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КАТЕДРА „ГЕОГРАФИЯ И МЕТОДИКА
НА ОБУЧЕНИЕТО ПО ГЕОГРАФИЯ“

ТРЕТА МЕЖДУНАРОДНА НАУЧНА КОНФЕРЕНЦИЯ „ГЕОГРАФСКИ НАУКИ И ОБРАЗОВАНИЕ”

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"KONSTANTIN PRESLAVSKY" UNIVERSITY OF SHUMEN
DEPARTMENT OF GEOGRAPHY AND METHODOLOGY OF TEACHING GEOGRAPHY

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CONSTRUCTION AND MEANING MICRO RESERVOIRS FOR AGRICULTURAL DEVELOPMENT IN THE MUNICIPALITIES OF PRILEP, DOLNENI AND KRIVOGASTANI IN MACEDONIA

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Abstract: *In a paper being processed for chapters: the environment and climate elements as a factor for the construction of micro reservoirs, selection of locations where they can build micro - reservoirs, a short description of all built artificial micro - accumulations by municipalities, use of micro - as reservoirs disperse, producing electricity for the development of fisheries, recreation population, erosion protection, flood protection and environmental protection.*
Keywords: *Climatic elements, locations, purpose.*

INTRODUCTION

Mountainous areas in the municipalities of Prilep Dolneni Krivogashtani account for about three quarters of the total area of the municipality. Only about a quarter of the area is located in the flat part of the Pelagonia. In the mountainous part of the three municipalities are 63 villages. One reason for the construction of such a large number of mikroakumulacii 574 and 18 are already built on the one hand and favorable: climatic, geological, morphological conditions and the other by way of extensive use of arable land in all three municipalities together amount 35759ha cultivation, 2568ha meadows, pastures 50077ha, 25784ha forests, fertile land or total 11837ha expressed in all three municipalities is 126025hk and it's extensive agricultural livestock production.

Given the large areas under cultivation, meadows and pastures need to provide only water and to be able to realize higher production. It also gave a brief description of mikro reservoirs that have already been built in the municipalities of Prilep and Dolneni. By constructing an imaginary 574 micro reservoirs and possible accumulation of more than 40 million m3 of water will provide conditions for irrigation of more than 20 thousand (ha) of arable agricultural area or about 60% of the area of oranicata. If you build these micro reservoirs we will get another plain size 20000ha. It should be noted that this will create conditions for intensive agriculture and livestock production in these municipalities and increasing agricultural and livestock production will create very favorable conditions for the development of the food industry. This is especially true for Prilep, Dolneni Krivogastani.Also note and broad significance of such mikroreservoirs disperse the goods, power generation, development of fisheries, livestock development, recreation population and tourism development, erosion protection, flood protection, for environmental protection and others. This creates very favorable conditions for the development of mountainous areas in all rural communities, for the return of the inhabitants of the villages in these municipalities. Construction of mikro reservoirs should have priority according to the aforementioned should have accelerated the pace of construction of 30-50 mikro reservoirs year.This will allow more food production for the population as well as the markets in our country and abroad. Water is life and livelihoods of the people, and the food is a source of energy. As a matter inconceivable that life is a fundamental and unique factor in the development of the economy, it significantly contributes to the maintenance and improvement of the environment and the available quantities of usable water dependent: agriculture, industry, energy, life and health. The basis for the development of agriculture in the three municipalities: Prilep Dolneni Krivogastani is the construction of small reservoirs. Agricultural areas in the mountainous areas of the three municipalities primarily refers to the higher parts of northern Pelagonia valley, then Mariovo part in Trojachkata valley with Nagip more quickly and naturally and drainage through the summer because they suffer most low-water development of crops. The problem with the irrigation water is quite evident so that there are no conditions without irrigation development as agriculture and cattle breeding, etc..

