn-out machinery and provision of enough high-performance tractors and other modern agricultural machinery necessary for the farms (either directly or indirectly - through different forms of financing, cooperation and mutual assistance), is the determinant for the smooth and timely performance in Polish, and other papers, activities in crop and livestock production (Vasiljević and Subić, 2005).

If mechanization in agriculture, there is insufficient or poor quality, in the case of the considered space, the consequences can be reflected in the following: increased soil compaction, poor tillage, planting and care, mechanical damage to plants and fruit plants, increased losses in harvesting, farming operations run out the optimum date and "pollution" of land, water and air, harmful substances from exhaust gases or chemical protection (Group authors, www.poljoprivreda.info).

When considering, the problem of technical equipment of agriculture, in the north-eastern part of Montenegro, unconditionally must be borne in mind that statistics are almost anecdotal. They are, for each year, when results derived from the census of agriculture, just estimate. The data on farm equipment, means of work, the official statistical institutions over, and no. Thus, according to the Federal Statistical Office in Belgrade in 2000 in the municipalities of Berane, Andrijevica and Plav there were a total of 632 tractors, mostly low-performance tractors (Andrijevica - 61, Berane - 421, Plav - 149). Judging by the number of tractors, the degree of mechanization is low because of a tractor, comes 12 acres of arable land, from which it results, that it is irrational to invest in technical capacity of agriculture. It is not uncommon for individual households, and have several tractor because the tractor is very often used, as well as means of transportation (it involves a driver's license, lower class), but due to lack of spare parts. Specifically, the study the

municipalities, there is no action, supplied with spare parts for tractors, and also, there is no specialist service for the repair of agricultural machinery.

The causes of this, the technical equipment of agriculture, are numerous and varied. They can be divided into three groups: economic, social and psychological. In other words, the penetration of agricultural mechanization in the northeastern part of Montenegro, is conditioned by many factors, starting with: the price of assets, lack of social support through financing their purchases through the problems of their full utilization and fast amortization, up, up mentality - the personality of farmers - their habits, attitudes, beliefs and convictions.

Our research evidence, based on similar surveys, conducted by Group authors (1980), pointed out to the fore several important observations, ie. insight in the field, we came to several conclusions unfavorable:

- First, agricultural holdings are very modestly furnished the means of agricultural work,
- Second, the agricultural resources for the work, were represented in the traditional - Non-mechanical,
- Third, we note the presence of insufficient funds for the half-functional work (tractor, truck, mowers, binders and the like.) and
- Fourthly, much of the agricultural assets, used in joint ownership.

Among the means for soil were represented in a simple non-mechanical means (plow, plow), a mechanical, almost symbolically (tractor, mower). To make the problem even more, the majority has no plans in the near future, the purchase of these assets. The most common use of means of transport, with cars, trailers and trucks. Even worse situation, with the means of processing and processing of agricultural applicable product (threshers, shellers, Trier), respectively, for the mechanization of various processes in livestock production (milking, feeding, drinkers, etc.).. The quality of treatment, sowing and tending of crops affected, the yields and product quality of all plant species. It was found, is that poor quality tillage reduces yield by 15-25%, poorly performed sowing of 10-15%, and poor quality mechanical and chemical care can halve crop yields. Mechanical damage to plants during the performance of farming operations caused by not selecting appropriate machines or inappropriate use of influence on the yield of crops. It was determined that the yield of seed corn, because of damage to leaf mass, in removing the balloon, is reduced by 20-30%. Damage to fruit, in performing farming operations, resulted in lower yields and product quality. Damage occurs especially in harvesting, transport and finishing, especially in seed and vegetables. For some plant species, determined the birth defects of 25-35%. Losses of fruit when harvesting, as a result not perfection machine or a bad choice of modes, occurring in all plant species. Thus, the losses identified in wheat for 5%, seed

corn for about 7%, sugar beet, about 8%, and in some vegetable and over 20%, which is much more than the allowable value. Thus, throughout the production process and finishing products, machinery is a key factor in achieving higher yields, better quality and increased efficiency of agricultural production (Group authors, www.poljoprivreda.info). What is especially puzzling when we look at the quantitative relations, is the fact that (and at this stage of development of agricultural resources for the work in the subject area), farms, processed agricultural lands to their assets or borrow funds from a neighbour, or to different ways of coping.

For proper and complete understanding of the situation with these quantitative relations, according to Group authors (1980) should take into account qualitative factors such as level of economic development of the considered space, nature and configuration of the terrain, history, tradition and the like. It is interesting to analyze the specific correlation between the level of equipment of agricultural holdings means of operation and many other features. Among the most important factors that determine the level of equipment of agricultural holdings are: the number of active age household members, operating exclusively in the possession of (those farms which have more members have better, agricultural equipment), farm size, especially arable land (farms with more land possession are better equipped in farm machinery). "Food production, particularly on larger farms can not be imagined without the variety and quality of machinery. No successful production without modern machinery and its proper application. "(Group authors www.poljoprivreda.info). In the same way, affect the quality of arable land - property that is an important factor, is itself, the personality - "head of household, his level of education, activity, and the like. (the educated farmer, and if they work on their agricultural property, it is investing more in agricultural machinery).

