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of the United Nations**

**Supporting Development of Agriculture Land Markets to Bring Abandoned  
Land into Production (TCP/MCD/3802)**

**Analysis of land abandonment and development of  
agricultural land markets in the Republic of North  
Macedonia – Conclusions and policy recommendations**



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## Executive Summary

This report has been prepared as part of the FAO technical assistance project *Supporting Development of Agriculture Land Markets to bring Abandoned Land into Production* (TCP/MCD/3802). It presents the results of the conducted analysis on land abandonment in the context of the current farm structures and land market development and provides comprehensive policy recommendations to improve the situation.

There is a wide range of definitions of land abandonment in literature and in the legal framework of various countries. In contrast, in the legal framework of the Republic of North Macedonia there is no definition of land abandonment. For the purpose of this study, abandoned land refers to agricultural land previously used as arable land, vineyards and orchards that has ceased to be utilized for agricultural production.

The report proposes and then applies a methodology for the identification and monitoring of abandoned land, which is a precondition for any other measures and actions to addressing it, including through the taxation of abandoned land. Results of the conducted analysis of the level of land abandonment show that the average amount of abandoned agricultural land in the country is **32 %** (including both private and state ownership). The magnitude of land abandonment is higher in the Western part of the country and in mountainous areas and municipalities and not surprisingly lower in areas with high soil quality and good potential for agricultural production.

Accurate annual information on land abandonment is currently missing and generating it is one of the recommendations provided hereafter.

Abandonment of agricultural land is a ‘place specific phenomenon’ with a complex set of drivers. Landscape changes, including land abandonment, are highly dependent on specific political and institutional, economic, cultural, technological, and natural and spatial factors as drivers.

A complex set of interlinked social, economic and environmental factors contribute to abandonment of agricultural land. For North Macedonia, the main reasons contributing to the land abandonment revealed by the analysis in this report are the basic natural conditions of the land plot, the small and fragmented farm structures which restrain farm profitability and their further development, dependence of irrigation and poorly functioning irrigation schemes and other economic reasons shaping the farming environment, leading first to extensification of agricultural activity, outmigration of in particular rural youth and consequently of ageing of the rural population, and eventually to abandonment of agricultural land. These factors are self-reinforcing and ranking them would be context specific.

According to the Farm Structure Survey data 2016, there are 178,125 agricultural holdings / farms in the Republic of North Macedonia. In average, one farm utilizes **1.8 ha** of agricultural area. The Farm Registry data 2017 is showing a slightly larger but still comparable average farm size than the 2016 Survey with an average figure of **1.9 ha**. The Farm Registry data are complementary to the Farm Structure Survey data as it provides the additional information that

the average number of land parcels per farm is **5.8** and that the average size of an agricultural land parcel is **0.32 ha**. **68%** of the arable agricultural land was in 2016 used by the owner of the land, while **32%** through lease agreements.

The report also presents updated figures on land market dynamics. The land market infrastructure in North Macedonia is in place and the land markets are functioning albeit still weak and functioning at a low pace with an average annual land turnover of **0.5 %** or around 1,700 ha. The average parcel size traded was around 0.3 ha, so very close to the average size of agricultural land parcels. The average recorded land market prices per hectare was 22,000 Euro in the period 2016-2020. However, many transactions in the sales market are conducted with non-agricultural purposes, e.g. parcels in the proximity to or part of urban or rural settlements, carried out for the housing/construction purposes in the future, this being reflected in the price. It can also be observed that in general landowners are having high expectations about the value of their land which seems to limit the market turnover, and coupled with lack of collection of property taxes and enforcement of land use regulations, contributes to land abandonment. In reality it is without any cost of the landowners to leave their agricultural land abandoned. The mobility of land and the current land turnover in the market are too low to address the farm structure challenges.

The Report also analyses the regulations of the agricultural land markets and compares it with those in EU countries using 15 different variables grouped into four categories: measures to protect the tenant, measures to protect the owner-cultivator, measures to protect the non-farm owner, prevent fragmentation of agricultural land. The report shows that North Macedonia is placed somewhere in the middle with a medium level of land markets regulations with clear focus on protection of landowners and prevention of fragmentation and less protection of the sitting tenant on agricultural land.

In the analysis of the national legal framework no direct legal mechanisms were identified to combat land abandonment with exception of a recurrent property tax obligation for the unutilized agricultural land introduced under the Property Tax Law. While the measure was originally not specifically designed as an instrument for combating agricultural land abandonment, but rather for safeguarding the active farmers as a specific category of citizens from property taxation, its function, if properly enforced, could be dual.

While the overall legal regulation is considered to be satisfactory, municipalities face significant difficulties to keep the accurate registers needed for collecting property tax, there are discrepancies in the valuation and in some cases the municipal authorities have not even harmonized their valuation methods with the centrally adopted acts. Based on the conducted analysis of farm structures, land market development, the stage of land abandonment and its root causes, the following policy recommendations are provided to the Government of North Macedonia represented by the Ministry of Agriculture, Forestry and Water Economy. It is recommended:

- To clearly distinguish between i) *interventions that are applied in a project based approach* and ii) *interventions that to be applied with country-wide impact* when addressing land abandonment.

### Recommendations related to *interventions applied in a project based approach*

- To use the already fully operational land consolidation instrument to also address land abandonment in land consolidation project areas, including to use the land consolidation feasibility studies to discuss solutions that will bring abandoned land in production after the land consolidation.
- To actively manage and privatize small and fragmented state owned agricultural land parcels in land consolidation projects.
- To apply a lease facilitation instrument on top of the implementation of land consolidation projects to improve the use structure after the ownership structure is improved.

### Recommendations related to *interventions to be applied with country-wide impact*

- To further develop the methodology applied in the project and monitor on an annual basis abandonment of agricultural land combining data from AREC and LPIS with annual field inspections of 5-10% of the land parcels identified as abandoned through deskwork.
- The annually updated data set of abandoned land should be transferred to the municipal authorities and there provide the currently missing data needed for the collection of property tax of abandoned agricultural land.
- To further support the municipal authorities in relation to enforcing the property tax on (abandoned) agricultural land (MAFWE and AREC).
- To further support the development of agricultural land markets throughout the country.
- To develop and introduce a country-wide web-based lease facilitation system connecting landowners not utilizing their agricultural land with local farmers interested to rent additional land.
- To adopt the prepared amendments of the Law on sale of state-owned agricultural land to ensure an active management of small and fragmented state land parcels and their privatization giving priority to local farmers, in particular owners and users of neighbouring land parcels.

### Recommendations on establishing an enabling institutional framework

- To further consider the possible establishment of an integrated Land Agency subordinated to MAFWE.
- To develop and implement a capacity development programme for MAFWE staff, including the branch office, and AREC staff on the selected policy interventions to address land abandonment.

## Abbreviations

AREC	Agency for Real Estate Cadastre
CFS	Committee on Food Security
EU	European Union
FAO REU	Food and Agriculture Organization of the United Nations, Regional Office for Europe and Central Asia
MAFWE	Ministry of Agriculture, Forestry and Water Economy
LPIS	Land Parcel Information System
RAL	Registered Agriculture Land
SSO	State Statistical Office
UAA	Utilized Agricultural Area
VGGT	Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security

# 1. Introduction

With multiple crises related to food, energy, climate change, the COVID-19 pandemic and recently the war in Ukraine – Europe is facing a pressure on food security that has not been seen for decades. Many countries have in response a renewed focus on strengthening local food production.

As the main factor of production, agricultural land, whether in state or private ownership, is a very valuable asset and more efficient management of agricultural land provides an opportunity to strengthen local food production, increase competitiveness and productivity of the family farms, and eventually positively affect the livelihood of the rural population and contribute to sustainable rural development.

This report has been prepared as part of the FAO technical assistance project *Supporting Development of Agriculture Land Markets to bring Abandoned Land into Production* (TCP/MCD/3802). It presents the analysis on land abandonment in the context of farm structures and land market development and provides comprehensive policy recommendations to improve the situation.

The mentioned project and the land abandonment analysis provided in this report is complementary and interlinked with to the ongoing land consolidation activities in the country supported by the EU funded and FAO implemented *Mainstreaming the National Land Consolidation Programme – MAINLAND* project (GCP/MCD/002/EC) implemented during 2017 - 2022 and the ongoing project *Enhancing Land Consolidation in North Macedonia* (GCP/MCD/008/EC) to be implemented during 2022-2026. The work on land abandonment and land market development also builds on the earlier FAO project on the privatization state-owned agricultural land (TCP/MCD/3701/C1) implemented during 2018 –2020.

The policy recommendations provided hereafter concerning land abandonment and land market development are in line with the principles of the *Voluntary Guidelines on the Responsible Governance of Tenure of Land Fisheries and Forests in the Context of National Food Security (VGGT)* (CFS 2012).

There is a wide range of definitions of land abandonment in literature and in the legal framework of various countries (Pointereau 2018; Perpina Castillo et al. 2018). These definitions are grounded in a specific context of these countries and differ in the type of their approach, e.g. administrative, economic, social, ecological/landscape and agronomic. For the purpose of this study, abandoned land refers to agricultural land used as arable land, vineyards and orchards that ceased to be utilized for agricultural production.

Abandonment of agricultural land is a ‘place specific phenomenon’ with a complex set of drivers. Land abandonment may be more pronounced in areas with limited production capacity and productivity, e.g. in areas facing natural constraints (Schuh et al. 2020). In particular, agriculturally less-favoured areas, such as mountain areas, islands and other remote areas, face significant challenges in retaining a vital farming structure, and have long been confronted with a steady decrease in the agricultural land use. Location in disadvantaged areas could add to



these challenges and hamper integration into effective agricultural value-chains and innovative, quality schemes of food supply. The reason for land abandonment in the vicinity of cities is often related to increasing land-use change pressures in these areas where there is a tendency for setting aside of land for speculative development purposes (Vanwambeke et al. 2012).

Land abandonment has major environmental, social and economic impacts, which differ starkly depending on the geographical context, as does its potential to serve as a land reservoir for re-cultivation. These impacts are both positive and negative and vary over time and space (Ustaoglu and Collier 2018; Leal et al. 2016). The negative consequences of the land abandonment process are that arable land abandonment undermines countries food security and represents a lost opportunity for food production and an unutilized potential for economic development in rural areas where there are in general few other opportunities than agriculture. Land abandonment is associated with disappearance of open spaces with the advance of newly developed vegetation, resulting in the reduction of species adapted to man-made environments resulting in loss of biodiversity. Abandoned lands may be more vulnerable to fire risks. A reduction in river flows and water supply resulting from increased plant biomass. There are also negative societal and environmental impacts of land abandonment on the cultural landscapes and management techniques, which are essential for sustaining the development of mountain communities.

On the other hand, land abandonment in some situations may contribute to environmental benefits through an increase in carbon sequestration resulting from new vegetation development, better regulation of the water cycle and an increase in water quality, and reduction in soil erosion due to regeneration and protection of vegetation. Transition of agricultural land to abandoned land can in some situations be an opportunity to improve the habitat of many species that were severely affected by landscape fragmentation in the past and have positive impacts on the biodiversity through rewilding and restoration of the habitats.

Thus, not all abandoned agricultural land should be brought back into production, as it might have negative impact on nature and environment and be more suitable to convert it permanently to other land-uses. Understanding determinants of abandonment patterns, and especially how their influence varies across broad geographic extents, is therefore important for designing sound, coherent and evidence-based policy responses. Pertinent to this are issues related to the procedures to changing the land use categories in land registries, mechanisms to monitor/inventory and control land abandonment.

There is a wide body of literature analysing the drivers of land abandonment process (Schuh et al. 2020; Perpina Castillo et al. 2018, Leal et al. 2016). Most often these drivers are grouped into the bio-physical or environmental (e.g., soil properties, climate), socio-economic (e.g. ageing population, outmigration, market integration/access, value chain organization) and farm structures (e.g., the size of the farm, the number of land plots comprising the farm, property rights/ownership structure). Political, institutional and regional context drivers are also often mentioned. Landscape changes, including land abandonment, are highly dependent on specific political and institutional, economic, cultural, technological, and natural and spatial factors as drivers (Plieninger et al. 2016).