As a consequence, many villages are almost more than half the displaced tend to further eviction and discharge in those areas. In these areas there are water management solutions for utilization of available water for irrigation and other uses. It is necessary to consider the possibilities for building mikro reservoirs to realize their individual and total capacity and opportunities for irrigation in all three municipalities. Besides the primary purpose of irrigation mikro reservoirs need to consider other possibilities and purposes as the construction of sozdavaaat mikroreservoirs development: animal husbandry, fisheries, recreation, as disperse goods and game protection and improvement of the environment. All this shows the importance and the role and purpose of mikro reservoirs. If we experience the United States, has already built more than a million man-made reservoirs, Italy and it points out the need to build a small mikro reservoirs in arid hilly and mountainous areas and in general to pay more attention and to create conditions for faster and more massive dams and mikro reservoirs.Given that micro reservoirs are located in the mountainous areas in the valley narrowed places avoiding terrain with great lows, the topographic position, the geological structure of the terrain, the material properties, climatic elements and direct and indirect users of water.

1. CLIMATE AS A FACTOR FOR CONSTRUCTION OF MICRO RESERVOIRS

The theory of the five municipalities are characterized by different values of meteorological elements and phenomena. Different values of climatic elements resulting from spatial or natural conditions. According to geographical location all three municipalities included in warmer zones in the country as we are in its southern part. In fact, the warm Aegean Sea three municipalities are within 70 km (straight line) and did not rule out the influence of the sea on the climate. The territory of three municipalities are located at higher altitude (average between 650-680 m.) Where the influence of warm air masses from the Aegean Sea has significantly less value. Average high and high mountains that enclosing the area of all three municipalities have shaped the climate, and there appears specific climate very different from the climate in other parts of the state.

In particular in the area of his flat during the year occur years with extreme temperatures: summer with absolute temperature of + 40 ° C as a result of the creation of the lake warm (tropical) winter air while the absolute minimum of -30 ° C, resulting from cold lake air. So, the temperature amplitude during the year can range between 70-80 ° C, which is a characteristic exclusive to where Pelagonia and Prilep field within which are Prilep, Dolneni Krivogastani. Data on climate elements are taken from existing meteorological stations in all three municipalities: Prilep, Pletvar, Brailovo, Slepce, Strovija Debreste, graft, Bonce, Beshishte, Vrpsko, Dunje, Chanishte, Nikodin and Carevik.

a) Temperature of air

Temperature is one of the most important meteorological elements. Besides cloudiness, temperature affects the structure and rejlefnata, altitude, vegetation and more. For these reasons, there are significant differences in the changes in temperature between the heights and the horizontal direction, as there are differences in other parts of the state.

The height temperature falls, as a rule, every hundred meters to 0,39 ° C. The mountains in the area of the warm Mediterranean climate have increased annual temperatures and less fluctuation of temperature with height. Daily fluctuations in the temperature of the surrounding mountains is less than the difference in Prilep field. The largest differences in temperature between the mountains and the plain in all three municipalities appear in early spring months, because then most of the solar energy is used for melting snow on the mountains. The coldest month of the year is January with mountains of -8 ° C and 0.3 ° C in the valley section. The warmest month is August and the mountains of the 22.3 ° C, and in plain 22.6 ° C. Average January zero isotherm in the area is located at a height over 400 meters. Izotermata below -2 ° C on slopes higher than 1000 meters. izotermata and over - 4 ° C at altitudes of 1450 m. The average in July isotherm below 20 ° C occurs on slopes that lie above 600 m., And izotermata below 10 ° C extends into parts that lie above the height of 900 meters. Izotermata and 5 ° C below the terrain height above 1800meters.

b) Precipitation

Precipitation of importance, not only as a meteorological element but their significance is beyond the biosverata. The distribution of rainfall during the year is different. The surrounding mountains fall precipitation amounts greater than kotlinskoto level. In fact, the amount of precipitation depends on orografijata, altitude and the impact of the Aegean Sea. The annual amount of precipitation increases with proper height. The average annual value is around 56mm. every 100m. height. In all three