In the opinion Kalezić (1976) the process of introducing modern agricultural machinery is conditioned by several factors:

- First, increasing the income of agricultural population, which is oriented to the plant or, animal production, or the realization of income outside the farm, would provide financial ability to purchase agricultural machines and tools,
- Second, employment in non-agricultural activities, has made the need to be this way "lost" manual labour, mechanical replacement, which has led to increased productivity and economic efficiency of agricultural production and
- Third, a new attitude towards personal work and own resources in agriculture, which should be established on new principles, and supported the initiatives of farmers and rural settlements.

Investment in processing facilities (drying) and storage will be viable only after ensuring sufficient quantity and

quality of raw materials (fruits, vegetables), for processing. The solution to this problem in terms of new and reconstruction of existing, outdated technology dryers, would ensure better placement, local products on the market and give impetus to further development of fruit and vegetables in the northeastern part of Montenegro, taking into account the favorable agro climatic and agro ecological conditions. As drying is a seasonal business, dryers in terms of rationality, must be universal, that is adjustable over a wide range of parameters (temperature, pressure, velocity), which would enable the drying and different plant culture (in addition to fruits and vegetables, mushrooms, herbs) (Karić et al. 2009).

We would like to emphasize, not looking extent of the analysis of all aspects related to the process of introducing modern agricultural machinery, that the intensity will be significantly determined by the degree of cost-orientation of production choices. Only if the overall economic measures, they created the conditions for complete use of agricultural machinery, one can expect satisfactory results in agricultural production, this part of north-eastern Montenegro.

The degree of agricultural mechanization in livestock production is very low. Specifically, forage crops with natural grasslands are usually naturally dried (hay). Grain feed (corn, barley, oats) are typically ground in mills, rarely using hammer mill. Using self-propelled motor mowers and mower trailers of tractors and power cultivators would speed up the natural mowing lawns. According to Koprivica and Komarčević (1996) to mow a hectare, it is 50 hours (five people per 10 hours), while the motor cultivator mower, you need only 6 hours.

For the protection of crops from diseases, pests and weeds are used hand and power sprayers. These sprayers are commonly used in fruit and vegetable production, and less frequently, to protect other crops.

Chemization in agriculture

Modern agricultural production is now inconceivable without Switch to chemicals, which are mainly used in food and plant protection. Industrial chemicals for agriculture are a key factor in ensuring the production, both from the standpoint of enriching the soil, and for the protection of plants against diseases and pests. The rapid spread of pests and diseases threatening agricultural production, and it is not possible to save without adequate protective equipment (Đerković,1992).

The role of manure in agriculture, not only reflected in the increase of nutrients, but also to improve the physical properties and the thermal regime of soil, restoring soil microflora and so on. (Manojlović, 1986). The use of natural organic fertilizer, has steadily decreased in the northeastern part of Montenegro. Less use of manure resulted from the decrease of cattle. For example, in

1994 we had 41,506 cattle, 4,264 pigs, 68,534 sheep, 92,261 poultry. In 2001, we have 29,992 cattle, 2,470 pigs, 44,352 sheep and 80,667 poultry. Drastically reduce the number of cattle not only have negative consequences for agricultural development, but also on soil fertility in general. For the production the manure is virtually irreplaceable. to improve the fertility of land and wealth. By reducing the number of cattle, also causes the reduction in the need to increase the area under forage crops is also an important crop that improves soil fertility and wealth - especially the cultivation of leguminous plants (Rajović, 2005).

Observations from the field indicate that in valley Berane, Andrijevića, Polimlje and valey Plav-Gusinje, natural organic fertilizer mainly used for gardening, a little fertilizer other crops. In contrast, the use of manure in rural areas is more evenly distributed on arable land. To some extent, natural organic fertilizers can be replaced by incorporated plant residues: straw, of corn mush, etc. "Plowing under crop residues increases the proportion of humus and nitrogen, improve water-air properties of soil, etc." (Šušić, 2000). However, in the northeastern part of Montenegro, these remains of agricultural crops, is usually burned of the amount of arable land.

"Mineral fertilizers, among all factors have the greatest impact yield, the order of 50% to 60%." It is believed that 1 kg of fertilizer provides the average grain yield by 3.0 kg, 4.0 kg of maize, potatoes and fruit, 6.3 kg and 15.0 kg of hay "(Stanojević, 1984). Due to the lack statistical data on the use of chemicals in agriculture, considered the space, we present data at the National Level. According to unreliable statistics, the agriculture of Montenegro, now consumes about 11,000 tons of mineral fertilizers. From this amount, the public sector spent 4.4, on a private 6.6 thousand tons. To 1 ha of cultivated land, spent 61 kg of mineral fertilizers, and by its consumption of mineral fertilizers Montenegro is about 56% below the world average, and about 3.7 times below the average for Europe. If we compare exercised by individual countries, then the lag is manifested in a more dramatic form. There is no country in Europe which, by the consumption of mineral fertilizers, was similar to Montenegro. Significant use of mineral fertilizers in Montenegro is still in its infancy, and it should be unconditionally intensify, given that, for now, there is no more powerful means to increase yield in agriculture (Đerković, 1992).

