

THE EXTENT OF AGRICULTURE IN THE REGIONS OF NORTHERN MACEDONIA

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Abstract

The agricultural sector displays distinct characteristics compared to other sectors of the economy. While market competition determines the fate of businesses in most sectors by favoring the best solutions, agriculture experiences exceptions due to state support in the form of subsidies. The primary rationale behind direct state support in agriculture is the essential nature of food for human survival. Agriculture encompasses a broad range of economic activities, including land cultivation, plant cultivation, animal breeding, and their utilization for human needs. Although agriculture is closely associated with natural conditions, it is crucial not to overlook the significant role played by social factors in its development. Natural factors for analysis include topography, climate, water resources, soil composition, flora and fauna, and the geological and petrographic characteristics of the soil. Social factors to be considered include land improvement, mechanization, chemical inputs, seed selection, animal breeding, and the establishment of vocational schools.

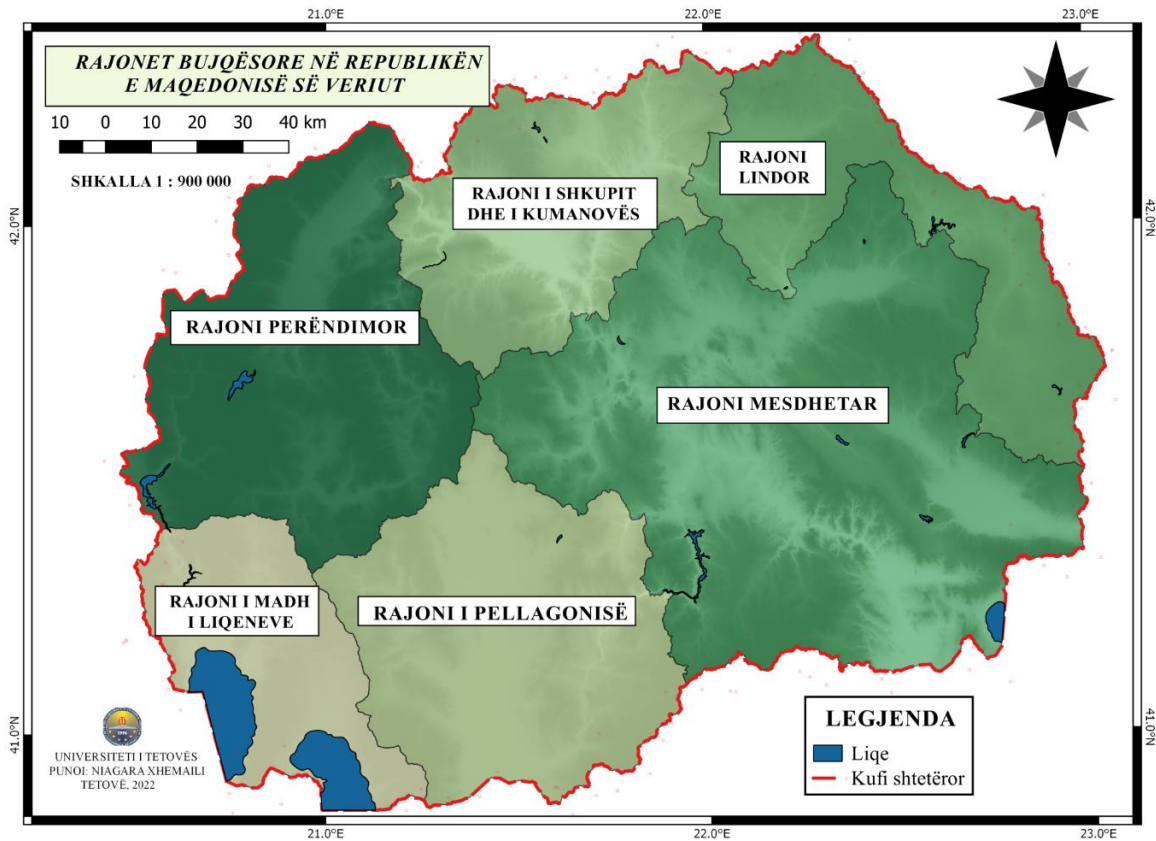
In North Macedonia, there are six agricultural regions: Golemozerski Region, Western Region, Skopje and Kumanovo Region, Eastern Region, Mediterranean Region, and Pelagonia Region. As a developing country, North Macedonia is undergoing a transition towards transforming its agriculture sector from a semi-open sector in international trade to a more open and liberalized one with support from both internal and external sources. This paper aims to critically assess the progress and prospects of North Macedonia in these processes and draw conclusions regarding the best alternatives for agricultural development.