Analysis of land abandonment in Armenia conducted by FAO during 2017 (FAO 2017) concluded that it is a complex multi-dimensional process with interlinked economic, environmental and social factors. Several negative trends such as the inefficient farm structures dominated by the small farms, excessive land fragmentation, an ageing rural population, out migration of young people from rural areas, general dependence of agricultural production on water and the availability of irrigation facilities, various problems along the agricultural value chains and increasing problems of land degradation, all become self-reinforcing. Small and fragmented agricultural holdings with reduced viability prospects are often regarded as particularly prone to the abandonment process. Thus, there are usually multiple root causes of the problem, which also requires a complex and holistic approach to its solution.

The structure of the report is as follows. After this introduction, Section 2 describes the farm structures in North Macedonia and their recent development. Section 3 focuses on agricultural land markets and their functionality and describes the land administration system, analyses key land markets regulations and provides updated figures on land market functionality in the country. Section 4 focuses on land abandonment, including the legal and institutional framework pertinent to land abandonment, the results of the land abandonment inventory conducted as part of this study, followed by an analysis of the main reasons for land abandonment in North Macedonia. Finally, in Section 5, the report provides conclusions and policy recommendations to address land abandonment and further develop the agricultural land markets.

## **2. Farm Structures in North Macedonia**

The Republic of North Macedonia has private property rights to agricultural land, which are tradeable at the land market and inheritable. Out of the total arable land fund in the country of 577,622 ha and pasture lands of 700,605 ha, about 60% and 18% respectively is in private ownership (FAO 2019a).

The restitution process started in the late 1990s as a corrective measure to the collectivization process in the Former Yugoslavia and did not change significantly the farm structures in North Macedonia (Hartvigsen 2013). Although many mechanisms were used throughout the socialist period to establish and enlarge the agricultural land for utilization of the socially owned enterprises and private ownership was regulated and at times suppressed, the majority of the agricultural land stayed in private ownership and use throughout the socialist era in Yugoslavia. Based on the current data, estimations would be that the private – socially owned ratio in North Macedonia during the Yugoslav era was 60 - 40 percent respectively.

The Law on restitution adopted in 1998 envisaged three main approaches: restitution of the former property (as the main approach), compensation with equivalent property, or compensation with government bonds. The process of restitution is considered as one of the most delicate systematic reforms in North Macedonia together with the privatization of the socially owned enterprises, including the socially owned agro-kombinats utilizing the large blocks of agricultural land as a result of the former collectivization process.

In March 2012, the Government announced that the restitution process had been finalized and 31 000 claims for restitution had been considered. There is no data available on the total area returned to the previous owners. However, based on the number of co-owned land parcels between the state and private owners and the size of the ideal parts of the private landowners (which was the usual modus operandi in the cases of restitution) the estimation would be that the area does not exceed 25,000 ha.

As a result of the restitution process, at present, 23,658 cadastral parcels of agricultural land became co-owned between the state and private owners covering an area of approximately 66,000 ha. Out of the above number, approximately 27,000 ha are land parcels larger than 2 ha which is the statutory threshold for physical division.

Thus, as mentioned, the restitution process in North Macedonia has not changed significantly the farm structures. North Macedonia has made some attempts but so far not chosen to privatise the remaining agricultural land in state ownership, but to lease it out. The total area of state owned agricultural land leased out up to 2019 is about 125,000 ha (out of 240,000 ha) (FAO 2019a). The land is leased out to approximately 9,000 tenants. Approximately 60% of the total leased out state land is granted to large corporate farms.

AREC data from 2014 indicate a total number of parcels of arable land in private ownership of 1,551,548 and 429,934 in state ownership. Thus, the average size in the country of privately owned parcels is very small and comprises 0.22 ha, while for the average size of state owned parcels is 0.56 ha (FAO 2019a).

The excessive fragmentation of both landownership and land use, is a result of the historical developments, traditional structure of the farms, inheritance customs and laws with the restitution process contributing on top of the abovementioned.

This small average size of the parcel as a production unit has negative effects on the productivity, competitiveness and efficiency of farms and prevents further modernization and economies of scale. The effects of fragmentation on the productivity of small-scale farms are analysed in the National Land Consolidation Strategy for the period 2012-2020 (MAFWE 2012). According to 2010 Farm Accountancy Data Network records, the profitability of agricultural farms shows a correlation between the size of the farm land and the number of parcels. Moreover, land fragmentation represents a challenge for the development and investments in roads, irrigation and drainage systems in rural areas.

It is important to clarify that for the purpose of this report, an *agricultural farm* is understood as an organized unit of production with or without legal status, comprised of both agricultural land owned (by its members) and leased in from other landowners. The same approach is applied in the methodology of the survey on the *Structure of agriculture holdings (farms)*, which was used as one of the two main sources of data in this section.

Thus, the basic information about the farm structures in North Macedonia has been extracted from the sample-based survey on the *Structure of agriculture holdings* conducted by the State Statistical Office (SSO) in 2013 and 2016<sup>1</sup>. The main information generated by the survey includes the total number of farms, an overview of land resources with the households including by main land use categories, irrigation status, information about agro-technical measures, number of livestock, labour force and other. Although the survey was also conducted in 2010 it was not used in the analysis since its data structure is not always similar and comparable with the 2013 and 2016 surveys.

The second source of pertinent information is the *Farm Register*. The Farm Register of North Macedonia is used to manage state support to the agricultural sector (agricultural subsidies). The register incorporates data on the farms, area utilized in total and per crop, and data related to cattle breeding. It is important to note that not all farm holdings are registered in the Farm Register, but only the ones that have applied for and are entitled for receiving subsidies.

A third potential data source concerning farm structures and land utilization could have been Agricultural Census data. However, the last Agricultural Census in North Macedonia was, conducted back in 2007, more than 15 years ago. Although an agricultural census usually provides a good overall of agriculture and land utilization in the countries, because the data is outdated and also because of an unsuitable data structure, the 2007 agricultural census data has not been taken into consideration in this analysis.<sup>2</sup>

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<sup>1</sup> <https://www.stat.gov.mk/PublikaciiPoOblast.aspx?id=79&rbrObl=38>

<sup>2</sup> The SSO is preparing to conduct a new Agricultural Census in 2023. The test census was conducted in June 2022 as a part of the preparation and the results are expected to be available at the end of 2023.

## 2.1. Description of the farm structures according to the Agriculture holdings survey

According to the farm structure survey data, the total number of farms in North Macedonia in 2016 amounted to **178,125** units utilizing in total **320,738** ha of agricultural land. Between 2013 and 2016, the number of farms increased with 4.2% (while the total available area of farms increased by 0.2%). The average farm size in the country in 2016 was **1.8** ha.

Out of total number of farms in 2016, 0.2 % or 280 were legal entities. The total agricultural land area available to farms registered as legal entities is 55,185 ha. The average farm size of the legal entity category was **197** ha accordingly, and it increased 10% from 2013 to 2016. A more detailed information about the farm structures is provided in the Tables 1, 2, and 3.

It is important to note that the farm size averages according to the Farm structure survey methodology include both **land in ownership and formally land leased in**.

	2013	2016	Change (%)
Number of farms	170,885	178,125	+4%
Total utilised agricultural area (ha)	315,863	320,738	+2%
Average size of farms (ha)	1.8	1.8	0%

**Table 1:** Farms (both individual household farms and legal entities).

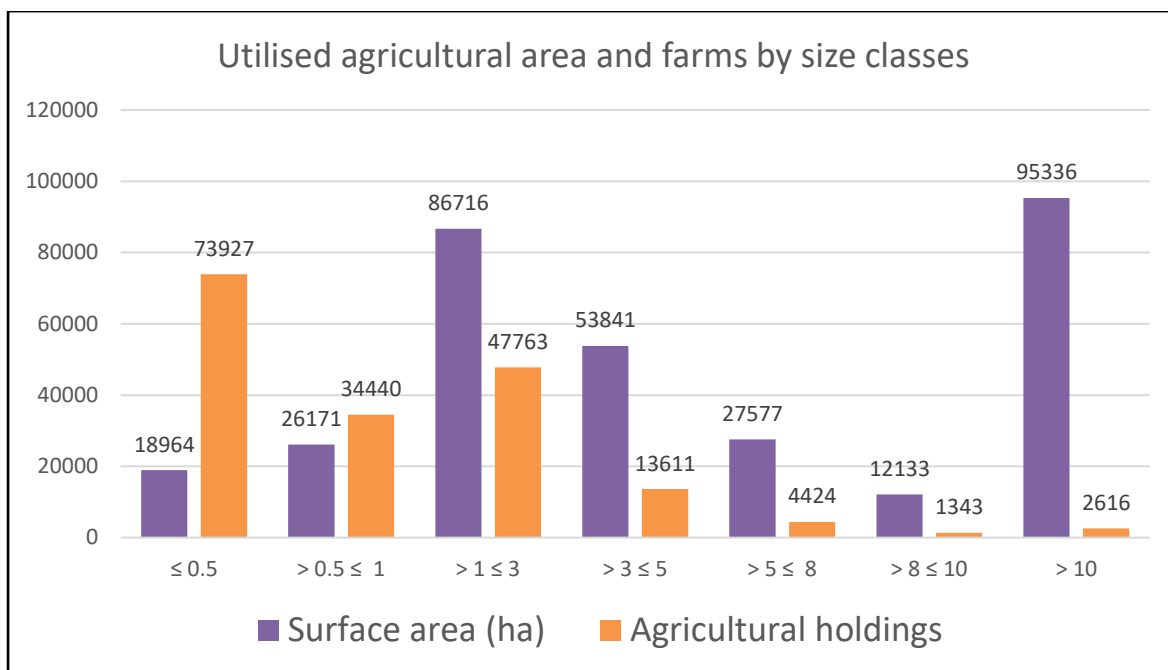
	2013	2016	Change (%)
Number of farms	170,581	177,845	+4%
Total utilized agricultural area (ha)	266,579	271,989	+2%
Average size of individual farms (ha)	1.6	1.5	-6.4%

**Table 2:** Individual (family) farms.

	2013	2016	Change (%)
Number of farms	304	280	-8%
Total utilized agricultural area (ha)	49,278	48,748	-1%
Average size of farms/legal entities (ha)	162.1	174.1	+7.1%

**Table 3:** Legal entity farms.

The distribution of utilized agricultural land and farms by their size classes is presented in Figure 1.



**Figure 1:** Utilised agricultural area and farms by size classes. Source: Author's own elaboration based on the Agriculture Holdings Survey 2016.

## 2.2. Description of the farm structures according to the Farm Register data

As mentioned, the analysis of the farm structures is also conducted based on the data from the *Farm Register* of MAWFE from 2017<sup>3</sup>.

While more recent data from the Farm Register are available (2020), due to the change in the classification and registration of the farms in the system in late 2017 the same categories of data are recently shared only about the registered farms that were recipients of the state subsidies. Taking into consideration the above, the available data sets are not comparable historically (both with the previous Farm register data and the latest sample-based survey on the *Structure of agriculture holdings* conducted by the SSO in 2016) and thus a separate analysis is provided for the year 2020. In addition, it should be noted that similarly to the data from SSO, the Farm Register reports do not differentiate between the types of tenure over the agricultural land utilized by the farms (ownership, lease or other) in the statistics presented.

The Farm register data is available on the number of farms, total surface of the available agriculture area, number of parcels, and data about the number and size of farms by size classes.

The data from the Farm registry from 2017 are complementary to the Farm survey data and it provides additional information about the number of registered parcels and opens up for the possibility to calculate two more farm structure indicators: *the average number of land parcels per farm and the average size of a parcel*.

<sup>3</sup> <https://app.powerbi.com/>

As of 2017, the Farm Register contained records about **161,657** farms in the Republic of North Macedonia (Table 4) with in total **308,025 ha** of utilized agricultural land.