municipalities over the past 50 years appear two peaks of precipitation, such as: summer peak in June, in the mountainous part is 83.1 mm., And a minimum of rainfall in winter-February in the mountainous part of 36.1mm., And in the plains of 29.0mm., and August in the mountainous part of 39.7mm., and July in the plains 32.4mm. During the vegetative period (April to October) in the mountains fall 350.6mm total., And in the plains 308.1 mm. This amount is insufficient and need artificial irrigation, and this is achieved by constructing micro reservoirs which will irrigate arable land and pastures in mountain and lowland part of the territory. The annual amount of precipitation in the mountains is 662.4 mm., And in the plains 499.1 mm.Precipitation type is divided against rain and snow. Greater participation in the rain. Of this kind are particularly unfavorable rainfall heavy, which can cause significant damage to agriculture. The overall annual amount of snow accounts for different representation depending on the altitude. For example, to 400m., Participation in the annual snow precipitation amount is 10%, and the heights of 1500., More than 30%. First Snow occurs in the first half of November, and the last in mid-April.

The frequency of days with snow roof is different and it is between 30 to 80 days plain to the mountains and heights of more than 1700., Snow cover lasts up to 90 days and more. The thickness of the snow cover is different and ranges between 30 and 100sm., And in some places reaches up to 2m.

Regarding pluvio meter mode can say that the area is characterized by a transitional regime, with maximum rainfall in spring and autumn and winter and minimum in summer.

v) Winds

Winds represent quite important meteorological element, since they depend on other climatic conditions. Due to the configuration of the field on the territory of three municipalities usually winds blow from northeast direction. Northeast blowing throughout the year, and the maximum is in July and August. The maximum speed of the wind is 22.5 m / s. South west wind is most common in the spring months and its speed reaches 22.5 / s. The frequency of silences is marginally 438. Silences are most common in the winter of the year, which is the reason for creating a lake with cold air.

g) Other weather events

Besides air temperature, precipitation and winds: insolation, cloud cover, fog and city. According to the importance of the topic that pushes you say something about the cloudiness and insolation.

- **Insolation:** The duration of the solar glow depends on cloud structure and relief. The annual amount of sun shine around 2140 hours. Maximum occurs in July (from 300-350 hours) or daily average of 10-20 hours, and the minimum in December of 55-100 hours, with an average daily glow 2-4 hours. In the plains insolation is 266 hours while in Prilep field along the solar glow is 2263 hours.
- **Cloud:** cloud as opposed to the emergence of insolation, ranging between 4.3 to 5.7 tenths. Maximum in winter and up to 7.4 tenths, and in the summer months there is a minimum and it is from 73 to 123, and cloudy from 70 to 130 days, and moderately cloudy from 112 to 216 days.

d) The technical construction of relief

The territory they occupy three morphological municipalities belong to the transitional zone between Sharskata and Rodopi zone. The mountains that comprise Prilep field have generally different composition. Marko's Towers, boxwood and Zlatovrv is composed of gneiss and granite-granodiorit adamelit. The highest parts are the remains of gneiss, and at times appear as strings of flint and shale biotipni. The rocks of these mountains are of volcanic origin. To the east of Zlatovrv is dolomiten crystalline marble, and under it has layers of gneiss. Mountains and Selecka Babuna are composed of gneiss, and the mountain is composed of Bushova metamorfisani shale. The mountain Dautica meets metamorfisan limestone marble. Bottom of Prilep field is composed of freshwater and aluvium works for lake stage. The surface that was located on water-formed mineral wetland soils of which occurred later smolnicite.

Later rivers that flowed in the field of material brought sediments and soils in the lower part were zatrupuvani River alluvial and diluvial on the rim with drifts. On the rim of the field where developed gneiss and granite-gneiss, brings together the smaller and larger parties Georgia. It has around the town of Prilep. In Mariovo appear volcanic rocks and presence of ore. The soil of this mountain region is shallow and rocky, with the exception of the few places near the Black River where they found alluvial sediments.

Raechkata valley is mainly composed of limestone and river despite Raechka formed alluvial soils. Relief in two municipalities: Prilep Dolneni mainly mountainous, while the municipality Krivogastani part of Dolneni is plain.