Keywords: Agriculture, regions, crops, soils, meadows, perspectives.

1. Factors for Agricultural Development

The factors influencing agricultural development can be categorized as natural and social. Natural factors encompass relief, climate, water resources, soil, flora and fauna, and the geological and petrographic composition of the soil. Social factors include land improvement, mechanization, chemical inputs, seed selection, animal breeding, canal construction, and the establishment of professional schools. The agricultural regions in North Macedonia are as follows:

1. The Great Lakes Region: Resnje, Ohrid, Debarcë, Struga, Vevčan.
2. Western Region: Center Zhupe, Dibër, Kíçovo, Plasnica, Makedonski Brod, Mavrovë, Rostushë, Gostivar.
3. Region of Tetovo, Vrapčisht, Bogovina, Bërvenica, Tearca, Jegunovce, Zhelina.
4. Region of Skopje and Kumanovo: Skopje, Old Negorican, Kumanovo, Likovë, Čučer Sandevë, Petrovec, Ilinden, Haračinë, Zelenikovë, Studeničan, Sopisht.
5. Eastern Region: Kriva Palanka, Konçe, Vasileva, Kočan, Saint Nicholas, Zernoc, Česino, Karbince, Çashka, Rosoman, Llozovë.
6. Region of Pelagonia: Manastir, Novacë, Mogilë, Demir Hisar, Krivogashtan, Krushevë, Dollnen, Prilep.



Map 1

Agricultural Land

Agricultural land refers to land utilized for cultivating crops such as fields, gardens, orchards, vineyards, meadows, pastures, fish ponds, swamps, and other lands that, although not directly used for agriculture, can be optimally used for agricultural production considering their natural properties and economic conditions.

Agricultural land is highly suitable for plant growth as it provides essential mineral matter and water. Upon closer examination, agricultural land reveals three layers: the humus layer, the mineral layer, and the layer of soil-forming rocks. The humus layer, the topmost layer, is brownish and contains rich remains of living organisms and plants. The mineral layer, rich in stones and minerals, is accessible only to plant roots. The layer of soil-forming rocks contains only a few rock fragments. Currently, there is a lack of comprehensive theoretical and scientific treatment of Agrarian Law and its institutes. Limited research exists on current issues related to agrarian relations, with historical treatments being the exception.

North Macedonia has the lowest amount of agricultural land per capita in Europe. Protecting this land remains a significant task for both governmental structures and society as a whole. The implications of neglecting this issue can result in the transformation and loss of the land's natural function, limiting the possibilities for future generations to meet their needs.

Table 1: Agrarian Structure in the Regions of North Macedonia, 2010-2020 (%)

Regions	%		
	Agricultural land	Working land	Pastures
	2010		
Skopje region	100	53	47
Northeast Region		77	23
Eastern Region		71	29
Southeast Region		65	35
Vardar Region		53	47
Pelagonia Region		42	58
Southwest Region		50	50
Polog Region		25	75
RNM		51	49
		2014	
Skopje Region	100	50	50
Northeast Region		55	45
Eastern Region		41	59
Southeast Region		47	53
Vardar region		33	67
Pellagonia Region		44	56
Southwest Region		37	63
Polog Region		24	76
RNM		41	59
		2020	
Skopje Region	100	49	51
Northeast Region		55	45
Eastern Region		41	59
Southeast Region		53	47
Vardar Region		34	66
Pellagonia Region		44	56
Southwest Region		37	63
Polog Region		24	76
RNM		41	59

Source: ESRMV (data processed by the author)

The table above illustrates the distribution of working land and pastures in North Macedonia's regions as a percentage. It is evident that in 2020, the Northeast Region had the highest proportion of arable land, accounting for 55% of all agricultural land. Conversely, the Polog Region had a lower percentage of arable land, comprising only 24% of the total agricultural land. However, the Polog Region had a higher proportion of pastures, accounting for 76% of the total area.