	<b>Farm Registry 2017</b>	<b>Farm Survey 2016</b>
Total number of farms	161,657	178,125
Total utilized agriculture area of the farms (ha)	308,025 ha	320,738 ha
The average area per farm	<b>1.9 ha</b>	<b>1.8 ha</b>
Total number of agriculture parcels	937,699	n/a
The average number of parcels per farm	<b>5.8 parcels</b>	n/a
Average parcel size (ha)	0.32 ha	n/a

**Table 4:** Comparison between the Farm registry data and the Farm structure survey data.

Interestingly, about 40% of the farms in the Farm Register do not cultivate any agricultural land (Table 5). These are usually farms that are engaged in raising livestock or beekeeping for instance.

Thus, we can conclude that in average, one farm in North Macedonia uses **1.8-1.9 ha** of agricultural land divided into **5.8** land parcels with an average size of **0.32 ha**. The analysis results also confirms the polarized farm structure in North Macedonia where about 0.1% of farms larger than 100 ha are farming about 32% of all agricultural land (according to the Farm Registry data 2017).

	<b>Number of agriculture holdings</b>	<b>Total area</b>
Farms without registered ag. land	63,909	0
<2 ha	66,496	56,187.8
2 – 4.9 ha	23,422	70,326.7
5 – 9.9 ha	5,430	36,110.5
10 – 19.9 ha	1,508	19,904.1
20 – 29.9 ha	369	8,809.2
30 – 49.9 ha	271	10,298.9
50 – 99.9 ha	123	8,186.4
> 100 ha	129	98,201.7
<b>Total</b>	<b>161,657</b>	<b>308,025.3</b>

**Table 5:** The farm register classification of farms according to main size classes, 2017.

Finally, the survey on the structure of agriculture holdings conducted by the SSO in 2016 also provides data on the share of agricultural land used by the owners of the land and used through rental agreements. Out of all 320, 738 ha of utilized arable agricultural land **68%** of the land was in 2016 used by the owner of the land and **32%** through lease agreements. When we look at the land utilized by individual farms, as much as 78% was used by the owners and only 22% was rented. For agricultural land farmed by corporate farms (business entities), only 10% of the land was owned while 90% was rented, usually through long term agreements to use large areas of state owned agricultural land.

### **3. Agricultural land markets in North Macedonia**

Agricultural land markets by means of their transfer function are fundamental for agricultural development including in addressing the problems of inefficient farm structures, land abandonment, provision of land for public objective projects, provision of access to land to young farmers and farms to develop into commercial family farms, implementation of redistributive land reforms, and is a precondition for the application of several land management instruments such as land consolidation, banking and lease facilitation.

The theoretical expectation is that land markets can provide a low-cost means to carry out transactions that would transfer agricultural land to most productive use (Deininger and Feder 1998). Thus, the land market can transform land ownership and use patterns by shifting land to more efficient users / uses or from landowners who are not interested in cultivating land, to active farmers interested in acquisition of more land (Gorgan and Hartvigsen 2022).

Land market functionality is not an end in itself, but should serve the goals of policy support to farmers and agricultural and rural development in general. Agricultural land is not a commodity in its conventional sense because it is linked to a specific location and because it is not infinitely reproducible over time in the way that labor and capital are (Gorgan and Hartvigsen 2022).

Agricultural land is clearly heterogeneous and may be categorized according to location, agricultural use category such as arable, pasture or perennials, fertility, and ownership structure. Other market imperfections result from nonmaterial values attached to land such as social, emotional, cultural, or even religious values.

This section first presents a brief description of the land administration system in North Macedonia, analysis of the regulations of agricultural land markets and presents updated figures on land market dynamics.

#### **3.1. The land administration system**

The Republic of North Macedonia recognizes in its Constitution private property to agricultural land and property rights are as mentioned tradeable and inheritable.

The institution responsible for establishing and maintaining the real estate registry and cadastre is the Agency for Real Estate Cadastre (AREC).

The Law on Real Estate Cadastre<sup>4</sup> is the main law regulating the activity of the AREC, including establishment and maintenance of the real estate cadastre, creation and management of the land registration and cadastral information system, provision of information. AREC also publishes regular official statistics on the formally registered land market transactions. AREC operates a GIS portal, which allows to view free of charge basic information about real estate property, visualize borders of land parcels, topographic maps and other products, and to request

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<sup>4</sup> <https://www.katastar.gov.mk/en/laws/>



services or electronic documents, e.g. property certificates or detailed cadastral boundary certificates, against a fee.<sup>5</sup>

The immovable property registry is fully computerized and land records are digital. The cadastral maps and the registration information are kept in a single database. The land registry represents a comprehensive and functional database allowing for registration and checking for encumbrances (liens, mortgages, restrictions and the like). AREC also records the boundaries of various administrative units within the country<sup>6</sup>. AREC reports that all privately held land parcels in the country are mapped but not all are yet formally transferred from the old land cadastre to the new real estate cadastre system. The total number of registered parcels of agricultural land (excluding pastures) in the country is around 1.98<sup>7</sup>million.

AREC works and activities are financed from the state budget for approximately 30 % of its budget, while 70 % is coming from the fees paid by the users of the land registry. The cost of registering property in North Macedonia is in average estimated at around 3 % of the property value<sup>8</sup>, which is somewhat high in comparison with other countries in Europe. While the registration of private property has improved with in the past decade, the problems of registration of the state property are more excessive.

In North Macedonia, the private sector, in particular private geodetic companies, are involved in performing cadastral surveying and geodetic services. As of 2022, there were 139 private surveying offices and 294 licensed surveyors in the country<sup>9</sup>.

### **3.2. Regulation of agricultural land markets**

The legal protection of private ownership rights to agricultural land is enshrined in the Constitution of the Republic of Macedonia of 1991. These constitutional provisions are specified in Article 30, which guarantees ownership rights and inheritance rights, and in Article 55, which guarantees freedom of the market and entrepreneurship. The Constitution provides that ownership creates both rights and responsibilities; hence it should serve the well-being of both the individual and of the community<sup>10</sup>.

The Law on Property and Other Real Rights as a general law introduces some market limitation related to agricultural land. In particular, this is the bar on foreign ownership (both of legal entities and individuals). More specifically, when it comes to the acquisition of ownership rights over agricultural land, the law states that the foreign natural persons and legal entities cannot acquire the right of ownership of agricultural land in the territory of the Republic of North Macedonia.

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<sup>5</sup> <http://ossp.katastar.gov.mk/OSSP/>

<sup>6</sup> <https://dergipark.org.tr/en/download/article-file/2329982>

<sup>7</sup> AREC, 2014

<sup>8</sup> <https://archive.doingbusiness.org/content/dam/doingBusiness/country/n/north-macedonia/MKD.pdf>

<sup>9</sup> Source: AREC 2022

<sup>10</sup> <https://core.ac.uk/download/pdf/6671558.pdf>

Foreign natural persons and legal entities may, under the conditions of reciprocity, acquire the right to a long-term lease of agricultural land in the Republic of North Macedonia, on the basis of consent from the Minister of Justice, upon a previously acquired opinion of the Minister of Agriculture, Forestry and Water Economy and the Minister of Finance. The existence of reciprocity foreseen is to be determined by the Minister of Justice, under the conditions and in the procedure determined by law.

The Law on Agricultural Land is the main legal act regulating agricultural land utilization and preservation, land conversion and at the same time laying down the rules and procedures for leasing out of state owned agricultural land.

As a special law, the Law on Agricultural Land, considering the abovementioned bar on foreign acquisition of agricultural land in the general law, is also detailing the agricultural land market regulation instruments applicable for the citizens of North Macedonia. In particular, it introduces a bar on physical division of agricultural land parcels smaller than 2 ha and a pre-emptive right for co-owners, joint owners and neighbors in case of sale. The enforcement of this mechanism is done in the property transaction process and enforced by the Notary Public offices. In addition, it is to be noted that the same law introduces some protection of the tenants of state owned agricultural land only. However, as a considerable area of the state owned agricultural land was already leased out on long term contracts prior to the introduction of some of the tenant protection provisions in the Law and the protection mechanisms were introduced in and amended several times from 2007 to date, it should be noted that different sitting tenants holding long term leases on state land enjoy various levels of protection. The only constant protection measure that seems to appear in all active lease agreements is the right to automatic renewal of the lease to the state owned land parcel.

In addition to the abovementioned legislative acts, the Law on Sale of State-owned Agricultural Land adopted in 2013 is regulating the rules and procedures of acquisition of state-owned agricultural land also following the general bar on foreign purchase. In particular, it stipulates two types of procedures for sale (privatization) of the state-owned property: i) through the Annual Program and ii) on request as a pre-emptive right of the sitting tenants (long term lease holders). It also introduced methodology for regulation of maximum area offered under each Annual Program for sale as well as the maximum cumulative area to a single individual or legal entity and introduces bar on consecutive sales to close family members and connected legal entities as well as limitations of the origin of the capital of the companies five years before the purchase.

In addition, there's a bar on transactions of the purchased land for five years after the acquisition. It also introduces limitations in terms of the place of residence of the potential buyers for agricultural land up to 10 ha limiting it only to the municipality residents where the land is located while for land blocks larger than 10 ha the only criteria for sale is the highest bid in a public auction process.

It should be noted that although the Law on Sale of State-owned Agricultural Land has been adopted in 2013, its implementation has been delayed due to the inconsistencies in the legal text and although one Annual Program was adopted in 2014, not a single sales transaction has been concluded up to date, with exception of the several transactions of the land under glasshouses that has been offered to the owners of such glasshouses in a separate, exceptional procedure.

In 2020, MAFWE with the technical assistance of FAO has drafted amendments to the abovementioned Law which differentiates the state-owned agricultural land in several different categories and lays down specific rules and regulating for sale of each of these categories. A series of public consultations over the draft amendments of the Law have been concluded in 2021/22. However, the amendments have not been processed by the Government and consequently the Parliament until February 2023.

The land regulations in place in North Macedonia have in this project been assessed using a framework suggested by Swinnen et al. 2014, comprised of 15 different variables and grouped into four categories:

1. Measures to protect the tenant (5 variables)
2. Measures to protect the owner-cultivator (6 variables)
3. Measures to protect the non-farm owner (2 variables)
4. Prevent fragmentation of agricultural land (2 variables)

The full list of variables and their description is shown in Annex 1 which also presents how the qualitative information for each of the variables is used to create quantitative indicators. For most of the variables, this is a simple 0 -1 quantification. This applies especially when it concerns the existence of a specific law/regulation or not.

Later the scoring of the indicators is used to create a “Tenant Protection Index” (TPI), an “Owner Protection Index” (OPI) and a (total) “Land Regulation Index” (LRI), and to compare the North Macedonia land market regulatory framework with 21 European countries assessed by Swinnen et al. 2014.

#### *Measures to protect the tenant*

Land market regulations aiming to protect the tenant can include regulations that impose maximum rental prices, minimum rental contract duration, automatic rental contract renewal, conditions for rental contract termination and pre-emptive buying right of the tenant. In North Macedonia all the five variable under this category get zero score meaning that the rights of tenants are protected weakly compared with the other countries. As mentioned above, some of the above categories do exist in the national legal framework, but only in relation to the state owned agricultural land. However, due to the fact that more than half of the state land was already leased by the time of imposing these protective clauses for the tenants and considering that the current Law on sale of state owned land has not been implemented since its adoption and in both cases none of the legal mechanisms apply to the privately owned land, North Macedonia has been assessed to have a low level of protection of the rights of the sitting tenants.

#### *Measure to protect small (local) owner / cultivator*

Land market regulations which aim to protect the owner / cultivator include restrictive conditions on the owner (such as nationality), maximum sales prices, preemptive right for neighboring farmers and a maximum on the transacted area fall under this category. In North Macedonia, there is a restriction for legal entities (purchase, inheritance, etc.) with shares owned by foreigners. Also, natural persons with foreign citizenship are prohibited to own agricultural land. The leasing of agricultural land is not prohibited for both foreign natural persons and companies. However, a prior consent of the Minister of Justice and positive opinions from the Minister of Agriculture and Minister of Finance are required as discussed above. According to the Law on Agricultural Land, neighboring farmers have a pre-emptive right in case the adjacent parcel is put on the market for sale.

#### *Measures to protect non-farm owners*

Regulations to protect the landowner include the maximum duration of a contract and minimum rental prices.