2. Choice of location for the construction of micro reservoirs

The construction of small earthen dams and the formation of micro reservoirs can be performed only on favorable terrain. When choosing locations for the construction of micro reservoirs should be evaluated on the ground both in terms of morphology and topography of the area and also in terms of determining quality material for construction of the dam, are located near the dam and it is important drzhlivosta of a water surface area of accumulation, silt and forestation zatrevenosta the basin etc.. When determining the location of the dam and its height or size of the accumulated space should be taken into account the size of the watershed. Small reservoirs are usually constructed of small water courses, where there is an optimal ratio between the catchment area and volume of the reservoir that forms. Avoided locations of dams with large catchment area because they are very large and expensive, while the duration of the life of the reservoir is short, as will quickly fill with sediment. In such cases provided for in the catchment area to build more reservoirs so small relative to the size of the catchment area in km^2 according to the volume of the reservoir in a hundred thousand m^3 usually does not exceed 1.0, and sometimes can amount up to 2.0. Most of the projected and constructed micro reservoirs for irrigation. The three municipalities are no conditions for the construction of 574 micro reservoirs, which the municipalities would be distributed according to the following schedule: the municipality Prilep conditions for the construction of small reservoirs in the following towns:village. Dren 6 Gudjakovo 8 Veprcani 18 Chanishte 14 Krushevica 20 Dunje 29 Beshishte 13 Monastery 3 Vitoliste 21 live 9 Coil 14 Peshtani 11 Kokre 21 Polchishtre 4 Vrpsko 6 Lopatica 8, 13 Bonce , Kanatlarci 3, 11 lettuces, Sheleverci 2 Smolani 9 Carevik 7 Little Radobil 5 Nikodin 29 Toplice 6 Oreovec 15 Trojaci 14 Large Radobil 7 Chest 4 Pletvar Lenishte and 10, white rooms in 19 Markova Fountain 3 Stone 6 tent, a hamlet 4 Prilepec 3 Vucidol 10 Chumovo 5 Shtavica 8 Small Ruvci 8 Dabnica 7, 10 and graft in the calculation of the area of the municipality provided data only on villages and it is for 59 settlements 1043.8 km2 of which goes to 36957 ha of arable land, pastures 41,024 ha and 18,820 ha forest. The municipality also Dolneni conditions for the construction of small reservoirs in the following villages: Desovo 3, two of which are built Slepce 13 Brailovo 7 Drenovci 5 Nebregovo 16 Upper Village 7 Debreste 10 Rilevo 5 Zrze 8 Cauchy 5 Strovija 14 Gostirazhni 15 Crniliste 6, 7 and Dolgaec Margari 5 it is important to note that the village Brailovo built a micro accumulation, while the municipality Prilep built in graft 4, Pletvar 4 Belovodica 2 Vucidol 2 artificial lake Prilep. Municipality Dolneni comprise 35 villages with a total surface area of 385.7 km2 of villages, where arable land is 19,443 ha, 7700 ha of pastures and forests 2.8 ha. Krivogastani municipality has 13 villages with a total surface area of the villages of 80.7 km2, of which arable land is 6217 ha, 253.2 ha of pastures, forests and 35.5 ha. In this municipality since orografijata the ground not provided artificial reservoirs.

3. PURPOSE MICRO RESERVOIRS

3.1. Micro disperse accumulations as

In mountainous areas of the municipalities of Prilep and Dolneni in the summer months of June, July, August and September will not only water but no water irrigation and watering of livestock. Whole flocks of sheep are made after the extra mile to supply goods or moving to areas where there is water, while cattle are worn by village wells, fountains. In such cases micro reservoirs built for irrigation will serve both for watering livestock. It is therefore necessary to build reservoirs for micro and disperse.

It is especially important in mountainous areas with an altitude greater than 1000 where pastures are spacious and very good conditions for the development of animal husbandry. Such is the case for example in the areas of villages in atarite: Pletvar, Kokre, tempered and Peshtani where there are spacious and beautiful pastures in the summer months where there is not enough water for watering livestock or absent. These micro reservoirs must be built at a distance more than 2 km, and height in relation to pasture no more than 50-100 m. We may say that these micro accumulations will make up conditions for intensive development of animal husbandry in those areas that are rich in pastures.