Meadows and pastures play a significant role in the agricultural sector, providing essential food for animals. Meadows yield hay and fresh grass, making them crucial for livestock feed. In 2020, the total area of meadows reached 59,773 hectares across all working areas.

Geographically, meadows are classified as lowland and mountain meadows. Lowland meadows are predominantly found in Pellagoni and Pollog, while mountain meadows are typically situated on mountain slopes, near riverbeds, and on moist north-facing slopes.

Meadows are further categorized based on the distribution of plants, including common, steppe-desert, and swampy meadows. They can also be classified according to seasonal use, distinguishing between winter and summer meadows. Furthermore, meadows are categorized based on their geographical location, such as high mountain, mountain, and coastal-lowland pastures.

Lowland meadows are located in the lower regions of pit fields and coastal areas in the Middle Povardarje. Forest pastures are predominantly found on steep mountain slopes and coastal terrain, particularly in areas beyond the high forest line. Forest pastures cover approximately 700,000 hectares, with the majority situated in mountain massifs such as Sharri, Bistra, Stogova, Karaorman, Korab, Galičica, Pelisteri, Jakupica, Osogova, and others.

The agrarian structure in the regions of North Macedonia, based on land use, has undergone changes between 2010 and 2020 (ha)

Regions	2010 (ha)						
	Agricultural land	Cultivated land	Arable land and gardens	Orchards	Vineyards	Meadows	Pasture
Skopje Region	72 402	38 425	31 836	647	1 973	3 942	33 938
Northeast Region	100 429	77 604	63 613	957	1 628	11 406	22 817
Eastern Region	110 321	78 152	65 029	3 336	1 646	8 141	32 143
Southeast Region	88 171	57 209	49 532	1 075	4 443	2 159	30 842
Vardar Region	108 185	56 906	45 301	1 031	9 055	1 519	51 254
Pelagonia Region	273 786	113 832	94 160	3 875	1 202	14 595	159 473
Southwest Region	99 115	49 938	39 754	2 174	618	7 392	49 168
Polog Region	162 001	41 168	30 938	1 144	41	9 045	120 833
RMV	1 014 410	513 234	420 163	14 266	20 606	58 199	500 468
2014 (ha)							
Skopje Region	80 184	39 043	32 438	788	2 043	3 774	41 108
Northeast Region	169 543	77 873	63 653	883	1 448	11 889	91 660
Eastern Region	177 171	76 490	62 501	3 642	1 486	8 861	100 649
Southeast Region	124 674	59 264	49 875	1 697	5 618	2 074	65 290

Vardar Region	144 411	51 856	38 492	1 295	10 897	1 172	92 529
Pellagonia Region	263 243	115 148	95 877	3 838	925	14 508	147 832
Southwest Region	133 619	50 029	39 848	2 143	600	7 438	83 585
Polog Region	170 310	41 876	30 565	1 0230	44	10 244	128 832
RNM	1 263 155	511 579	413 249	15 309	23 061	59 960	751 086
	2020 (ha)						
Skopje Region	81 175	40 059	33 447	765	2 073	3 774	41 083
Northeast Region	143 693	78 405	64 410	1 321	1 508	11 166	65 281
Eastern Region	188 992	78 184	63 309	3 895	1 518	9 462	110 765
Southeast Region	115 517	60 699	49 772	2 263	6 441	2 223	54 695
Vardar Region	165 529	55 772	41 920	1 367	11 417	1 068	109 730
Pelagonia Region	261 061	115 233	95 999	3 992	873	14 369	145 328
Southwest Region	135 505	49 923	39 701	2 190	594	7 438	85 577
Polog Region	173 106	41 573	30 265	991	44	10 273	131 532
Skopje Region	1 264 578	519 848	418 823	16 784	24 468	59 773	743 991