The law regulates a minimum rental price for state-owned agricultural land and a maximum length of time tenancy duration. During the years 2006-2010, MAFWE signed around 3,000 contracts for renting out around 123,000 ha of state land.

#### *Measures to prevent fragmentation*

In North Macedonia it is prohibited to divide agricultural land parcels below a 2 ha threshold. Co-owners and neighbours have pre-emptive right in case of other co-owners decide to sell.

#### *The extent to which land market regulations affect land market functioning in North Macedonia as compared to the EU countries.*

To quantify the extent and differences in regulations affecting the functioning of the agricultural land sales and rental markets in North Macedonia, the variables under each measure were aggregated into an index for TPI, OPI and LRI (by simply adding the various variables). Table 7 contains the scoring calculated for North Macedonia and ranks the country in comparison with 21 EU countries assessed by Swinnen et al. 2014. Table 7 shows the large differences among the EU countries in relation to regulation of agricultural land markets. The strongest regulations are not in the former communist Central and Eastern European member states of the EU but in some of the Western European (long term market economy) countries. North Macedonia is placed somewhere in the middle with a medium level of land markets regulation with clear focus on protection of landowners and prevention of fragmentation and very little or no protection of the sitting tenant on agricultural land.

	Measures to protect the tenant/ Tenant Protection Index (TPI)	Measures to protect the small ownercultivator/ Owner Protection Index (OPI)	Measures to protect the nonfarm land owner	Measures to prevent fragmentation	Total Land Regulation Index (LRI)
France	5	3	1	0	9
Hungary	1	5	1	1	8
Poland	1	3.5	1	1	6.5
Slovakia	2	1	1	2	6
Netherlands	5	0	0	1	6
Austria	2.5	2	1	0	5.5
Belgium	5	0	0	0	5
Italy	3	1	0	1	5
Portugal		1	0	1	5
Slovenia	3	1	0	1	5
<b>N. Macedonia</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>5</b>
Lithuania	1	1.75	0	2	4.75
Latvia	1	2.5	0	0	3.5
Sweden	2	0	1	0	3
Denmark	0	2	1	0	3
Czech Republic	0.5	0	1	1	2.5
Germany	0.5	0	0	1	1.5
Romania	1	0.5	0	0	1.5
Finland	0	0.25	1	0	1.25
UK	0.5	0	0	0	0.5
Greece	0	0.25	0	0	0.25
Ireland	0	0	0	0	0

**Table 7:** A comparison of EU countries and North Macedonia land regulation indicators.

### 3.3. State of development of the agricultural land markets in North Macedonia

In 2016, AREC started to report on the market transactions of agricultural land, i.e., the prices stated in the sales or leases notarized contracts, thus enhancing the transparency of the land market information. AREC prepares quarterly a report based on the *Price and Rent Register* and publishes it on its corporate website. The below information was extracted and aggregated from these quarterly reports separately for sales and rental markets. The reports do unfortunately not provide separate data for state and private owned land.

#### Sales market

Table 8 shows key sales market indicators for the period 2016-2020. The so-called land turnover is a key indicator for the level of activity in a sales land market and is measured as the percentage of all (arable) agricultural land in the country that is changing owner in a certain year through sale-purchase transactions (Gorgan and Hartvigsen 2022).

Year	Hectares traded	Average price EUR/ha	Number of transactions	Average ha/ transaction	% of total private land (annual land turnover) <sup>11</sup>	% of total private utilized agricultural area <sup>12</sup>
2016	1,881	19,139	5,856	0.32	0.54	0.69
2017	1,537	19,244	5,442	0.28	0.44	0.56
2018	1,969	25,029	6,594	0.30	0.56	0.72
2019	1,612	27,035	5,247	0.31	0.46	0.59
2020 <sup>13</sup>	1,873	23,285	5,480	0.34	0.50	0.70

*Table 8: Agricultural land sales market performance.*

The average annual land turnover around **0.5 %** looks relatively stable in the reported years. During this period, on average, around 1,700 ha were transferred annually, while the parcel size traded was around 0.3 ha.

In comparison, during 1997–2007, between 1% and 2% of the total utilized agricultural area was traded annually in Belgium, Italy, France and Finland, while the same figure for the Netherlands in the same period varied between 2% and 4% (Gorgan and Hartvigsen 2022, pp. 5). In Lithuania, the annual land turnover of private owned agricultural land was around 3% in the period 2000–2003, while it dramatically increased to 5–7% after becoming an EU member country in 2004. In the Czech Republic, the annual turnover of private purchased land amounted to about 0.3% of the total agricultural area in average during the period of 1993–2001. However, from 2002 to 2004, the annual turnover of private land increased to 1.5% and to 3.3% in 2005 after EU accession. Thus, we can conclude that the agricultural land sales market in North Macedonia is functioning but is still weak with relatively few annual transactions.

In the period from 2016 to 2020, the average sales price of agricultural land was increasing (Table 8)<sup>14</sup>. The highest price increase of 23% was attested in 2018.

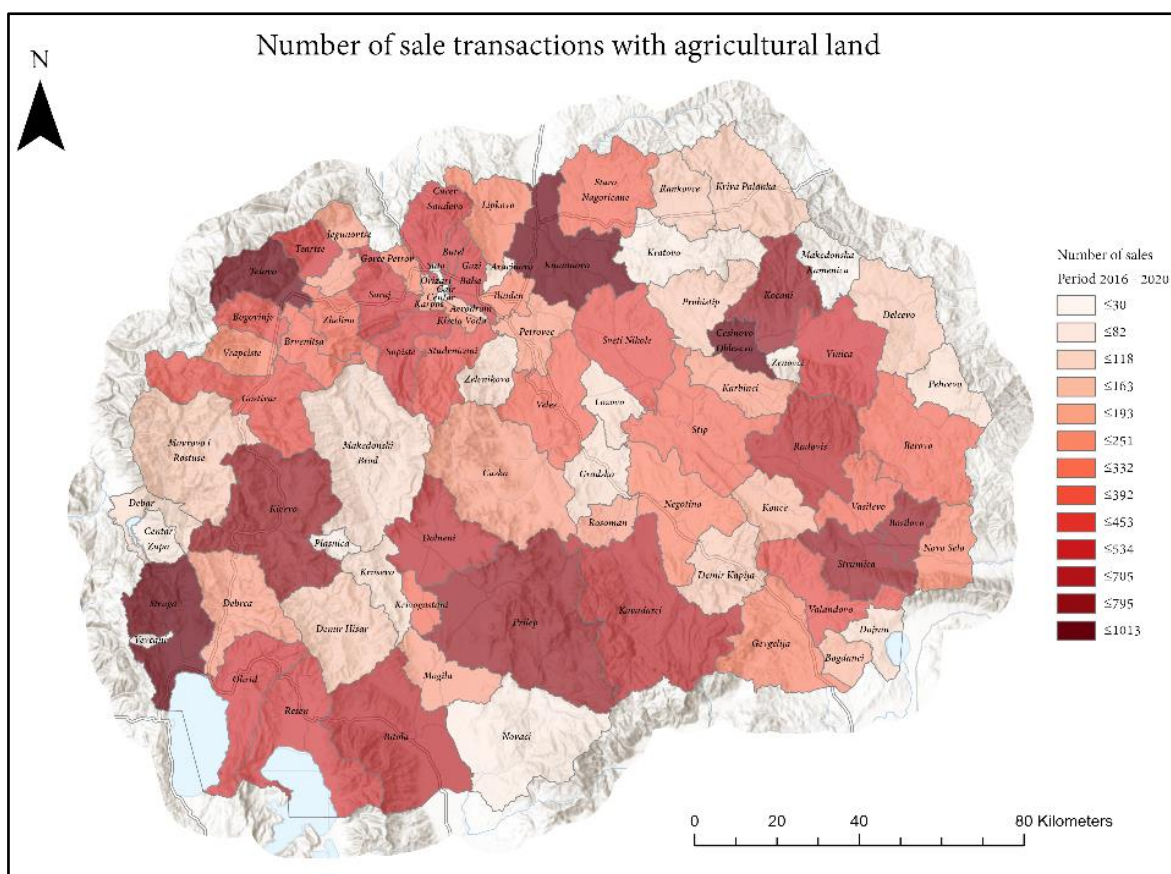
The average sales price per hectare of 22,000 EUR during 2016-2019 appears to be somewhat high for the agricultural land in comparison with the price level reported by farmers that have participated in land consolidation projects under the MAINLAND project and currently advertised agriculture land parcels for sale. The current prices per hectare in the Pelagonia region goes from 8,000 to 13,000 euro. The average price per hectare of 22,000 euro, obtained by the analysis of data from AREC is much higher than stipulated price. This is likely a result of transactions with parcels of agricultural category in the proximity to or part of urban or rural settlements, carried out for non-agricultural purposes, e.g. housing and construction purposes.

<sup>11</sup> 350.000 ha; source - AREC

<sup>12</sup> 272.000 ha; source - Farm Structure Survey, SSO

<sup>13</sup> Data for the whole year extrapolated from the first three quarters.

<sup>14</sup> Only first three quarters of 2020 are taken into consideration.



**Figure 2:** Number of registered sales transactions per municipality during 2016-2020. AREC 2021. Author's design using the following datasets: NUTS 4 municipalities' boundaries by the Agency for Real Estate Cadastre (AREC); number of sales transactions by AREC; ESRI World Base map.

### Lease market

Table 9 shows key lease market indicators for the period 2016-2020. The table shows only formally registered lease agreements (long-term) as it is not common to register short-term lease agreement and short-term use agreements usually remain informal in North Macedonia as in other countries.

Year	Hectares leased	Average price EUR/ha per year	Number of transactions	Average ha/transaction	% of total private land <sup>15</sup>	% of total private utilized agricultural area <sup>16</sup>
2016	2,360	70	1,294	1.82	0.67	0.87
2017	991	29	860	1.15	0.28	0.36
2018	1,013	34	1,294	0.78	0.29	0.37
2019	1,372	36	1,202	1.14	0.39	0.50
2020 <sup>17</sup>	1,444	52	1125	1.28	0.40	0.50

**Table 9:** Agricultural land lease market performance.

<sup>15</sup> 350.000 ha; source - AREC

<sup>16</sup> 272.000 ha; source - Farm Structure Survey, SSO

<sup>17</sup> Data for the whole year extrapolated from the first three quarters.

According to the *Register of prices and leases at AREC*, the average lease price per hectare suffered significant changes in the period 2016-2020 (Table 9). The highest price per month per hectare is in 2016, and the lowest price is in 2017. This rental price is debatable since on one hand, very often there is underreporting of the lease rates with the objective to lower the income tax burden, due to “fictional” lease agreements between close family members (affecting the eligibility for subsidies) and due to existence of informal lease agreements.



## 4. Current state of land abandonment in North Macedonia

This section first provides an overview of land abandonment in Europe, then an overview of the legal and institutional framework pertinent to land abandonment in North Macedonia and analysis first the extent of land abandonment in North Macedonia using spatial data and finally the root causes of the land abandonment.

### 4.1. An overview of land abandonment in Europe: the actual situation and projections

Abandonment of arable agricultural land is a common land-use trend in many regions worldwide (Levers et al. 2018). In the period 2015-2030, about 11% (more than 20 million ha) of agricultural land in the EU are under high potential risk of abandonment due to factors, related to biophysical land suitability, farm structures and agricultural viability, population and regional specifics (Perpina Castillo et al. 2018).

Among the EU Member States, Spain (in particular the North / Northwest part) and Poland (where the largest single loss at NUTS 3 level<sup>18</sup> is projected for the Chelmsko-Zamojski region – 85,000 ha) are likely to face by far the highest level of agricultural land abandonment in both absolute and relative terms. The two countries are projected to account for 1/3 of the total EU loss of agricultural land and Spain will be the only EU country to lose more than 1 million ha.

In Spain, in 2019, according to the Spanish Agrarian Guarantee Fund (FEGA), surfaces abandoned and without agricultural use are estimated at more than 2.32 million ha, representing 20% of all arable land area or 4.5% of the total agricultural area (Lasanta et al 2021).