Obviously, if we take into account the chemical properties of soil in the northeastern part of Montenegro, the consumption of mineral fertilizers is low. Also, the land that is rubbish acidic artificial fertilizers, there is a process of acidification. Secondary acidity appears that the naturally acidic soils (pseudo colluvium), and the lands that do not have this property (eutric Cambisol, vertisoli etc.). Most appropriate measures to reduce soil acidity and fertilizer are calcification (Manojlović, 1986). Under liming soil mean cultural measure, which seeks to convert the acidic soil slightly acidic and normal. This

task is accomplished by introducing large amounts of lime into the soil. In determining the amount of lime needed to take into account the soil texture, presence of organic material and cultural tolerance of plants to lime. Funds for liming are finely ground calcium carbonate, marl, lime baked, slaked lime, saturation sludge and other means. The effect of liming on average lasts 6-7 years.

Application of pesticides in Montenegro is recent. The total consumption of pesticides according Đerkovića (1992), amounts to 315 tons. The most used pesticides-fungicides (75%), insecticides (20%), while a relatively small percent of the herbicides, although their use in developed agriculture took a big swing. From the review given to Montenegro, we can assume that the consumption of pesticides in the subject area, almost negligible. In terms of further opportunities to increase agricultural production, large reserves are hidden in the private sector, and whether they will be used depends on the economic position of farmers in the future.

On the field we observed, and in conversation with farmers to their lands in particular, threaten the weeds, blight - potatoes and weeds - corn. "Blight is a very dangerous disease of potatoes. If the protection fails or is ineffective, it can completely destroy crops. The disease develops in all organs, from the leaves, stem up to the tuber. Eliminates the preventive "(Milošević, 2000). "Some of the measures for the cultivation of maize (control of weeds, pests and diseases), preferably (cultivation, feeding, watering), and some are optional (harrowing, rolling, removing obstacles, deep-dusting) (Jovanović, 2000). According to Komljenović (www.agrofabl.org), the damage of weeds in agriculture, most frequently presented in the following forms: weeds on average consume more water than agricultural crops, the production area, blinds, lower the soil temperature (up to 2.7 ° C to 10 cm depth) and consume large amounts of plant nutrients, particularly potassium and nitrogen. Modern combat weeds includes a number of various control measures and they usually include: cleaning of seed, proper treatment of various wastes in agriculture, proper nurturing of manure and compost, cleaning farm buildings, yards and machinery, destruction of weeds on non-production areas. There is therefore a need for the agricultural advisory service, which would be farmers, before the elections, herbicides and other pesticides in agriculture, gave guidance and advice, use and protection.

Selection in agriculture

The process of introducing high-yielding varieties of crops and purebred livestock in agriculture considered space, proceeded with a delay compared to other parts of the country. The first foreign varieties (products, San Pastore ,...) and domestic ("profilike", "krusevacke" ,...) varieties

of wheat and maize varieties party upon (Wisconsin, Nebraska) is beginning to be introduced into agricultural production, in the late fifties and mid sixties century. However, only the introduction of local cultivars of wheat (serbian, victory, "studenica", ..) and local early and late varieties of corn, the yields per unit area increased. Since the seventies of last century, in addition to domestic production of maize, were introduced by the, mostly Dutch-Belgian varieties ("dezire").

The use of vegetable production more cost-effective and more productive varieties of vegetables, starting thirties of last century, when "old sleepwalker" replaces the so-called. mountain potato (Kostić, 1965). In addition to high stasnih (Bartin) and medium late varieties, white and red potatoes ("kenebek", "condor" ,..), which are grown in all parts of the studied area, the depression of Berane, Andrijevića, Polimlje and Plav-Gusinje basin, is characterized by early varieties of white ("Jerli", "Frisia" ,...) and red potatoes ("Cleopatra"). Significant changes to the varietal composition of other types of vegetables, are related to the cultivation of local varieties of tomato (jabučar, Balkans), pepper (white, peppers for pickling, cayenne pepper, "Macedonian"), and introducing high-yielding foreign and domestic varieties of cabbage, carrot, cucumber, onion and garlic and so on. Production potential of new varieties can be used only by applying the varietal crop management, training of producers and knowledge transfer in agriculture. The only compliance with the requirements of each genotype and mitigation of climate impact through cultural practices can create conditions for high and stable production. New generation of varieties of cereals have increased genetic potential for yield and quality, at a much higher level than the old varieties. The limiting factors of production are reflected through: environmental conditions, level of cultivation technology for user-producers or transfer of knowledge.

