Transformation of The Lands By Cadastral Cultures in The Republic of Macedonia

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Abstract

The Republic of Macedonia covers an area of 25.713km^2. From its entire territory, 5.065km^2 are flat, 7.599km^2 are hillsides and 12.255 km^2 are mountainous areas. About 1700 settlements existed on the entire territory up to the 70s of the 20 century. All of them covered certain territory (on average about 15km^2 per settlement). The land was used for different purposes (agriculture, gardening, orchards, vineyards etc.), and it is classified by cadastral cultures (fields, rice fields, orchards, intensive orchards, vineyards, intensive vineyards, meadows, pastures, forests, swamps and wetlands and infertile or barren land). Great changes have occurred with the displacement of the population during the processes of industrialization and urbanization. About 150 settlements are totally resettled, and in another 500 the population (from the average 400 inhabitants per settlement) was reduced to barely 50 or fewer inhabitants. This process caused great changes in the transformation of the lands of cadastral cultures in the Republic of Macedonia. The objective of this research study is to more concretely and more accurately recognize the geographical, ecological and economic consequences in the area of the Republic of Macedonia.
Keywords: Republic of Macedonia, cadastral cultures, land transformation, farmlands, abandoned farmlands, forests, pastures

Instead of An Introduction

The Republic of Macedonia is a country in the center of the Balkan Peninsula. It is situated between the countries Serbia and Kosovo to the north, Bulgaria to the east, Greece to the south and Albania to the west. Today it covers 25.713 km^2. It is a predominantly mountainous country. In its relief, 12.255km^2 are mountainous, 7.599km^2 are hillsides and 5.065km^2 are flat lands; the rest of the territory is covered with water (Markoski B., 1992).

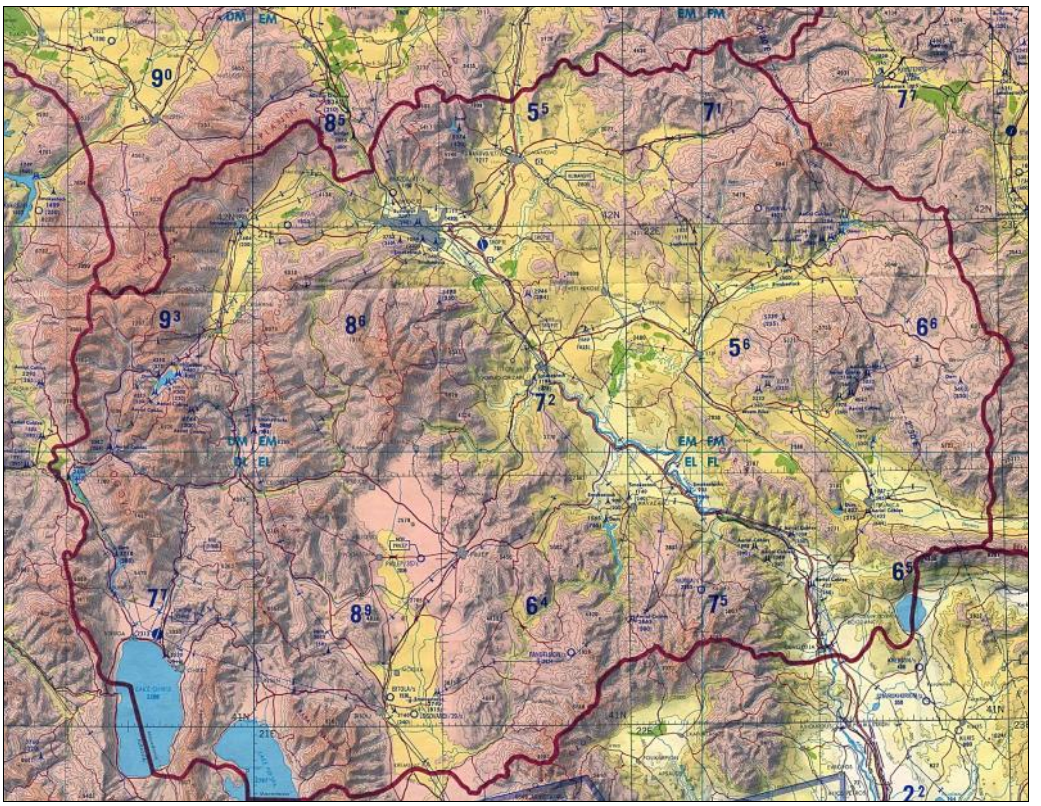
According to the climate characteristics of the territory of the Republic of Macedonia, there are sub - Mediterranean, continental and mountain climate. The average annual temperatures are in the range of 14ºC in the Gevgelija – Valandovo Valley, to around 8ºC in Mavrovo on the Bistra Mountain. The rainfalls are in the interval from 350mm in Ovce Pole (the central area) to 1500mm in the ravine of the river Radika (in the western parts of the Republic of Macedonia) (Lazarevski A., 1993).