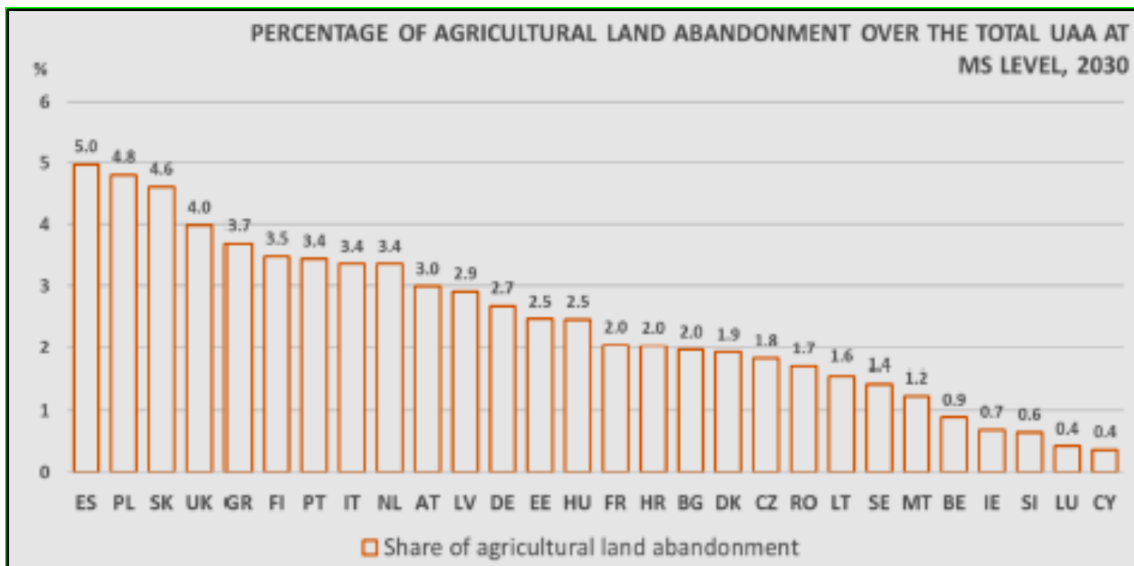
In absolute terms, France (South / Southeast), Germany (Western parts) and Italy (especially Sardinia) complement Spain and Poland in the group of the largest agricultural land abandonment among the EU member countries, altogether responsible for more than 70% of the loss.

In relative terms (% of country's UAA), the abandonment will be less pronounced in Germany and also France - below the 3% EU average, because of the large total stock of agricultural land in both countries. The Netherlands (notably South Limburg), Northern Portugal, Finland, Greece (particularly Korinthia and Lefkada island) and especially Slovakia (4.6% loss projected) are expected to be above the 3% EU average.

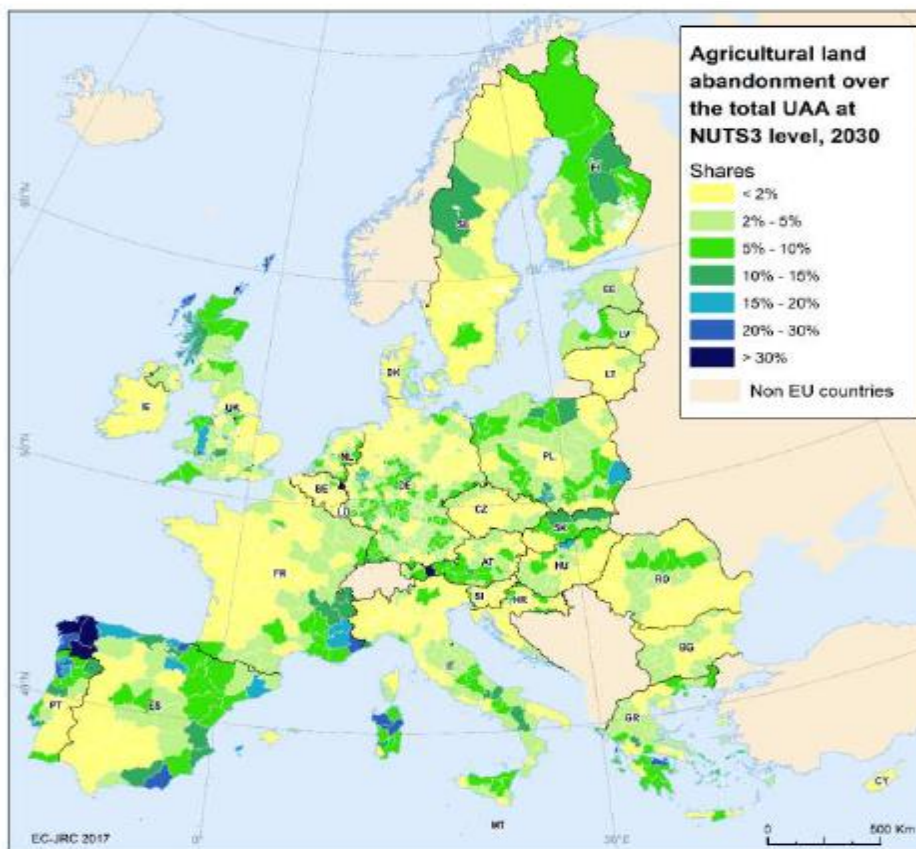
Figure 3 presents the expected relative (as share of total UAA) agricultural land abandonment between 2015 and 2030 per EU Member States, while Figure 4 presents the projected abandoned agricultural land as share of total agricultural land at NUTS 3 level in the EU within the period 2015-2030.

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<sup>18</sup> EU nomenclature of territorial units for statistics, 3<sup>rd</sup> level: small regions for specific diagnoses (NUTS 3).



**Figure 3:** Projected agricultural land abandonment between 2015 and 2030 in EU Member States, % of total UAA. Source: Perpina Castillo C., Kavalov B., Diogo V., Jacobs-Crisioni C., Batista e Silva F., Lavalle C. 2018. Agricultural Land Abandonment in the EU within 2015-2030. European Commission. [https://joint-research-centre.ec.europa.eu/document/download/fd756a75-5aba-4051-9aaa-e1c21485f34d\\_en?filename=jrc113718.pdf](https://joint-research-centre.ec.europa.eu/document/download/fd756a75-5aba-4051-9aaa-e1c21485f34d_en?filename=jrc113718.pdf).



**Figure 4:** Shares of agricultural land abandonment with regard to the total agricultural land aggregated at NUTS 3 level in 2030.

Source: Perpina Castillo C., Kavalov B., Diogo V., Jacobs-Crisioni C., Batista e Silva F., Lavalle C. 2018. Agricultural Land Abandonment in the EU within 2015-2030. European Commission. [https://joint-research-centre.ec.europa.eu/document/download/fd756a75-5aba-4051-9aaa-e1c21485f34d\\_en?filename=jrc113718.pdf](https://joint-research-centre.ec.europa.eu/document/download/fd756a75-5aba-4051-9aaa-e1c21485f34d_en?filename=jrc113718.pdf).

Land abandonment is also widespread in other regions of Europe including in the Western Balkans countries. In Bosnia and Herzegovina, the figure is assessed as high as 45% of the arable agricultural land (Gorgan and Hartvigsen 2022). In Albania, about 10% of all privately-owned agricultural land (excluding pastures and hayfields), or about 56,000 ha, is estimated to be abandoned (Tarelli 2013). Türkiye has about 2 million ha of abandoned agricultural land. In Armenia, according to the 2014 Agricultural Census data, 33% of the land of family farms and 38% of the land of corporate farms is abandoned (FAO 2017).

#### **4.2. Legal and institutional framework pertinent to land abandonment**

The Law on Agricultural land<sup>19</sup> contains provisions towards the rational use of agricultural land as limited natural resource, protection of the agricultural land and protection of the ownership and user rights over agricultural land. Furthermore, it specifies that the agricultural land is a resource of public interest that enjoys special protection. Furthermore, the law declares that the right to ownership of agricultural land produces rights and responsibilities for the owner and serves for the good for both the owner and the society. The owners of agricultural land are obliged by the Law to utilize the agricultural land in accordance with its primary use, to maintain it and increase its fertility, as well as to prevent it from pollution and other types of degradation. In this way, the Law already lays down the basis for further development of instruments for combating land abandonments. However, there are no further explicit provisions that would enforce the declared goals for a special protection and/or utilization of the agricultural land for its primary purpose.

In the further analysis of the national legal framework no direct legal mechanisms were identified to combat land abandonment with exception to the recurrent property tax obligation for the unutilized agricultural land introduced under the Property Tax Law<sup>20</sup>. While the measure was originally not specifically designed as an instrument for combating agricultural land abandonment, but rather for safeguarding the active farmers as a specific category of citizens from property taxation, its function, if properly enforced, could be dual.

In particular, the Property Tax Law contains in article 8 a tax waiver on the annual property tax for utilized agricultural land. The designated tax authorities are the municipalities and the average tax rate varies from 0.1% to 0.2% of the value of the property and the decision on the actual tax rate in the stipulated range is made by the municipal councils. With the latest changes to the Property Tax Law in 2021, the tax rate for the unutilized agricultural land has been increased to three times of the nominal tax rate determined by each municipality. Thereby, the land tax accrued for a conditional abandoned land plot of 1 ha, of a market value of 10,000 Euro, will be 60 Euro per year ( $0.2\% * 3 * 10,000$  Euro).

The property tax is collected based on the Tax Registers established on municipal level containing the information on the eligible taxpayers, the area of the lands and buildings, the value of the property, property tax rates and the tax collection rates and debt from previous

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<sup>19</sup> Official Gazette No. 135/07 with subsequent amendments. <https://diz.gov.mk/wp-content/uploads/2021/01/the-law-on-agricultural-land.pdf>

<sup>20</sup> Official Gazette, No. 61/2004 with subsequent amendments.

years. Municipalities are required to harmonize their property registers Real Estate Cadaster database and submit the contents of their property registers to the Central Register and the Public Revenue Office.

The basis for calculation of tax liability is the market price and the obligations are calculated in accordance with the Methodology for valuation of immovable property under the Law on Valuation. The market value is determined based on the comparable method and in case there are no market transactions of comparable nature in the particular municipality, the compensation rates for expropriation are used. In case there are no cases of expropriation either, the calculations are done based on the market value of similar property in the neighboring municipalities. The municipal authorities are obliged to conduct zoning and assessments based on the obtained immovable property market prices as well as regular revalorization of such zoning methodology. The control and audit functions over the determination of the market price as the basis for taxation is granted to the Ministry of Finance and the Chamber of Valuers in certain cases, while the control and collection of the tax revenues is sole responsibility of the municipal authorities.

The property tax law prescribes severe penalties for those who fail to pay on time, beginning with the seizure of personal property and extending to the garnishing of wages (Dillinger et al. 2019).

While the overall legal regulation is considered to be satisfactory, municipalities face significant difficulties to keep the accurate registers, there are discrepancies in the valuation and in some cases the municipal authorities have not even harmonized their valuation methods with the centrally adopted acts. Although there are no available accurate data on the collection rates on municipal level overall, nor per category of immovable property, according to some reports as high as 43% of the municipalities collected less than 80% of their yearly projections on property tax collection (Andonova et al. 2020) and the tax revenue is ‘lower than 100 percent-in some cases significantly so’ (Dillinger et al. 2019)<sup>21</sup>.

Even though the relevant Law provides extensive enforcement powers to the municipalities, the reasons for de facto low performance of the local authorities related to the property tax collection are numerous and include inadequate or insufficient staffing, reluctance of the local officials to tax the residents, lack of accurate data from AREC and Tax Revenue Office as some of the municipalities operate with the lists and registers provided by the above institutions in 2005 as part of the decentralization process, discrepancies in the methodological approach in the property valuation process as basis for taxation, lack of accountancy software and procedures, etc.