Long-standing desire of producers of vegetables was to obtain the highest possible yield, the larger the fruit, and thus better profits. Thus began looking for a solution that would contribute to greater marketability, and as a result came up, a trend toward. "Mini vegetables", that is, varieties that form a very small fruits. According to objective criteria (chemical composition), but also, and based on culinary properties (aroma, taste, smell), miniature vegetables exceeds the standard products, and in some species (tomato), the ability to store the fruit at a temperature of 15 to 20 ° C up to three weeks, significantly more than standard products. Bearing in mind that the commercial production of "mini vegetables, virtually at the outset, it is understandable that many technological processes, from harvest to the collection and processing, require a search for appropriate solutions. Thus, in some species, such as beetroot, apply a very thick sowing, to "prevent" the formation of coarse roots of carrots or sweet corn, used specially selected varieties with lighter fertilization and irrigation, etc.. A particular problem is the application of mechanization and



Figure 1. Area of the village Navotina - example of excellent use cultural practices in the orchard

processing of miniature fruit, since, in this, that the existing machinery and equipment to certain standards. In our country, the production of "mini vegetables", has not been widely accepted. Occasionally, in markets, and markets on offer found, "chery-tomato"(Đurovka, www.poljoprivreda.info). There are some indications of interest of some vegetable growers, the growing of vegetables and it is realistic to expect that it is more production.

Replacement of seedlings in orchards in this part of north-eastern Montenegro began in the seventies of last century, with the application of international quality varieties of fruit. In the considered area, are now represented by the local varieties of fruit: plums (Stanley, early cv.), apples ("Jonagold", "Idared",), and pear ("kaludjerka", "viljamova" ...), cherry, cherry, raspberry, strawberry, etc...(Figure1.)

Besides the autumn ploughing, fertilization is one of the most important cultural practices that need to be undertaken in the resting phase of fruit trees. Fertilization has a direct impact on fertility and soil structure, regulating the duration of the vegetation and the optimal growth of vegetative mass, enhances the resistance of fruit to low temperatures, diseases and pests, and contributes to better productivity and quality of fruits (Savić, www.agropres.org.rs).

The breed of cattle, are highly significant presence of race. In sheep dominated Pramenka, but lately I have more present and new, more productive breeds and their crosses with our Pramenka as vintenberg, Chios, carnelian). Bush prevails in cattle and domestic Spotted, derived from the cross drilled with Simmental breed. Simmental breed distinguished features: rapid growth of young animals and harmonious body structure, harmonized between production capacity for milk and meat, satisfactory fertility, longevity, very good use of forages and extraordinary ability of acclimatization. Sheep breeding, and we can say and cattle were the main branches of livestock. However, due to migration flows and disrupted the structure of the population, which peaked at the beginning of the nineties, a degree of development, when hunting from the early sixties, has been below any level of needs and possibilities of the considered prostora. The greatest presence in the

domestic pig has White Meaty and foreign breeds Landrace and Yorkshire. The pig has for centuries been a domestic animal that is kept in the backyard, aiming to provide household fat and meat, or, to use waste from households. After that, there is a period when the pig was kept as a by-product in the household, in order to use grains that could not be sold. The last 30 years, the changes are aimed at production of pigs for the market which resulted in improving the genetic base and housing conditions. "Today, the productivity of pigs, has reached a level which until recently was considered to be biologically limited. Per sow, per year to get 26 pigs, 1800 to 2000 kg of live action, 1450 to 1620 kg of carcasses and 900 to 1010 kg of meat "(Radović,www.poljoprivreda.info).

Crop rotation

Crop rotation, as a system of crop production, the spatial and temporal change of crops to more rational use of land and achieve optimum yield. Includes a time shift of crops (crop rotations), a replacement crop (agricultural change) and holiday shifts land . Weather fruit replacement crops or realized within the framework of crop rotation during one rotation, and the backbone are the main crops plodoreda. Spatial shift crops (rotation) means a spatial shift of crops by plodorednim fields. It is, realizes that, to all production areas (fields), the division in a number of rotation fields. From there, encourages, numerical designation of crop rotation (two field, field crop rotation, crop rotation cetera fields etc.). Rest area, should ensure its normal functioning as a substrate for growing arable crops. Spatial distribution of different types of crop rotations, determined by the size of farm, crop structure, intensity of crop production, etc. (Milojić,1984).For depression of valley Berane, Andrijevica, Polimlje and Plav-Gusinje, in areas of intensive agriculture, characterized by growing in monoculture of some crops (eg corn, peppers, green beans ..)(table 1.).

After several years in order to preserve land and soil, vegetable production is moved to another plot of land (due to fertilization and irrigation, land would be "spoiled

Table 1. Categories of crops in the rotation (Mihalić, 1985)

Crop marks	Crop Category	Time of sowing and ripening
Botanical-breeding	Annual	Last for only one vegetation
	Perennial	Take two or more vegetation
	Winter	Sowing of summer than fall. End up next year
Seasonal	Spring wheat	Sown after the winter (spring). End up in the summer of autumn
	Summer	Sow a flying late July, ripen in the fall
	Before the crops	Crop prior to the next crop
	The following crops	Crop that comes after the crop
	Over crops	Crops large habitat or are advanced in growth compared to the crop
Agro Technical	Protective crops	Over the crops that protect under crop initially growth (small grains in relation to clover)
	Under crops	Smaller crop habitat of the crop
	Subsequent crops	It is sown after the main crop from spring to autumn
	Cover crops	Interpolation can be a space, then under crop, or time then the subsequent crop
Agro-economic	Main	Crop that is most important in the rotation.
	Side	Crops are less important (additional)

Source: Komljenović, www.agrofabl.org.