The hydrographical image of the Republic of Macedonia is comprised of a number of rivers. The biggest river is Vardar. Its largest tributaries are Treska, Crna, Pcinja, Bregalnica and others. As a separate is only the Strumica River. Thus, 22.075km^2 is a catchment area that belongs to the Aegean Sea. The river Crn Drim together with the Ohrid and Prespa lakes belong to the Adriatic catchment area. This catchment area covers 3.320km^2. An insignificant surface falls into the Black Sea catchment area.

The territory of the Republic of Macedonia is characterized with diverse natural (grass and woody vegetation) and cultivated vegetation.

On the territory of the Republic of Macedonia about 1750 settlements exist, of which 30 are city settlements. In these in 1948 there were1.150.000 inhabitants, and in 2002 there were 2.055.004 inhabitants.

Almost all business branches are developed. But, the agricultural sector is a foundation. That is why the objective of the research is the proposed problem with the arable lands, its abandonment and transformation into other non – arable surfaces.



Republic of Macedonia

Objective of The Study

Right after the Second World War, the Republic of Macedonia was characterized with distinctively agricultural and livestock economy. Soon after it is approaching towards the development of the secondary activities, especially the mining and industry, and alongside happened a development of the tertiary activities. The processes of industrialization caused modernization of the agricultural sector with the implementation of different agricultural mechanization. There were significant development and bigger productivity.

The processes of industrial and agricultural modernization caused the process of accelerated urbanization, so sizeable population from the mountainous and hillside areas (whose products became noncompetitive) migrated in cities where the industry was mainly located.

This kind of flow of migratory movements in the Republic of Macedonia caused abandoning of the rural areas (especially from the mountainous and hilly areas), thus from the 1700 settlements, today there are about 1100 functioning settlements. From the remained around 600,

one part is totally displaced, one part has small number of inhabitants on average below 50 inhabitants. They have a mostly older population and are without appropriate utilities infrastructure.

The aforementioned processes caused serious changes in the transformation of the land by cadastral cultures. According to this article, the basic cause is to determine the range and displacement of the transformed cadastral cultures from one to another type. The real condition of the agricultural farmlands can be seen as a result of this, in context of agricultural and livestock production, capacities for production of food, the increase of surfaces with pastures and forests and their capacity for exploitation.

Study Methods

The geographical, cartographical, statistical method and the methods of analysis and synthesis are used in the research procedure.

The geographical method is used in terms of immediate field observation throughout the entire territory of the Republic of Macedonia.

The cartographical method is used for immediate determination of the relief – typical characteristics of the settlements. The elevations of the settlements and the altitude placement of the territories of the settlements are determined using map metrics. In this manner the number of settlements in the flatlands, hillsides and mountain territories is determined.

The statistical method is used during the calculation of the size of the areas under cadastral cultures from the database of settlements in the Republic of Macedonia. The sizes of the agricultural farmlands are separated and determined in this manner, and their transformation into other non – agricultural lands.

The basic cause – effect aspects of the changes in the size of the agricultural farmlands in the Republic of Macedonia are determined through the methods of analysis and synthesis.