All the above mentioned constraints are even more amplified when it comes to the property taxation of agricultural land as only uncultivated (unutilized) land parcels according to the law are subject to taxation. The information on the utilization is not available in AREC nor the Public Revenue Office and these are the only two sources that the municipal authorities get their data from. In addition, and especially considering that the majority of the agricultural land

area is situated in rural municipalities, it is virtually impossible to use the valuation and tax collection administration for field inspections over the status of utilization per land parcel of agricultural land, nor there are accurate data elsewhere in the public administration that could be made available to the municipal tax collection authorities. Therefore, in reality, this legal solution in reality provides for a general tax waiver on agricultural land.

The Law on Agricultural Land stipulates the maintenance of a Register of Agricultural Land with a special section for sub-register of unutilized agricultural land (recorded either on request of the owner or ex-officio by MAFWE) which should be regularly published on MAFWE webpage. However, such register has never been established or maintained by MAFWE. It is unclear what would be the purpose of the public display of such records even if properly maintained, firstly because there are currently no specific land management instruments benefiting from such exercise and secondly, the Law on Agricultural Land and the Law on Property Tax do correspond on the issue, in order to open a possibility for such data to represent a mandatory basis for the municipal tax authorities for recurrent property tax collection on unutilized agricultural land. In addition, the solution to establish of register based on request of the landowners without stipulating an obligation for the landowners to mandatory produce such declarations or possibly ex officio (without establishing the rules and procedures for determination of the unutilized agricultural land on recurrent basis for the public administration to be able to act ex-officio) is not enforceable and a separate issue for discussion and improvement.

A functional system of monitoring and identification of abandoned land done *ex-officio* by MAFWE (i.e. Register of Agricultural Land) and introduction of legal mechanisms for mandatory data exchange between MAFWE and municipal authorities, will offer sound basis for the municipalities to tax abandoned agricultural land.

### **4.3. Identification of abandoned arable agricultural land: methodology and results**

Three different data sources with spatial and attributive data have been used to conduct the analysis to establish an overview of the extent of abandoned agricultural land in North Macedonia. The main data source used is the country-wide cadastral map showing land parcels boundaries as well as attributive data for each parcel. The second data source represents boundaries of farms as registered in the Land Parcel Identification System (LPIS) managed by the MAFWE. The third data source used in the analysis is satellite imagery from different time periods with spatial and temporal resolution suitable for the identification of abandoned agricultural land.

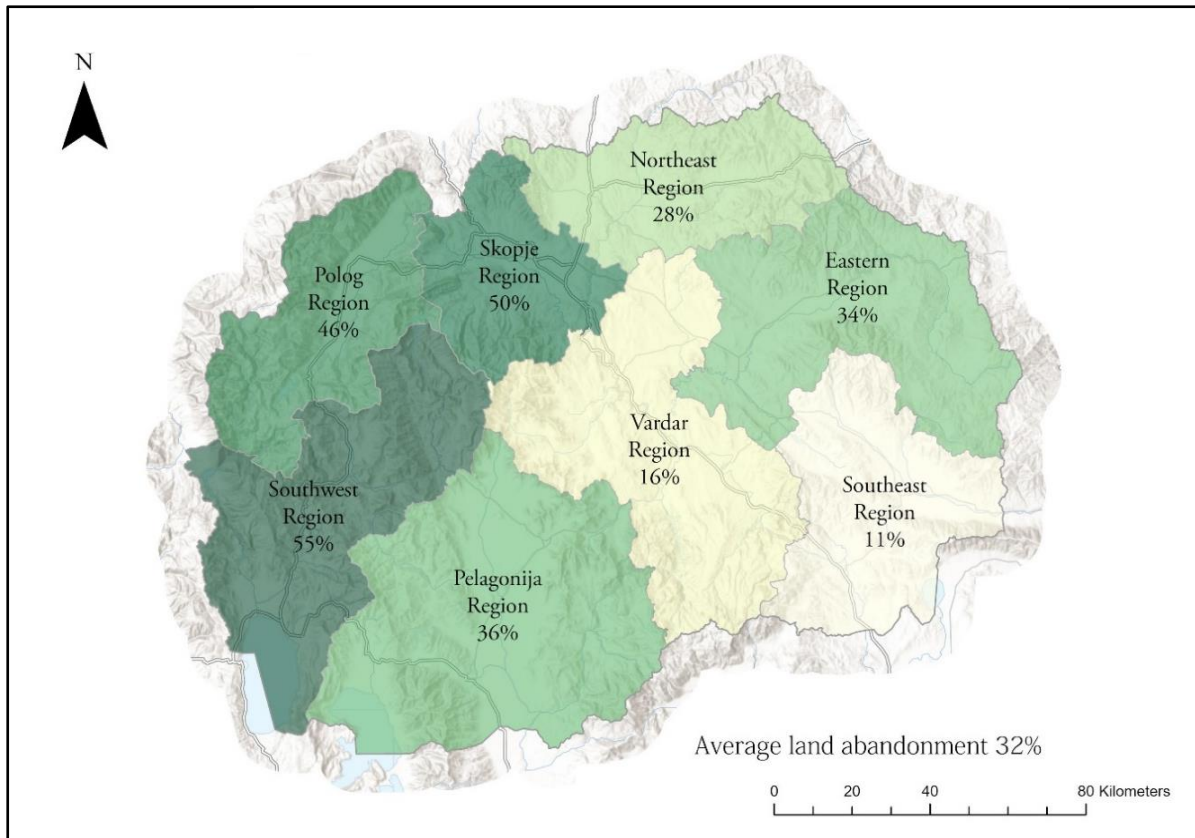
The applied process of identification of abandoned agricultural land consists of three major steps. The *first step* of the process is based on the cadastral parcel data extracted from the AREC database. This dataset consists of all cadastral parcels in North Macedonia. This step has identified cadastral land use classes that belong to the category of agricultural land such as arable land, gardens, orchards, vineyards and rice fields. Only the parcels that have been assigned to some of these classes are selected for further processing and analysis (meadows and pastures were excluded from the analysis). The dataset of agricultural land parcel selected

for the analysis also contains information about land classes assigned to each land parcel (from 1<sup>st</sup> to 8<sup>th</sup> class). This new dataset consisted only of parcels belonging to the category of agriculture land is named as Registered Agriculture Land (RAL).

The *second step* in the analysis combines RAL and LPIS datasets. The RAL dataset consists of cadastral parcels officially registered in AREC as agricultural land but without information if parcels are cultivated or not. On the other hand, LPIS dataset consists of only cultivated parcels belonging to the category of agriculture land, where property owners have applied for agriculture subsidies. LPIS data is considered reliable since these areas are regularly controlled and validated by MAWFE. In this second step of the process, LPIS dataset is subtracted from the RAL dataset in order to remove parcels for which we have reliable information that does not fall in the category of abandoned land. The result of the second step is a new dataset consisting only of cadastral parcels that need to be manually checked in order to confirm if the land is either cultivated or abandoned.

The *third step* consists of a manual assessment of each parcel in the dataset created as the final product of the second step. The parcels are overlapped and analyzed in comparison to satellite images of different time periods. From a visual inspection of satellite images, a conclusion can be made if a particular land parcel is cultivated or abandoned. The satellite images used in this process are part of the *ESRI Way Back* archive which consists of images part of the *World Imagery Basemap*, satellite data obtained from around the world in the past years. The resolution of the used satellite images is between 0.6 m and 1.2 m and the years of observations are 2014, 2015, 2019 and 2020.

The final result of the overall process is a new dataset that consists of cadastral parcels registered as agricultural land by AREC, which after concluding the abovementioned three consequent steps, are identified as abandoned agricultural land. This final dataset of abandoned land is used in this report for further statistical analysis on agricultural land abandonment in North Macedonia while the visual presentation of the results of the above explained exercise on regional and municipal level is provided in Figure 5 and 6 respectively.



**Figure 5:** Percentage of abandoned arable agricultural land in North Macedonia by regions in 2020 based on the conducted analysis. Author's design using the following datasets: NUTS 3 statistical regions by the State Statistical Office; an assessed amount of abandoned agricultural land by regions; ESRI World Base map.

As presented in Figure 5, the magnitude of land abandonment is higher in the western part of the country and in mountainous areas and municipalities and not surprisingly lower in areas with high soil quality and good potential for agricultural production. The percentage of land abandonment varies from 55% in the South west region (covering the municipalities of Vevcani, Debar, Debarca, Ohrid, Kicevo, Makedonski Brod, Plasnica, Struga and Centar Zupa) with approximately 55% of abandoned land out of the 50,000 ha of available agricultural land and the lowest percentage in the Southeast region of the country (municipalities Bogdanci, Bosilovo, Valandovo, Vasilevo, Gevgelija, Dojran, Koce, Novo Selo, Radovis and Strumica) with only 11% abandonment out of the approximately 57,000 ha available arable land. However, it is also evident that in certain regions with high potential for agricultural production (e.g., Pelagonija region, Eastern region Skopje region), the abandonment percentage is above the national average.

Further analysis per municipality were concluded to determine the 'hotspots' of land abandonment at regional level resulting in a much more detailed overview of the situation. From the results, visually presented in Figure 6 below, it can be concluded that that in some regions (Pelagonija and Eastern Region in particular) there is a polarized situation within the regions where there are an extremely developed rural micro-regions and at the same time almost completely abandoned micro-region. In the case of the Pelagonija region this is the case in the Mariovo plain which covers an area of approximately 20,000 ha of arable, but not utilized

agricultural land (shared between the municipalities of Prilep, Novaci and Kavadarci). This lowers the overall average for the whole Pelagonia region. In the case of the Eastern region covering the municipalities of Berovo, Vinica Delcevo, Zrnovci, Karbinci, Kocani, Makedonska Kamenica, Pehcevo, Probistip, Cesinovo Oblesevo and Stip with approximately 80,000 ha of agricultural land available, the situation is also polarized. The land abandonment is extremely expressed in the border region with Bulgaria (up to 65%), while it goes as low as 6% in the municipality of Cesinovo - Oblesevo.

The Skopje region with approximately 38,000 ha available agricultural land has only 7 rural municipalities all in proximity to the capital and many of the municipalities have been using such positioning for urban/industrial development to accommodate the development needs of the city of Skopje whose population density has been noted as 4 times higher as the national average.



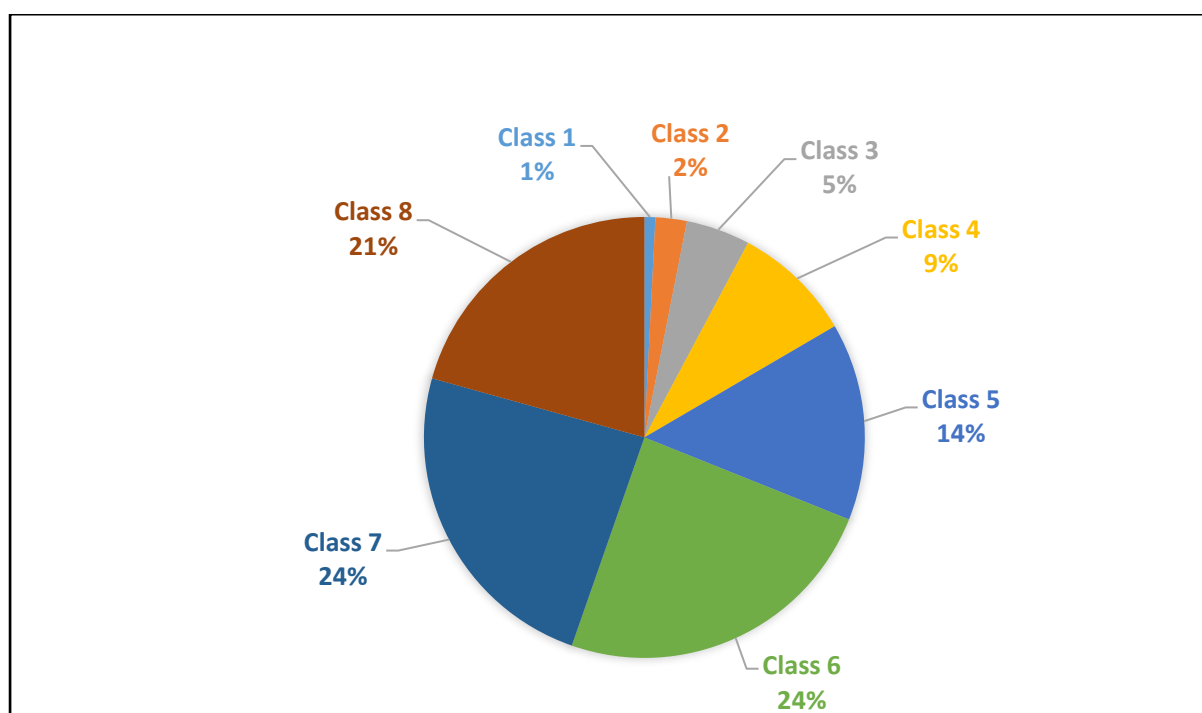


#### 4.4. Connection between land abandonment and land classes

In North Macedonia agricultural land is classified into 8 classes where class 1 is the best land parcel, and class 8 is the worst.