") (Kostić, 1965). Growing crops in monoproduction, caused the spread of diseases, insect pests and weeds, and it was one of the main reasons for the introduction of crop rotation. Harmful organisms can completely disable production crops. Insects such as moths, rapeseed oil pipe, and lately corn rootworm (*Diabrotica virgifera* Le Conte), present a major problem in maize which is grown in production, which significantly limits its cultivation. In the re-cultivation of crops, many are spread weeds, and chemical control of weeds or not sufficiently effective, or worse, damage the crop due to accumulation of active substances in the soil. In addition, some weeds are becoming resistant to herbicides, which are used each year in the same area, which causes their strong expansion. To solve this problem, the only acceptable solution, the change of crops (Komljenović, www.agrofabl.org).

According to the stories from the village of Sveto Marsenić "Navotina", which is engaged in vegetable production by 1962, tomato-

eggplant, cabbage, green beans, cucumber and other vegetable crops, grow best with row crops (maize, potato) and small grains. After the alfalfa and clover, are usually grown potatoes and corn. "After several years in order to preserve land and soil, vegetable production is moved to another plot of land (due to fertilization and irrigation, land would be" spoiled ") (Kostić, 1965).

Vegetable growers in this part of north-eastern Montenegro, grown in one year and two or three vegetable crops on the same plot. In doing so takes care of the needs of some vegetable crops, manure for fertilizer. Usually after a cabbage, cucumber, eggplant, submitted directly fertilizing manure, spread the roots of

(onion, carrot, lettuce ,...). Mentioned vegetable , apply different variants five fields, six fields, seven fields crop rotation: clover-potato-potato-late cabbage-spinach-carrot, potato-potato-tomato-eggplant-tomato-corn, early potatoes late cabbage-corn-carrot-spinach, ...).

Thus, in the areas of crop production, crop rotations occur in multiple fields, in different variants. In the villages of the valley Lima grown are corn, wheat and sunflowers, as a monoculture or in combination. According Milojić (1984) as the only sunflower CULTURE unstable, it is not desirable to cultivate over the same grounds. In the mountainous regions of the studied area, narrowed the number of crops, while in the rotation, alternating small grains, corn and forage crops, and in some rural areas, and potatoes (the village of Kralje, Šekular, Skič ...).

Land melioration

Under melioration are considered measures to improve the physical, chemical and biological properties, and the thermal regime of soil. Thus, land reclamation in the wider sense, in addition to drainage, irrigation, flood protection and erosion, involves the conversion of agricultural land in neobradivih arable, improved arable land, use of organic and inorganic fertilizers (Vučić, 1979).

Creating new quality properties and characteristics of land, is realized by application of various improvement measures of physical and chemical properties of soil and land protection measures. In addition to deep plowing and undermining, repairing water - air properties of soil contributes to the use of organic and mineral fertilizers,



Figure 2 The village of *Gnjili Potok* - valley meadows "Lomovi" is ready for mowing (with the use of agricultural work, hay yields increased 1.1 t / ha

introduction of legumes and grasses in crop rotation, etc.. Lasting effect in improving the physical - mechanical properties of soil have measures geared to improving soil structure. Their essence is to encourage the creation of granular aggregates as the best form of soil structure. For this purpose, apply classification, which is achieved by coagulation of colloid and education microaggregates (Čirić, 1991).

In the analysis of natural features and genetic characteristics of soil types in the northeastern part of Montenegro, points to the poorer productive characteristics of individual soil types (Rajović, 2009b). On water permeation basic substratum, in terms of arid climate of the considered space, the problem of retaining soil moisture, it is pronounced. This is especially true of alluvial soil, the gravel-sandy ground, which as a drain, "emphasizing the dry soil, capillary water break, at the time the gravel-sand layer, it is not enough saturation groundwater" (Čirić, 1991). Sandy alluvial soil composition, poorly kept and poorly stored water. On the other hand, soil that has a heavier texture, ie. those that contain a higher percentage of clay, tend to leak water. It absorbs less water, but it is quite well kept. Therefore, in the spring of sticky and tough enough to handle, requiring the application of powerful machinery, processing. A typical representative of these soil properties is smonitsa. Educated at the lake sediments, flattened and slightly inclined surfaces, the observed area (the foot Petnjik, Budimlje, Police, Velike, Ulotina). These properties cause water to permeable soil with good air conditions, a waterproof (clay) bad air conditions. Both these features can be overcome by deep plowing and timely, with the help of tractors and machinery. And in Berane basin regularly does, wherever these have been developed soil types.

In the cultivation of agricultural land reclamation measures are applied, in order to improve agricultural land and properties for creating and maintaining a water-air regime of soil. Drainage systems are being built in rule in the process of consolidation and apply to the choice

agricultural areas of priority, ie, the use of irrigation systems, mainly related to quality agricultural land (first and second class bonotetne) (Katić and Simonović, 2007). First land capability class in the subject, represented in valley Berane, Andrijevića and Polimlje. They are developed on drier positions in the alluvial plain Lima, Lješnica, Brzava, Kaludarske and Dapsicka River, and the left side of Lima, upstream of Andrijevića (between Luga and Murina). Other land capability class occurs in Plav - Gusinje basin, Andrijevića valley and the lower terraces in the valley of Lima Berane valley on its right bank (Rajović, 2009b).