In 2020, North Macedonia had a total of 1,264,578 hectares of agricultural land, of which 519,848 hectares (41.1% of agricultural land) were designated as cultivated land. Within the cultivated land category, 418,823 hectares (33.1% of agricultural land) were allocated for arable land and gardens, 991 hectares (0.07% of agricultural land) for orchards, 24,468 hectares (1.9% of agricultural land) for vineyards, and 59,773 hectares (4.7% of agricultural land) for meadows. Among the branches of agriculture, plowing plays a crucial role. It involves the study and processing of agricultural land, specifically preparing it for the cultivation of cereals, trees, vegetables, vineyards, and industrial plants. In North Macedonia, plowing covers an extensive area of 418,823 hectares, which accounts for 80.5% of the total cultivated area and 33.1% of the agricultural areas in the country.

It is worth noting that the data presented in this section is sourced from ESRMV and has been processed by the author.

Keywords: agricultural land, cultivated land, arable land, gardens, orchards, vineyards, meadows, plowing, North Macedonia.

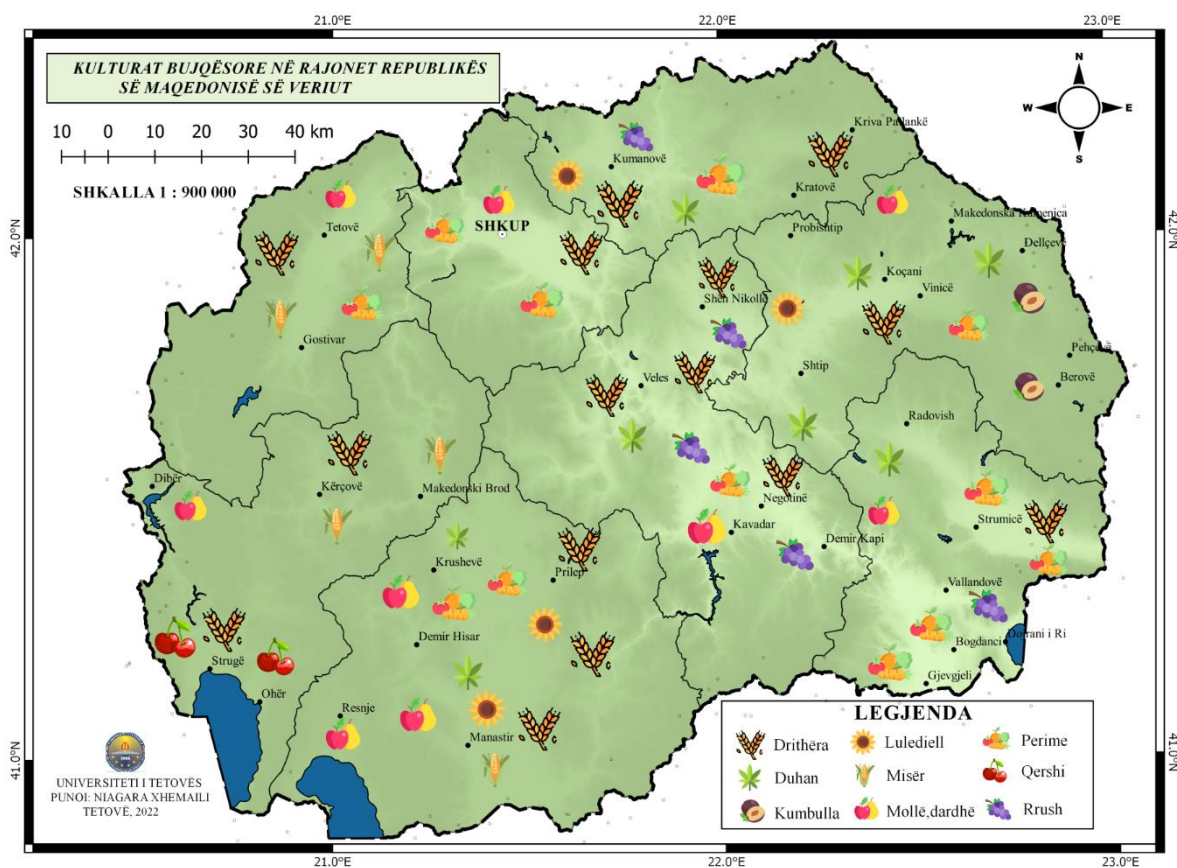
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Table 2. Surface utilization by types of agricultural crops, 2020 (ha)

2020	
Crops	Area in ha
Cereals	160 000
Industrial plants	22 000
Fodder plants	42 000
Vegetables	53 000

Crops

Cereals are crucial annual grain crops that play a significant role in human nutrition. They serve as essential raw materials for the food industry and are also utilized as animal feed. The main cultivated grains include wheat, corn, barley, oats, rice, industrial plants, and fodder.