The cadastral class for each land parcel within one cadastral municipality is assessed and determined based on the natural and economic factors. Pedological characteristics, climate, location and irrigation fall under natural factors, while the road (access) infrastructure and the remoteness are considered as economic factors. The analysis of the extent of abandoned agricultural land in North Macedonia, explained in the previous section, has also investigated the relationship between land abandonment incidence and the land class.

The below pie-chart (Figure 7) presents the distribution of abandoned arable agricultural land throughout the 8 land classes. The full table containing information per municipality on the amount of abandoned land distributed by land classes is available in Annex 3.



**Figure 7:** Percentage of abandoned arable agricultural land in North Macedonia by soil classes in 2020 based on the conducted analysis. Source: Author's own elaboration.

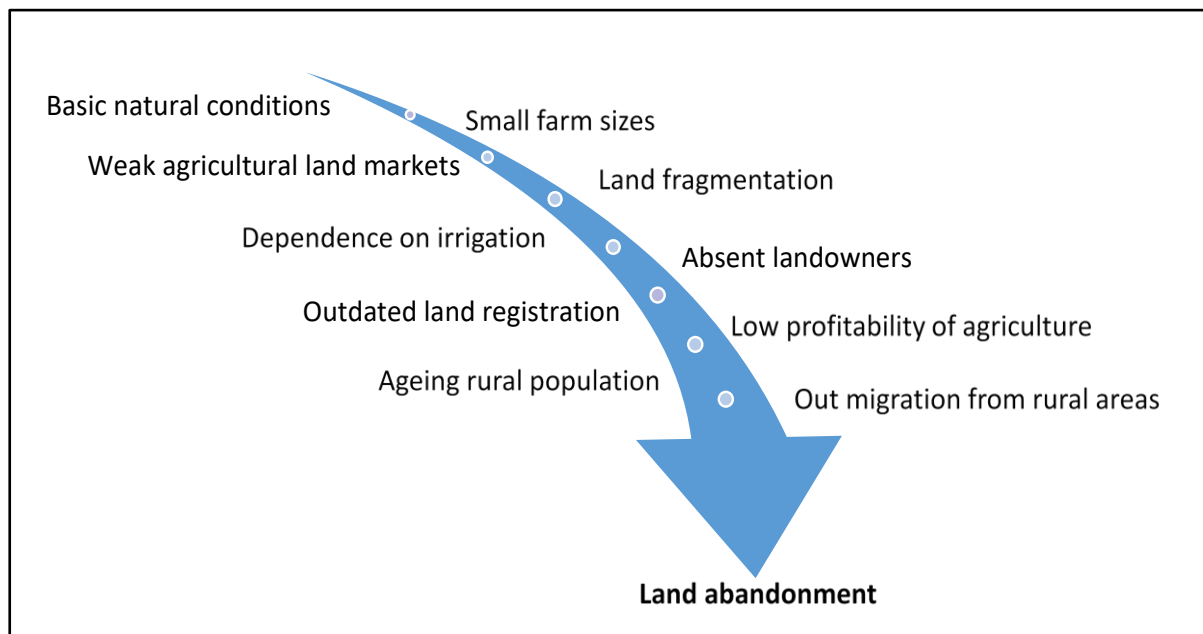
The findings confirm that there is a correlation between the land class and the incidence of land abandonment. Only 17% of all abandoned agricultural land fall within the classes 1-4. The remaining 83% fall within classes 5-8.

Thus, it can be concluded that agricultural land of good natural and economic condition (of a higher land class) is least likely to be abandoned. Conversely, the lower is the rating against the economic and natural factors (or the lower land class) the more likely the land is to be abandonment. This comes in confirmation that basic natural conditions of a land plot (including soils quality) are among the main root causes of land abandonment analysed in the next section.

#### 4.5. Analysis of the root causes of land abandonment

Land abandonment has multiple causes and is often a result of a complex multi-dimensional process with interlinked social, economic, and environmental factors resulting in the land finally being unutilized. Several negative trends such as the inefficient farm structures dominated by very small farms, excessive land fragmentation, low land market turnover, an ageing rural population, out-migration in particular of young people from rural areas, heavy dependence of agricultural production from water and the availability of irrigation facilities, various problems along the agricultural value chains and increasing problems of land degradation, all become self-reinforcing. Thus, there are multiple root causes for the problem, which then also requires a complex and holistic approach to its solution.

While the agricultural land abandonment originates from a rather complex set of interlinked constraints than from a single reason, the main reasons differ from country to country, and some outrank others. The factors are usually a combination of social, economic and environmental nature as also discussed with reference to the situation in other European countries in Section 1 Introduction. For North Macedonia, the most likely reasons contributing to the high level of land abandonment have been determined based on the experiences from the field work conducted under the MAINLAND project, but also based on the available statistical and agricultural production data for the regions (and municipalities) that show the highest percentage of land abandonment during the analysis. The key self-reinforcing drivers of land abandonment in North Macedonia are illustrated in Figure 8.



**Figure 8:** Process of self-reinforcing factors driving land abandonment in North Macedonia. Source: Author's own elaboration.

Based on the conducted analysis and interviews from the 2,500 landowners participating in the re-allotment phase of land consolidation, 650 landowners or more than 25 %, were identified as not living in the country at least in the last 4 years or as deceased but still registered in the

property register without any inheritance proceedings initiated. For these categories of landowners approximately 60 % of the land in their ownership was not utilized.

In addition, approximately 15% of the total number of landowners who live in the country have according to the same source kept the land as passive capital (in most cases these landowners have inherited the land). This category mostly consists of landowners who are not active farmers and usually not living permanently in the rural areas.

While the internal migration has not been detected as an issue in the last decades according to the SSO data and the abovementioned situation originates from the socialist times, the available statistical information on the depopulation trends due to the external migration shows a similar trend as the field data from the active land consolidation areas. According to the 2021 Population Census, the total resident population in North Macedonia was 1,836,713 persons. The figure on the resident population suggests that the country's population has shrunk by 9.2 % or 185,834 people since the last census in 2002. An ageing rural population and the declining rate of natural growth of the population adds additional pressure on rural areas and consequently contributes to land abandonment. As of the beginning of 2020, the share of North Macedonia's population at age 65 and above comprised of 14.5%, and is estimated to increase to 25.7 by 2050. The median age of the farmer (household head) is currently 60 years, where 42% are between 41 and 60 years, 8% are younger than 40 years, while 46% are older than 60 years according to SSO data. The ageing rural population is mainly caused by the high number of youth leaving rural areas. With the farm structures in place in North Macedonia (see Section 2), the out migration of youth is not only jeopardizing the future of family farming in the country of the agricultural production.

A range of economic factors determine farm profitability and incomes from farming and thus increase or decrease the likelihood of land abandonment. Economic factors include high costs of agricultural inputs, worn out or absent irrigation and drainage infrastructure and the need for renovation, high water losses and high cost of water supply (especially for high-lift pumped irrigation schemes), short credit terms, high interest rates and strict leasing requirements for agricultural machinery and equipment.

The structural problems of land fragmentation and small farm sizes are among the root causes of low farm profitability, which then lead to abandonment of agricultural activity and subsequently to land abandonment itself.

Finally, abandonment may also be caused by environmental and natural factors such as soil, climate and terrain characteristics (e.g. high altitudes, remoteness, steep slopes, unfavorable soil conditions), which either make land not suitable for cultivation at all, or makes it expensive.<sup>22</sup> North Macedonia occupies the 43rd place in the global ranking of countries according to the vulnerability index to climate change and 67th place according to the Readiness Index<sup>23</sup>. The Second National Communication on Climate Change and the 3<sup>rd</sup> National Communication on Climate Change identifies the negative impacts of climate change,

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<sup>22</sup> Biophysical criteria for the delimitation of areas facing natural constraints. Council reg. (EU) No 1305/2013, art. 31, 32.

<sup>23</sup> <https://gain-new.crc.nd.edu/ranking/vulnerability>

with farmers disproportionately affected due to high exposure to climate change risks and shocks, and their relatively lower ability to adapt.

The previous section provides a clear link between the land class and the land abandonment and depicts much greater tendency for abandonment of a lower classes on national level connecting the lower class of land with lower crop yields (due to unfavorable natural factors) or higher production costs (due to the economic factors).

Such situation would be even more poignant in relation to the climate change scenarios in the future, considering that the combination of arid climate and soils with low water-holding capacity, changing precipitation patterns, and increasing temperatures all reduce the amount of water available for agriculture, impacting crop yields.

As a result, if the adaptive capacities are not increased and negative effects mitigated, the agricultural production will remain caught in a low productivity – low-income trap, and socio-economic vulnerabilities and climate change risks will exacerbate challenges faced by the sector and the rural population which would consequently contribute to the new wave of depopulation and further accelerated land abandonment.

## 5. Conclusions and policy recommendations

This report has provided an updated overview and description of the farm structures in North Macedonia (Section 2), analysed the recent development of the agricultural land markets and their regulation (Section 3). In Section 4, the current state of land abandonment has been assessed together with an analysis of its root causes.

Based on the previous sections, this final section of the report provides first the main conclusions of the previous sections and then policy recommendations for addressing land abandonment and improving farm structures in North Macedonia. In this context, it is important to remember that not all abandoned arable agricultural land is suitable to bring (back) into production. Abandoned land parcels, in particular those that have been outside of production for a very long period, may today have nature and/or environmental values that should be protected. Thus, it is important in each case to consider if bringing land back into production could result in loss of biodiversity or have other negative impacts, which obviously should be avoided. Second, this this final section of the report provides policy recommendations to the Government of North Macedonia represented by the Ministry of Agriculture, Forestry and Water Economy on how to address the excessive level of land fragmentation and improve the inefficient farm structures.

### 5.1 Conclusions

#### 5.1.1 Conclusions on farm structures in North Macedonia

According to the Farm Structure Survey data 2016, there are 178,125 agricultural holdings / farms in the Republic of North Macedonia. In average, one farm utilizes **1.80 ha** of agricultural area. The Farm Registry data 2017 is showing a slightly larger but still comparable average farm size than the 2016 Survey with an average figure of **1.9 ha**. The Farm Registry data are complementary to the Farm Structure Survey data as it provides additional information that the average number of land parcels per farm is **5.8** and that the average size of an agricultural land parcel is **0.32 ha**.

The analysis has showed existence of certain gaps and difficulties in finding veridical farm structure statistics. The definition of the agricultural holding / farm used by the SSO is not explicit about the land tenure arrangements of the farms surveyed. Therefore, it is recommended to establish, publish and maintain more clear and understandable data on farm structures including on development of land ownership and farm sizes.

With regards to the ownership statistics at the country level (the total number of agricultural land parcels registered, the total number of property sheets, the average number of parcels per property sheet, average number of owners per property sheet, the total number of ownership right holders), such information is not being published by AREC, nor has it been possible to obtain it upon a dedicated letter of request.