Research Procedure

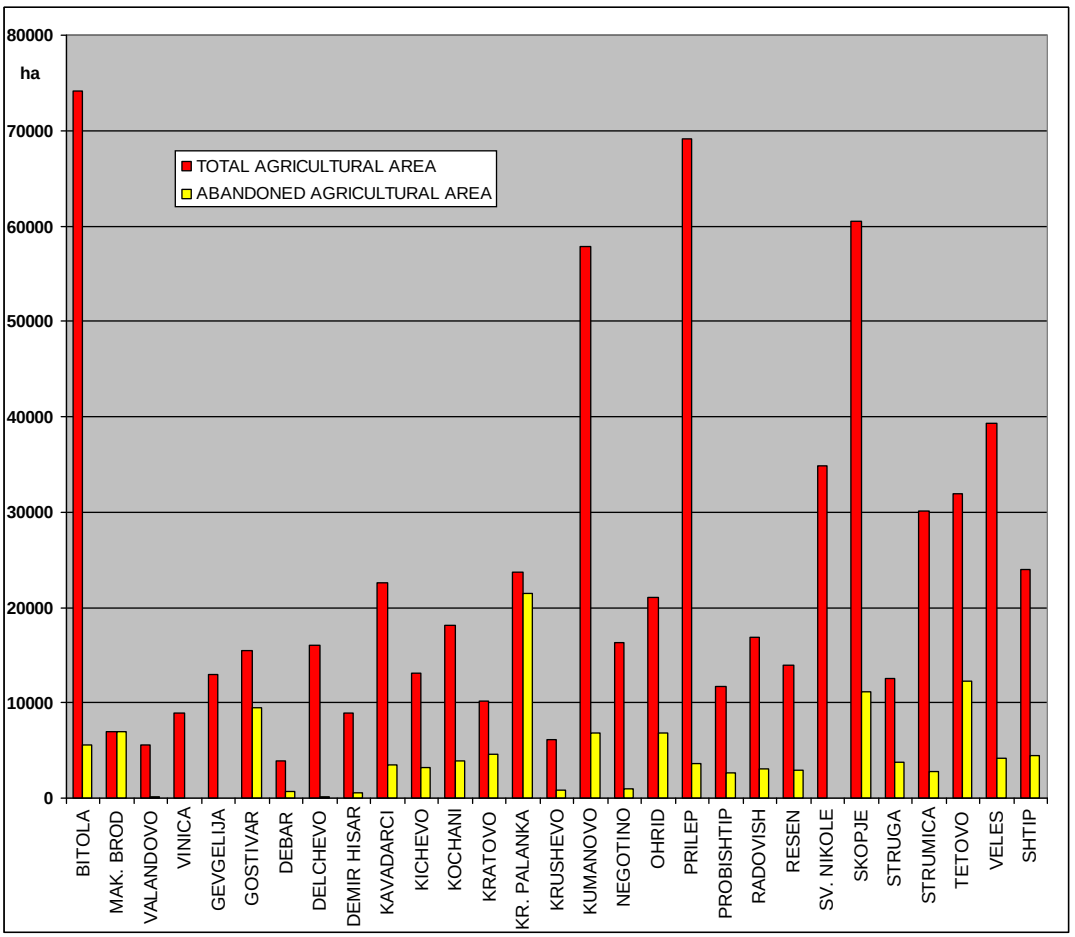
During the sixties and the seventies of the twentieth century, in the Republic of Macedonia, as a result of the then social and technical – technological conditions almost all the settlements existed demographically and economically in all the relief – typical conditions. In these conditions for every settlement and its territory, the cadastre has evidence for the sizes of the areas by cadastral cultures grouped as agricultural land (fields, rice fields, gardens, orchards, vineyards and meadows), non – agricultural land (pastures, forests, swamps and wetlands) and barren land (houses and buildings, yards, roads and railroads, waters, graveyards, religious objects, and other barren lands) classified in the state and private sector (National Geodetic Authority, 1982).

This kind of cadastral evidence (published in 1976) is very accurate, that is why it is taken as a basis in this research. In function of gathering the relevant data, this method of work was conducted:

1. Through immediate cadastral evidence the size of the areas under cadastral cultures is determined, on the total territory of the Republic of Macedonia;
2. On a map with 1:25000 scale (VGI, 1970 – 1975) are mapped the territories of every settlement (1718 cadastral municipalities);
3. On a basis of the such deferred territories the elevations of the immediate locations of the settlements and their elevation are established, but also the real spreading of the territories of the settlements, so that the relief – typical specifications of the settlements are determined and those are classified as flat, hillside and mountainous settlements (VGI., 1976);
4. From the cadastral evidence of the areas under cadastral cultures by settlements, the mountain settlements are separated whose population after 1981 has reduced for over 80%.