Melioration pastures in the north-eastern part of Montenegro, would improve conditions for cattle and would concern mainly on agro-technical works about cleaning the ground, fertilizing and spreading grass seed. It is necessary in this regard, the elaboration of projects for the establishment of meadows, which should be referred to appropriate cropping works with the main objective yield of fodder crops. The total capacity of livestock, limited pasture and meadow the land (50,048 ha) and yield of hay. Average hay yield per unit area of year 2000 amounted to 0.7 t / ha. Intensifying the production of hay, using cultural practices (irrigation, fertilization, meadows and pastures, etc..), Can significantly increase the number of sheep and cattle (Rajović, 2005)(figure 2).

Protection of soil erosion

Soil erosion is washing and removal of the finest and most prolific loose particles from the substrate. Besides natural factors on the erosion effect and man, inappropriate use and land cultivation. Decades of research have led to this, to develop various methods to prevent erosion. Protection measures include: maintaining adequate vegetative cover, planting trees, do not use the land for grazing (interim measures), construction of dams (barriers) that prevent the water that flows into the ditches.

Table 2 The coefficient of erosion hazard in some agricultural crops, according A.P. Verhevenku

CULTURE	Coefficient
Onion	1,00
Corn	0,85
Potato	0,75
Spring wheat	0,50
Peas	0,35
Winter wheat	0,30
Perennial crops:	
1. First year	0,08
2. Second year	0,03
3. Third year	0,01

Source: Narcisov V P, 1976.

The main reason why is lost and reduces the space of farmland, primarily erosion. Erosion only in this part of north-eastern Montenegro, of the total area agricultural and forest land, according to the Municipal Secretariat for Economic Affairs, was attacked about eighty thousand acres. Combating erosion and flash floods should be taken seriously, because we are dealing massive damage. The considered area is one of the region, who are vulnerable erosion. This best confirmed the fact that some regions, completely lost cover. Deo's responsibility borne by the many facilities for the defense of torrential floods and erosion, which are built, more than forty years, and from today's point of view of design elements with inadequate protection, and preventing erosion.

Analysis of land is one of the most important process of land protection, which means that the analysis of land can obtain information on proper fertilization, the type and amount of fertilizer and time of their application. This measure leads to a significant rationalization of the use of fertilizers in relation to the considered area, which is mainly represented fertilization without previous soil analysis. Basic fertilizer in addition to serving for nutrition products, and serve to build the soil, to improve the physical, chemical and biological properties. If the basic fertilizer by type and quantity of use in order to achieve significant qualitative changes in properties of soil fertility, permanent action, then get fertilizer character and amenity are talking about applying ameliorating fertilization and is usually performed on poor soils and normal to abnormal soils. On normal soils poor in order to fund a larger provision to feed, and the abnormal area in order to improve the physical, chemical and biological properties (www.serbian-online.se).

Measures to protect soil from erosion necessary, on all devastated and sloping surfaces of the considered space, regardless of the nature of use. The erosion of individual soil types are different. Determined by the nature of the substrate, the size of the slope, degree of

forestation, the way of processing and so on. Erosion is the most endangered arable and productive soil layer in valley Berane, Andrijevica, Polimlje and Plav-Gusinje. In addition, the flush of colloidal particles increases acidity land, lower humus, leached nutrients, which, in general, reduces the effect of agricultural practices. Increased the rate of erosion processes on slopes affected by how the use of arable and grass areas. Specifically, erodibility is determined and the plants that are grown on agricultural land with a slope. Intense erosion processes on land under row crops, and less pronounced in soils under steep grains, grasses and legumes (Narcissus, 1976). In the northeastern part of Montenegro, intensive erosion is especially present in early spring and late autumn, when vegetation cover provides minimum protection and land when the number of rainy days the most.

Basic measure of protection against erosion, appropriate treatment and sowing of agricultural land on the higher slopes. It is believed that the slopes over 6 °, must be performed contouring and planting of agricultural crops (Filipović, 1978). On agricultural land and slope, can be partially affected by terracing and melioraciom physical properties of soil. Therefore, the key to erosion control, lies in how land use and management system (Ćirić, 1991).

In addition to contouring and planting erosion on agricultural land, reduced agricultural crops with a low coefficient of erosion risk (Table 2). Growing crops with a low degree of erosion hazard and the introduction of crop rotation, small grains, grasses and legumes significantly reduces the negative impact of erosion on agricultural land. The intensity of erosion processes in the pasture decreases undersowing (Šušić, 2000).