Map 2.

Wheat

In 2020, approximately 68,959 hectares were dedicated to wheat cultivation, resulting in a production of 239,916 tons. The average yield was 3.5 tons per hectare. Wheat consists of grains and chaff. The grains are utilized in the production of noodles, pasta, spaghetti, cookies, grits, and various other food products. Wheat straw finds applications as animal feed, bedding material, qualitative fertilizer, as well as in the paper and pulp industry. Wheat cultivation is prominent in regions such as Pelagonia, Ovce Pole, Tikvesh, Kumanovo, Skopje, and other areas across the country. The vegetative period of wheat lasts approximately 270 days.

Maize

Maize is a highly important cereal crop used for human consumption and, to a lesser extent, as animal feed. It encompasses various subtypes, including sweet corn, hard corn, soft corn, sugar corn, and starch corn. In 2020, maize was cultivated on 34,123 hectares, yielding a production of 145,278 tons. The average yield was 4.2 tons per hectare. Maize cultivation is primarily concentrated in regions such as Polog, Strumica, Kumanovo, Koçan, Pellagonia, and other areas.

Please note that specific data for barley, oats, rice, industrial plants, and fodder crops were not provided in the text.

(Source: ESRMV, data processed by the author)

Table 3. Production of wheat and corn in the regions of North Macedonia, 2010-2020 (tons)

Regions	Ton					
	2009		2014		2020	
	Wheat	Wheat Corn	Wheat	Corn	Wheat	Corn
Skopje Region	22 445	8 806	24 215	17 199	23 661	14 928
Northeast Region	34 699	13 013	44 179	7 238	45 264	6 233
Eastern Region	29 429	20 746	26 992	18 302	22 753	20 146
Southeast Region	29 395	29 511	27 775	24 132	20 766	19 362
Vardar Region	28 835	3 304	25 529	3 425	24 170	3 556
Pelagonia Region	89 954	21 355	104 909	17 639	70 630	32 564
Southwest Region	15 980	13 476	15 021	12 512	12 698	11 919
Polog Region	20 381	44 026	19 333	36 484	19 973	36 570
RNM	271 117	154 237	287 954	136 930	239 916	145 278

According to the data processed by the author from the ESRMV source, the regional wheat production in North Macedonia in 2020 was as follows:

- Pelagonia Region: Produced the highest amount of wheat with 70,630 tons.
- Southwest Region: Produced the lowest amount of wheat with 12,698 tons.

In terms of corn production in 2020:

- Polog Region: Produced the highest amount of corn with 36,570 tons.
- Vardar Region: Produced the lowest amount of corn with 3,556 tons.

Please note that this information is based on the data provided and the processing conducted by the author from the ESRMV source.

Barley

Barley is a crop that yields over 800 industrial products used in various industries such as food, pharmaceutical, cosmetic, and chemical. It provides starch, oil, sugar, alcohol, vinegar, and other products. The vegetative period for barley lasts approximately 5 months.

Rye

Around 3,834 hectares were dedicated to rye cultivation in 2020, resulting in a production of 8.6 tons. Rye grains are utilized in the food industry for bread production, diabetic diets, and the production of spirits, among other applications. Rye straw is used in industrial processes.

Rye can be cultivated at altitudes of up to 2,000 meters and is also suitable for sandy and dry soils. Rye cultivation is prevalent in the Slavishte field and other areas.