Towards this group of settlements taken into account are a part of the settlements in the hillside areas (especially characteristic are the regions Debarca, Porece, Mariovo, Kriva Lakavica, Kumanovska Kozjacija);

5. The calculated values for the agricultural farmlands in these depopulated areas are deducted from the total value of agricultural land in the Republic of Macedonia. Afterwards, these lands were added to the total areas of non – agricultural land.
6. In this manner the value of reduction of the agricultural farmlands is determined, i.e. the amount of increase of the non – agricultural areas.
7. With the stated research technique, the results that show the transformation of the agricultural cadastral cultures in favor of the non – agricultural and barren surfaces are gathered.



Graph 1. Relation between the total and abandoned agricultural area in Republic of Macedonia

Results

The immediate research technique (as presented before) includes the sizes of the areas by cadastral cultures in 590 mountain settlements (Markoski B., 2004) that were previously separated through studious cartographical map metrics operations and immediate geographical observations of the terrain.

Table 1. Overview of the sizes of cadastral cultures in Republic of Macedonia

No.	Cadastral cultures	area in ha
1	Agricultural land (Fields, rice fields, gardens, orchards, vineyards, grasslands)	707 526.6
2	Pastures	655 359.1
3	Forests	923 416.9
4	Swamps and wetlands	1 097.4
5	Barren land (Houses and buildings, yards, waters, roads and railroads, graveyards, religious objects, other barren lands)	204 367.4
6	Lakes	79 532.6
	TOTAL	**2 571 300.0**

Table 2. Overview of the total agricultural and transformed areas by cadastral cultures (agricultural into non – agricultural lands) by municipalities and on the national level of the Republic of Macedonia

Centers of municipalities	Total agricultural land	Abandoned agricultural land in mountainous settlements	Abandoned agricultural land in hillside settlements	Transformed land (agricultural into non – agricultural land)	%
1	2	3	4	3+4	3+4/2
BEROVO	20118.9	2903,7	0.0	2903.7	14.4
BITOLA	74201.8	5616.6	6797.4	12414.0	16.7
MAK. BROD	6976.2	6976.2	0.0	6976.2	100.0
VALANDOVO	5634.1	199.7	451.2	650.9	11.6
VINICA	8918.9	0.0	0.0	0.0	0.0
GEVGELIJA	12903.5	0.0	707.5	707.5	5.5
GOSTIVAR	15456.5	9521.1	0.0	9521.1	61.6
DEBAR	3947.1	687.7	0.0	687.7	17.4
DELCEVO	16092.6	193.3	0.0	193.3	1.2
DEMIR HISAR	8890.2	571.7	1600.4	2172.1	24.4
KAVADARCI	22513.1	3530.5	2341.0	5871.5	26.1
KICEVO	13165.1	3167.6	0.0	3167.6	24.1
KOCANI	18072.1	3846.0	0.0	3846.0	21.3
KRATOVO	10181.7	4571.8	0.0	4571.8	44.9
K. PALANKA	23663.9	21444.8	0.0	21444.8	90.6
KRUSEVO	6144.8	863.0	0.0	863.0	14.0
KUMANOVO	57782.7	6847.1	0.0	6847.1	11.8
NEGOTINO	16297.8	908.6	106.6	1015.2	6.2
OHRID	21004.6	6794.6	358.8	7153.4	34.1
PRILEP	69164.5	3650.5	11967.6	15618.1	22.6
PROBISTIP	11732.2	2690.5	0.0	2690.5	22.9
RADOVIS	16932.0	3093.3	0.0	3093.3	18.3
RESEN	13940.0	2875.7	256.4	3132.1	22.5
SV. NIKOLE	34815.4	0.0	0.0	0.0	0.0
SKOPJE	60432.4	11160.5	0.0	11160.5	18.5
STRUGA	12570.3	3699.3	0.0	3699.3	29.4
STRUMICA	30133.4	2750.4	0.0	2750.4	9.1
TETOVO	31863.0	12239.4	0.0	12239.4	38.4
VELES	39309.1	4216.5	225.8	4442.3	11.3
STIP	24033.5	4507.8	0.0	4507.8	18.8
TOTAL	**706891.4**	**129527.9**	**24812.7**	**154340.6**	**21.8**

Great number of data were processed, however because of the better overview here are presented only the summary results on a regional and national level of the territory of the Republic of Macedonia.

From the stated data it is concluded that the agricultural lands in the Republic of Macedonia that (in terms of uniform placement of the population) were used in the agricultural production with the processes of industrialization, urbanization and reduction of the agriculture were lowered for 154340.6ha, 21.8% respectively on the level of the Republic of Macedonia. This means that the agricultural production capacities are considerably lower, besides the now bettered conditions for agricultural production.