Administrative measures (prohibition of growing row crops on agricultural land on slopes, the prohibition of plowing crosswise of the base, the prohibition of the use of degraded pastures for grazing, afforestation and catchment affected by erosion, plants provided for was

Table 3. Hydrothermal coefficient Seljaninov for months in the growing season (Limits for drought index that determines the need for water: < 20 - Irrigation is not necessary, 20 - 30 - irrigation justified; > 30 - Irrigation is not necessary (Vasić, 1979))

Station	Elevation	IV	V	VI	VII	VIII	IX	V.P.
Berane	670	1,6	1,0	0,8	0,7	0,7	0,9	0,9
Plav	908	2,3	1,3	1,1	0,9	0,9	1,3	1,3

Source: Republic Hydro meteorological Service of Montenegro, Meteorological year (respective year).

melioration, construction works for the protection of streams and rivers regulation primarily Lima), in valley Berane, Andrijevica, Polimlje and Plav-Gusinje, would reduce the intensity of erosion. In the northeastern part of Montenegro, agricultural land with a slope over 12 ° degrees are not suitable for arable land, but the terraced and grass land areas, should be grown fruits.

The level of protection from erosion little has been done, primarily to resolve torrent, reforestation, land reclamation of pastures. Made small antierosional measures, but it takes a lot to be done especially in the upper, steeper part of the watershed Lima. Should pay attention to the uncontrolled and unplanned felling of trees in recent years (eg, cut down the poplar wood Luge as a significant resource and defense of billowing Lima), which can cause activation of erosion in this part basin. Berane is one of the first municipalities in the north-eastern part Montenegro, which has acceded to solve flooding problems in the urban area of Lima and to the construction of gabion protection. During the construction of shore-fort at Budmlje words and Bistrica. Field observations indicate that the fight against erosion in the subject area, mostly caused by the abandonment of arable land on slopes. Because of the departure of agricultural population in urban areas and the inability to use modern machinery, many fields on the outskirts of Berane, Andrijevica, Polimlje and Plav-Gusinje valley had been abandoned. All these reasons, as well as reduction in livestock, led to the abandonment of pastures. On former arable land and pastures, has developed bushy and forest vegetation, or are these forested areas.

Irrigation of agricultural areas

Irrigation involves bringing water into the soil, the period when crops need, and the soil is not sufficiently. In addition, irrigation has special significance for the stable production of agricultural crops. The total rainfall during the growing season and its distribution by months, and the average value of hydrothermal coefficient Seljanovo (HTK) and potential evapotranspiration (PET), show the need for irrigation in agro terms of the northeastern part of Montenegro. The greatest need for watering crops are in July and August, during the period when the minimum

flows in rivers. Temporal distribution of the available amount of water is unsuitable for agricultural purposes. Also, unfavorable and spatial distribution of available water navodnjavanje. Vrednost hydrothermal coefficient during the growing season at the meteorological station is 0.9 Berane, Plav and 1.3 (Table 3).

Benefits for agricultural irrigation in the subject area are different. In the first place are determined by the amount of available water, predisposition morphometric, morphological, physical and chemical properties of soil types.

In relation to the morphometric characteristics of the relief the most suitable area for irrigation in the northeastern part of Montenegro is part of depression. Slopes parties determine how the irrigation of agricultural land. "For example, irrigation overflows can be applied to agricultural land, whose slope is less than 3°, while on the slopes of 3° - 6° using artificial rain, drop by drop and subrigacija, to take adequate measures antierozivnih (Čolić, Pavićević, 1962). Irrigation of agricultural land with a slope over the previous 6° requires terracing.

Therefore, the most suitable facilities for irrigation are related to the region alluvial plain rivers, river terraces, lake sediments Berane, Andrijevica and Polimlje and valleys. These are the spatial areas with slopes of up to 3 pages about and unexposed exposures in which the possible use of so-called. complete line of machinery for certain agricultural crops. On the river terraces as the dominant soil types of different production possibilities arise: eutric cambisol, pseudo and amphigley. Under the district that includes Plav-Gusinje valley has similar morphometric and soil characteristics as the previous podrejon. It is characterized by altitudes up to 948 m above sea level and slope to 3°. So, here is the possible use of so-called complete line of machinery for certain agricultural crops. The predominant soil type is fluvisol, locally present distric Cambisols, eutric Cambisols, podzol, planohistol (Plav Lake). Different varieties eutric cambisol enable fruit production. This discript II belongs to the class, so called very suitable land for agricultural production.

It is important that the irrigation of crops, receive a uniform amount of water with minimum losses. This can be achieve by applying appropriate methods of irrigation, the most important: surface irrigation,

Table 4. Approximate number of irrigations and the amount of water needed for some vegetable crops in m³ / ha

Vegetables	Number of irrigations	Of water content	
		One irrigation	TOTAL
Tomato	6 – 8	400	2400 - 3200
Peppers	10 – 12	400	400 - 4800
Industrial peppers peppers	6 – 8	300	1800 - 2400
Eggplant	10 – 12	400	4000 - 4800
The cabbage	5 – 7	300	1500 - 2100
Late Cabbage	6 – 8	300	1800 - 2400
Leek	7 – 8	250	1750 - 2000
Salad	3 – 4	250	750 - 1000
Spinach	2 – 3	250	500 - 750
Radish	1 – 2	250	250 - 500
Carrot	5 – 6	300	1500 - 1800
Green beans	4 – 5	300	1200 - 1500
Peas	3 – 4	300	900 - 1200
Cucumber	7 – 8	300	2100 - 2400
Zucchini	5 – 6	300	1500 - 1800
Melon	1 – 2	400	400 - 800
Potato	2 – 3	300	600 - 900

Source: Popović, 1991.

underground irrigation and sprinkler (sprinkling). Each has its advantages and disadvantages that come into play, depending on the economic, production and soil condition (Ćirić, 1991).