Rice

Approximately 3,555 hectares were allocated for rice cultivation, yielding a production of 21,278 tons, with an average yield of 6.1 tons per hectare. Rice cultivation requires alluvial soil, water, and warmth. It is used for human consumption, and starch is obtained for industrial purposes. Rice straw is utilized in animal husbandry for food and bedding, as well as in paper production. Rice is categorized into Indian and Chinese-Japanese rice, with various varieties such as marateli, manticelli, and san domenico. In North Macedonia, rice is primarily produced in the fields of Kočani, Strumica-Radovis, Veles, and Negotino.

Other Cereal Crops

Other cereal crops include oats, millet, and sorghum. Oats are used as animal feed and to produce groats and flour for human consumption. They are predominantly cultivated in mountainous areas such as Maleshevo, Osogovo, and Sharr Mountain. Millet serves as high-quality feed for birds and is also utilized in the production of boza. Sorghum is used as animal feed, for the production of syrups, and for making brooms. The cultivation areas for millet and sorghum are relatively small.

2. Conclusions

The Skopje region is situated in the northernmost part of the Republic of North Macedonia, encompassing the Skopje area. Despite being the smallest region in terms of area, it accounts for 7.3% of the total territory. In 2020, it was the most populated region, constituting 30.4% of the total population, and it also had the highest population density of 348.6 individuals per square kilometer. This region serves as a central hub for the country, boasting well-developed transportation and infrastructure networks. Additionally, it concentrates the majority of industrial, commercial, and service capacities in North Macedonia.

The Northeast region covers the extreme northeastern part of the country along the Pcinja and Kriva Reka rivers. It is one of the smallest regions in terms of area, occupying 9.3% of the total territory. In 2020, it accounted for 8.5% of the total population and had a population density of 76.2 individuals per square kilometer.

The Eastern Region is predominantly mountainous and comprises the extreme eastern part of the Republic of North Macedonia. It extends along the Bregalnica River, encompassing the basins of Shtip, Maleshevo, Pijanec, and the plain of Kočani. This region covers 14.2% of the country's total area and had a population representing 8.4% of the total population in 2020. The region has a population density of 49.3 individuals per square kilometer. The natural, geographical, climatic, and hydrological characteristics of the Eastern Region offer potential for rice production, particularly in the Kočani field, which is renowned for its rice cultivation. The ponds of Pijanec and Maleshevo are also favorable for the growth of fruits and vegetables. The Vardar Region encompasses the central part of the Republic of North Macedonia, stretching along the Vardar River. In 2020, it had the lowest population among all the regions, representing 7.3% of the total population. The Vardar Region covers 16.2% of the country's territory and has a population density of 37.6 individuals per square kilometer. Abundant water resources, including artificial rivers and lakes, coupled with favorable climatic conditions influenced by the Mediterranean climate entering the region through the Vardar River valley, make this region well-known for the production of fruits and vines with distinct geographical origins.

Consequently, a significant concentration of vineyards and vine processing equipment can be found in this region.

The Pelagonia region is located in the south of the country and encompasses the Pelagonia field and the basin of Lake Prespa. It is the largest region, covering 18.9% of the country's total land surface. Moreover, it is one of the most densely populated regions, with a population density of 48.2 individuals per square kilometer. The specific climate and extensive hydrographic network in the Pelagonia region provide favorable conditions for agricultural development. Consequently, it serves as the country's breadbasket and is the largest producer of tobacco, apples, and milk.

The Southwest region is situated in the extreme southwestern part of the Republic of North Macedonia. According to estimates from 2016, it accounted for 10.6% of the total population. The region occupies 13.4% of the country's total area and has a population density of 65.7 individuals per square kilometer. The region's topographical features, including the river basins of Treska, Black Drin, and the basin of Lake Ohrid, indicate significant water potential, partially harnessed by artificial lakes Shpile and Globočica, which house hydropower plants. These natural features, combined with the mild climate, offer opportunities for the cultivation of various types of fruits.

The Polog region covers the northwestern part of the Republic of North Macedonia, including the Polog field and the valley of the Radika River. It accounts for 9.7% of the country's total area. The specific vegetation found in the Polog Basin and the surrounding mountains create favorable conditions for agriculture, particularly cattle breeding. The region is renowned for its high mountain ranges, distinctive landscape, and climate conducive to cattle rearing.

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