Discussion

The data are presented by the municipalities (according to the administrative – territorial division before 1996) and overall on a national level (when the territories of the municipalities were more appropriately coincided with the natural – geographical regions), but the analysis is done by settlements. 590 mountainous settlements were covered that according to the relief – typical features are classified as mountain settlements. In these are identified 129.528ha of agricultural land. This group includes another 63 villages which are classified as hilly settlements and areas. Here 24.813ha of arable agricultural land is noted, or in a total of 653 settlements there is 154.431ha of abandoned agricultural land. This area represents 21.8% of the total arable agricultural land in the Republic of Macedonia.

Through the immediate field observations it is obvious that these areas are firstly transformed into pastures that are gradually growing over with bushy plants and after that are overgrown with woody forest plants.

The reasons for abandonment of the mountains and part of the hillside territories consist of:

- Processes of social planning (which in the analyzed period was basically neglecting the rural areas on account of the urban),
- The spatial planning (that besides the certain qualities in solving of the problems of the space is inconsistent in the phases of implementation of the spatial plans),
- Accelerated industrialization (that in the Republic of Macedonia is done right in this period),
- Accelerated urbanization (that in this period was also driven by industrialization and took a way of spontaneous flow that still goes on today),
- Delayed infrastructural equipping and regulation of the infrastructural systems (at first in the rural areas, and especially in the mountainous and hillside areas),
- Entering of the motorization and agricultural mechanization (in terms of abandonment of the distinctively extensive manner of agricultural management and securing the needs by trade routes),
- Inappropriate agricultural policies (inadequate measurements for stimulation and security for the farmers),
- Historically illogical factors for location and development of the settlements (settlements formed on economics, for certain periods justified criteria, cannot coexist in the today's way of organization, forcefully formed settlements etc.),
- Poorly functional organization of the village territories of settlements with scattered type,
- Technician – technological changes etc.

Because of the aforementioned factors, such changes have arisen in the settlements that caused:

- Migration of the population to the cities;
- Work preoccupation of the population from the primary to other sectors of activities;

- Changes in the functions of the settlements;
- Changes in the usage of the energy potentials;
- Changes in the crop rotation and the traditional occupations etc.

With the processes of industrialization and urbanization the surfaces with barren land are increasing, because in this period many roads were built, and in the bigger settlements the urban areas were widened and mostly at the expense of the arable agricultural lands, in favor of the non – arable and barren land (typical example is the spatial spreading of the city of Skopje (Markoski B. 2005)).

However, it is a fact that the usage of the agricultural land is reduced by 1/5 in spite of the increased number of the population (1.406.002 inhabitants in 1961, 1.909139 inhabitants in 1981 and 2.055.004 inhabitants in 2002, (SSO, 2004, 2004a, 2004b)).

The perspectives for using the abandoned arable agricultural areas should be seen through the change in the sectors of the economy, according to the transformed surfaces. That is, the development of organized intensive farming, strengthening of the forest and the activities that are arising from it, the exploitation of the increased presence of forest fruits, development of some tourist activities etc.

Conclusion

The Republic of Macedonia covers the central parts of the Balkan Peninsula. It covers a surface of 25.713km^2. From its entire territory, 5.065km^2 are flat, 7.599km^2 are hillsides and 12.255 km^2 are mountainous areas. On its territory there are about 1700 settlements; from these 30 are city areas. There are 590 mountainous settlements that are demographically empty or have an insignificant number of inhabitants, mainly less than 50 people. To this grouping belong other 63 hillside settlements. As a result of this in the period of the 70s of the 20th century up to today because of the migration of the population (mainly in the city areas and abroad) comes to abandoning of the productive agricultural areas. In this way, from the total arable agricultural surface in the Republic of Macedonia that was 706.891ha there are remained 525.551ha. This means that it was reduced to 154.340ha or 21.8%. These abandoned areas with time are transformed into pastures, and later are overgrown with bushes and forest woody plants.

The data for the abandoned or transformed arable agricultural lands into non – arable or barren lands are substantially big, and this means that the agricultural production capacities are lowered in the sphere of agricultural production, so in future the perspectives for using of this transformed land should be oriented towards development of the intensive farming, strengthening of the forestry and activities that arise from it, exploitation of the increased presence of forest fruits, development of some tourist activities etc.

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