Required size of irrigation water depends on rainfall, evapotranspiration, soil properties, application of cultivated vegetable crops (Table 4). Specific amount of water should be provided in the second half of the growing season, when many crops are in the final stages of vegetation development, and then have increased demands for moisture (peppers, green beans, squash, etc.).

The most prevalent form of irrigated arable land in this northeastern part of Montenegro, is related to the use of sprinklers, water guns, hand and motor pumps. These technical means, with less water, good soil and watering vegetable crops allow more efficient use of water.

CONCLUSION

Agriculture, as one of the most important components of economic development of the considered space, starting from the beginning of the sixties suffered a lot of negative impact because the period of industrialization in the last fifteen years of isolation, the social and economic crisis and lack in the long run economic development strategy, stopped its social, Technical and Technological Development (Rajović, 2010). The results of analysis of

the current situation suggests the following conclusions:

First, according to statistics in the municipalities of Berane, Andrijevica and Plav it was in 2000, a total of 632 tractors, mostly low-performance tractors. Judging by the number of tractors, the degree of mechanization is low because of a tractor, comes 12 acres of arable land. Agricultural holdings are very modestly equipped agricultural resources for the work. Among the agricultural means of work, were represented in the traditional - Non-mechanical. We note the presence of under-half-functional resources, and much of the agricultural assets, used in joint ownership.

Second, the use of natural organic fertilizer, has steadily decreased. Less use of manure resulted from the decrease of cattle. For example, in 1994 we had 41,506 cattle, 4,264 pigs, 68,534 sheep, 92,261 poultry. In 2001, we have 29,992 cattle, 2,470 pigs, 44,352 sheep and 80,667 poultry. Drastic reduction in livestock numbers, not only has negative consequences for agricultural development, but also on soil fertility in general. For the production the manure is virtually indispensable in improving the fertility of land and wealth. The use of fertilizer is still in its infancy, and it should be unconditionally intensify, given that, for now, there is no more powerful means to increase yield in agriculture.

Third, the process of introducing high-yielding varieties of crops and purebred livestock in agriculture considered space, proceeded with a delay compared to other parts of the country. The use of vegetable production more cost-

effective and more productive varieties of vegetables, starting thirties of last century. Replacement of seedlings in orchards, started in the seventies also the last century, with the application of international quality varieties of fruit. The limiting factors of production are reflected through: environmental conditions, level of cultivation technology for user-producers or transfer of knowledge. The breed of cattle, are highly significant presence of race. In sheep dominated „Pramenka“, but lately I have more present and new, more productive breeds and their crosses with our cattle „Pramenka“. In Bush prevails and domestic Spotted, derived from the cross drilled with Simmental breed. The largest presence in the domestic pig has a white fleshy and the breeds Landrace and Yorkshire.

Fourth, crop rotation, as a system of crop production, the spatial and temporal change of crops to more rational use of land and achieve optimum yield. Scope, time shift crops (result of shifts), a spatial shift of the crop (farmers shift) and home land. Spatial distribution of different types of crop rotations, determined by the size of farm, crop structure, intensity of crop production. In rural areas of the valley Lima grown are corn, wheat and sunflowers, as a monoculture or in combination. In mountainous areas, narrowing the number of crops, so it turns in the rotation, small grains, corn and forage crops and potatoes.

Fifth, we mean under the melioration measures to improve the physical, chemical and biological properties, and the thermal regime of soil. Creating new quality properties and characteristics of land, is realized by application of various improvement measures of physical and chemical properties of soil and safeguards. In addition to deep plowing and undermining, repairing water - air properties of soil contributes to the use of organic and mineral fertilizers, introduction of legumes and grasses in crop rotation, etc.. Measures to protect soil from erosion necessary, on all devastated and sloping surfaces of the considered space, regardless of the nature of use. The erosion of individual soil types are different. Determined by the nature of the substrate, the size of the slope, degree of forestation, the way of processing and so on. Erosion is the most endangered arable and productive soil layer in Berane, Andrijevića, Polimlje and Plav-Gusinje valley. In relation to the morphometric characteristics of the relief the most suitable area for irrigation in the northeastern part of Montenegro, has deo. However depression, the greatest need for irrigation of agricultural crops are in July and August, during the period when the minimum flows in rivers. Hydrothermal coefficient value during the growing season at the meteorological station is 0.9 Berane, Plav and 1.3.

In the preparation period for the integration of our country to the family of European countries, the technical equipment of agriculture reflected the basic component, the functionality of the new agrarian structure. As an

important production factor and an element of fixed capital, technical capacity of agriculture plays an important role in plant and animal production. Replacement of worn-out machinery and provision of enough high-performance tractors and other modern agricultural machinery necessary for the farms, is the determinant for the smooth and timely performance in Polish, and other agricultural papers, activities in crop and livestock production. Just as agriculture is considered the space can become an equal partner with other sectors of the economy and justify its primary role and economic importance.

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