3.2. Production of electric energy

A number of micro irrigation reservoirs are high above surface irrigation and the way the water from the higher accumulations, to the lowest can be used to produce electrical energy. This is for example

the case of micro reservoirs Strasko over Strovija village where over the last micro accumulation are 12 micro reservoirs placed one on another and can be used to produce electrical energy.

3.3. Development of fisheries

Micro reservoirs can be used for growing fish. With the growing need for food micro reservoirs population can adapt (applications) and the production of high protein foods of animal origin for food for the population. The most popular types of fish found in the regions where they are built micro reservoirs from the carp family, including: Chubb and krkushkata.

3.4. Recreation population

Micro reservoirs despite their primary goal to have irrigation of dry field in all three municipalities are expected to become centers for the development of recreation to residents of all three communities.
Therefore the construction of more micro reservoirs would contribute to our man has the ability to swim where and where to recreate, earning it the stamp of a modern civilized man citizen of a society that certainly care about the health and welfare of its people.

3.5. Protection from erosion and sediment retention

Micro reservoirs can be built in basins that have buichen character with obvious erosion and sedimentation. In that case you need before or at least simultaneously building a dam to take measures to prevent erosion and sedimentation. It enables downstream from dams to protect riverbeds from reaching the sediment and at the same time to protect the agricultural area as plavenje and applying a new coat of them. Therefore for each micro accumulation is very important forestation of the catchment area, zatrevenosta occurrence of erosion and sedimentation.

3.6. Flood protection

The main purpose of each micro accumulation that occurs in the construction of flood defense on the field and goods downstream of the dam. The degree of flood protection depends on the meaning and purpose of the reservoir. Micro reservoirs with accumulated space to shrink (mitigate) the intensity of flood waves of 10-20%. When flood waves encountered, when the reservoir is filled to useful levels. But such examples are rare given that large floods usually make heavy summer rains, when a rule micro reservoirs are half-empty and have room to keep the flood wave.

3.7. Environmental protection

Micro reservoirs provide water for irrigation, and then improve living conditions of people in the mountainous areas where the standard of living is low. Provide water for refinement and reduction of concentration wastewater by contributing to the protection of water flows. Micro accumulations affect the expansion of the areas under water, retain sediments and defend fertile fields.

CONCLUSION

Mountainous areas in three municipalities: Prilep Dolneni Krivogastani cover three quarters of the total area of the municipality. Only about one quarter of the area is located in the plains of Pelagonia. In the mountainous part of the 3 municipalities are 63 villages. One of the reasons for the construction of such a large number of reservoirs 574 and 18 are already built one by favorable climatic conditions and geological morphologically from other extensive way of utilizing land obrabotlivoto in all three municipalities together is 62617ha, 35759 ha of arable land. , 2568 ha meadows, pastures 48,977 ha forest 18,858.3 ha, 11837 ha of fertile land or total expressed in all three municipalities 126,025 ha and it is extensive agricultural livestock production. Given the large surfaces fallow meadows and pastures need to provide water only to be able to realize greater production. With the construction of imaginary 574 micro reservoirs and possible accumulation of more than 40 million m^3 of water will provide conditions for irrigation of more than 20,000 ha of arable agricultural area or about 60% of the area of cultivation. If you build these micro reservoirs we will get another ravnica size of 20,000 ha.

It should be noted that this will create conditions for intensive agricultural and livestock production in these municipalities and increased agricultural and livestock production will create very favorable conditions for the development of the food industry. This is especially true for municipalities: Prilep Dolneni Krivogastani. It also pointed to the widespread importance of micro reservoirs as disperse goods, power generation, development of fisheries, livestock development, recreation population, tourism development, erosion protection, flood protection, protection the environment, and others. This creates very favorable conditions for the development of mountainous areas in all three municipalities, for the return of the inhabitants of the villages in these municipalities. Construction of

micro reservoirs should have priority according to the aforementioned should have accelerated the pace of construction of 30 to 50 micro reservoirs annually. This will allow more food production for the population as also for the markets in our country and abroad.

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