### **5.1.2 Conclusions on the development of agricultural land markets**

Land market infrastructure in North Macedonia is in place and the land markets are functioning albeit still weak and functioning at a low pace with an average annual land turnover of 0.5 % or around 1,700 ha. The average parcel size traded was around 0.3 ha, so very close to the average size of agricultural land parcels (0.32 ha). The average recorded land market prices per hectare was 22,000 Euro in the period 2016-2020. However, many transactions in the sales market are conducted with non-agricultural purposes, e.g. parcels in the proximity to or part of urban or rural settlements, carried out for the housing/construction purposes in the future, this being reflected in the price. It can also be observed that in general landowners are having too high expectations about the value of their land which seems to limit the market turnover, and coupled with lack of collection of property taxes and enforcement of land use regulations, contributes to land abandonment. In reality it is without any cost of the landowners to leave their agricultural land abandoned. The mobility of land and the current land turnover in the market are too low to address the farm structure challenges.

The analysis of the land market regulatory framework shows that North Macedonia is at a medium level of land markets regulation compared to the EU member countries with a clear focus on protection of landowners and prevention of land fragmentation.

### **5.1.3 Conclusions on land abandonment and its root causes**

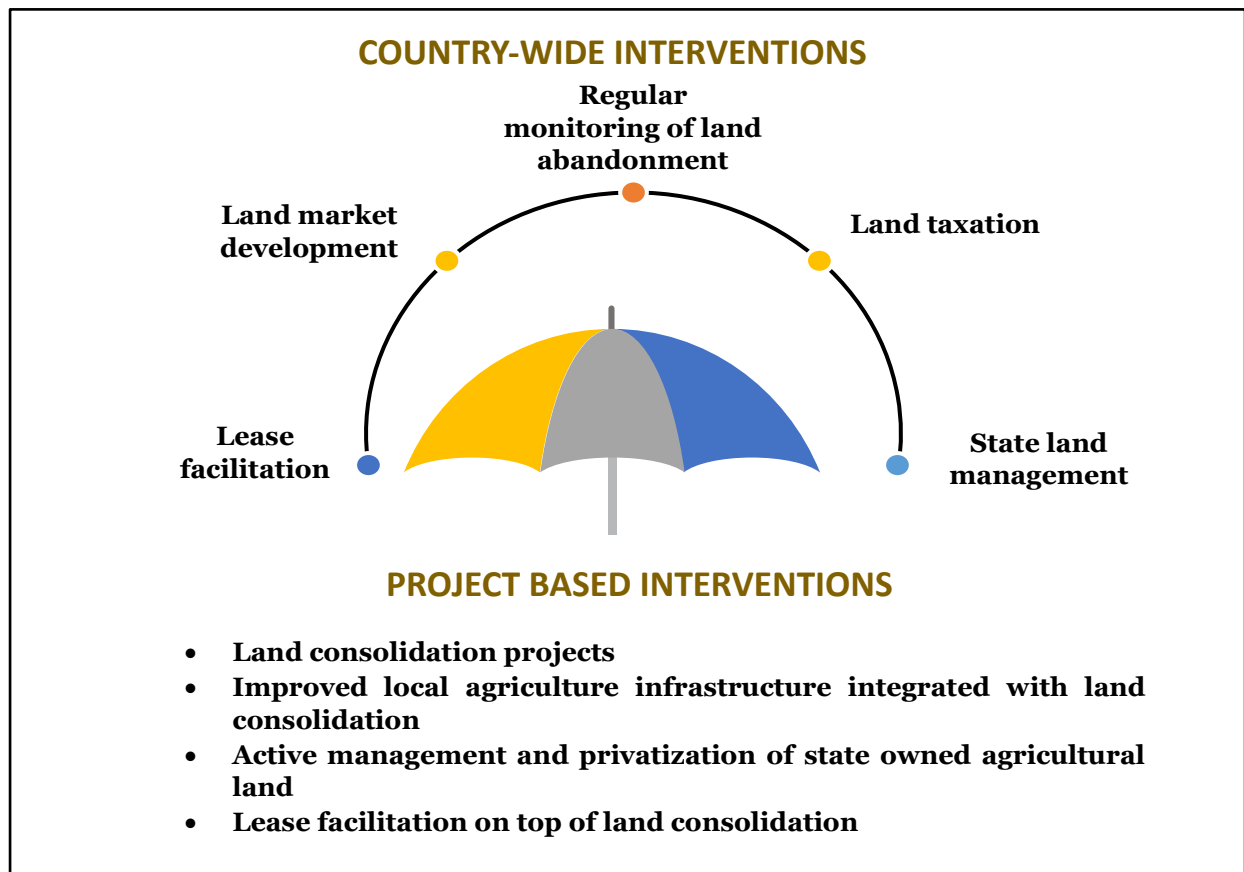
The results of the conducted analysis of the level of land abandonment show that the average amount of abandoned agricultural land in the country is 32 % (in both private and state ownership). The magnitude of land abandonment is higher in the Western part of the country and in mountainous provinces and municipalities and not surprisingly lower in areas with high soil quality and potential for agricultural production. However, the analysis also identified land abandonment 'hotspots' within the regions with high potential for agricultural production. The reasons for abandonment at micro (municipal) level within each region should be subject of further analysis and the abandonment could be possibly targeted through utilization of the project based land policy interventions as detailed in section 5.2.

A complex set of interlinked social, economic and environmental factors contribute to abandonment of agricultural land. For North Macedonia, the main reasons contributing to the land abandonment revealed by the analysis in this report are the basic natural conditions of a land plot, the small and fragmented farm structures which restrain farming profitability and their further development, dependence of irrigation and poorly functioning irrigation schemes and other economic reasons shaping the farming environment, leading first to extensification of agricultural activity, outmigration of in particular rural youth and consequently of ageing of the rural population, and eventually to abandonment of agricultural land. These factors are self-reinforcing and ranking them would be context specific.

## 5.2 Policy recommendations on addressing land abandonment and improving farm structures

As this report has documented, around one-third of all arable agricultural land in the country is currently unutilized. Bringing a large share of this land back into agricultural production represents an obvious opportunity to strengthen local food production in the country. This will generate additional income among farm households, contribute to the creation of new jobs in rural areas and ultimately contribute to increased food security in the country.

As we have seen in the previous sections, there are several complex and inter-twined root causes of the current very high level of land abandonment. In this context, a main reason is the inefficient farm structures (see Section 2) with small average farm sizes and excessive land fragmentation leading to low productivity and competitiveness of the small family farms. Other important factors are landowners absent (sometimes for generations) from the village where their land is located as well as unresolved inheritance when the formally registered owner is deceased.



**Figure 9:** Schematic representation of interventions applied at the country-wide and project-based levels. Source: Author's own elaboration.

In the same way as the problems are complex and inter-connected, also the policy response needs to be integrated combining land policy and other related policies like agriculture, economics and taxation. It is recommended to design a package of policy interventions to



address land abandonment and improve local farm structures. When doing so, it is recommended to clearly distinguish between:

- *Interventions that are applied in a project based approach*
- *Interventions that to be applied with country-wide impact*

This means that in areas with specific needs and/or potential for agriculture a specific set of tools can be applied in an integrated way and tailored towards the situation in the specific project area. The project based approach is recommended to be complemented by a set of tools and interventions that can be applied and have impact in a countrywide approach (Figure 9).

### **5.2.2 Interventions applied in a project based approach**

North Macedonia has since 2014 with the technical assistance of FAO developed a land consolidation instrument, which after the completion of the EU-FAO funded and FAO implemented MAINLAND project in November 2022 is now fully operational (Hartvigsen and Mitic-Arsova, 2022). It is recommended to integrate the land consolidation instrument in the interventions to address land abandonment and improve local farm structures that is applied in a project based approach. The project based interventions are recommended to include:

- *Implementation of land consolidation projects under the national programme*
- *Improved local agriculture infrastructure integrated with land consolidation based on local needs*
- *Active management and privatization of state owned agricultural land*
- *Lease facilitation on top of land consolidation*

The four suggested project based interventions can be combined depending on the specific situation and local needs in the project area.

#### **Implementation of land consolidation projects under the national programme**

European experiences show that land consolidation instruments through the improvement of inefficient farm structures can have a great potential to address land abandonment (Hartvigsen 2019). Land consolidation projects in North Macedonia are implemented based on a clearly identified local need and demand, usually after announcement of a call for expression of interest from potential project communities. The main objective of land consolidation is to improve the local farm structures in the project area by reducing land fragmentation and facilitating on a voluntary basis the enlargement of farms. Both is equally important. The result is fewer, larger and better-shaped land parcels leading to increased productivity and competitiveness of the participating farms. International experiences also show that public investments in land consolidation enhance private investments in agriculture at farm level (FAO 2015).

Following the procedures established in the Law on consolidation of agricultural land, land consolidation projects are implemented in three main phases; i) feasibility study phase, ii) re-

allotment planning phase (and design of improvement of agricultural infrastructure if included) and iii) registration and implementation phase.

### Addressing land abandonment through land consolidation in Dabjani

Dabjani became the second majority-based land consolidation project to be finalized in North Macedonia under the MAINLAND project, after the Re-allotment Plan was adopted by the qualified majority of landowners in January 2022.

Dabjani land consolidation area - before land consolidation      Dabjani land consolidation area - after land consolidation



Number of land parcels before and after land consolidation: 602 (before) / 127 (after)  
 Average parcel size before and after land consolidation: 1.2 ha (before) / 5.8 ha (after)

Dabjani was the largest of the MAINLAND project areas. It includes 742 ha of agricultural land, owned by 85 private landowners (435 ha) and by the State (307 ha). In the land re-allotment process the number of land parcels in Dabjani was reduced by almost five times and the newly formed parcels are regularly shaped with access to infrastructure and allow for much more efficient farming practices in the future.

Land consolidation brought additional benefits to the rural population in Dabjani. Many land parcels in the land consolidation project area, which were restituted to the private owners as part of the land reform process (denationalization) during the 2000s, were either located in the middle of state-owned agricultural land blocks, or in land plots in co-ownership with the State. Through the land consolidation process with the support from the MAINLAND project, both, the private landowners in Dabjani and the State managed to resolve longstanding and complicated land rights issues, which has negatively affected the utilization of the agricultural land in the whole area. Thus, the implementation of the land consolidation project is expected to bring back into production around 200 ha of abandoned agricultural land that has been unutilized for decades.

**Box 1:** Addressing land abandonment through land consolidation in Dabjani.

Source: Hartvigsen, M. and Mitic-Arsova, K. 2022. Note on Lessons Learned from the Introduction of land consolidation in North Macedonia during 2014-2022.

[https://www.fao.org/fileadmin/user\\_upload/reu/europe/documents/Events\\_2022/landnet13presentation/LL\\_.pdf](https://www.fao.org/fileadmin/user_upload/reu/europe/documents/Events_2022/landnet13presentation/LL_.pdf).

The land consolidation feasibility study is an excellent tool to get to understand the local situation in the potential project area, including the local farm structure (farm sizes, land fragmentation, parcel sizes, land lease, etc.) and also for the identification of unutilized (abandoned) arable agricultural land. Part of the feasibility study is to assess the interest of the landowners and local farms in the implementation of the project, i.e. to test the need and demand for land consolidation in the area. The Feasibility Study Report also provides recommendation of the most feasible land consolidation approach – majority based or voluntary. Box 1 illustrates how land consolidation already has been used to bring unutilized agricultural land back into production in the Dabjani land consolidation project implemented as part of the MAINLAND project.

### **Improved local agriculture infrastructure integrated with land consolidation based on local needs**

Improving the local infrastructure so that the area has suitable field roads and all land parcels have access roads and access to irrigation and drainage as needed can very much improve the productivity, competitiveness and profitability of the farms. In this way, it contributes at the same time to bringing abandoned agricultural land back into production.

Improvement of the local agriculture infrastructure is based on local needs already an integrated component of the implementation of land consolidation projects in North Macedonia.

### **Active management and privatization of state owned agricultural land**

Analysis conducted by FAO in 2019 (FAO, 2019a) showed that 41% of all arable agricultural land in North Macedonia is owned by the State (240,000 ha out of in total 577,000 ha). As discussed in Section 4 and again in Section 5.1.3, as much as in average 32% of all arable agricultural land in the country is currently abandoned. Data is unfortunately not available about abandonment of in particular the state owned land. However, based on expert judgement and the experiences from the MAINLAND land consolidation project areas, it can be expected that small state owned land parcels (< 1 ha) are at least as likely or even more likely than private owned land parcels to be unutilized.

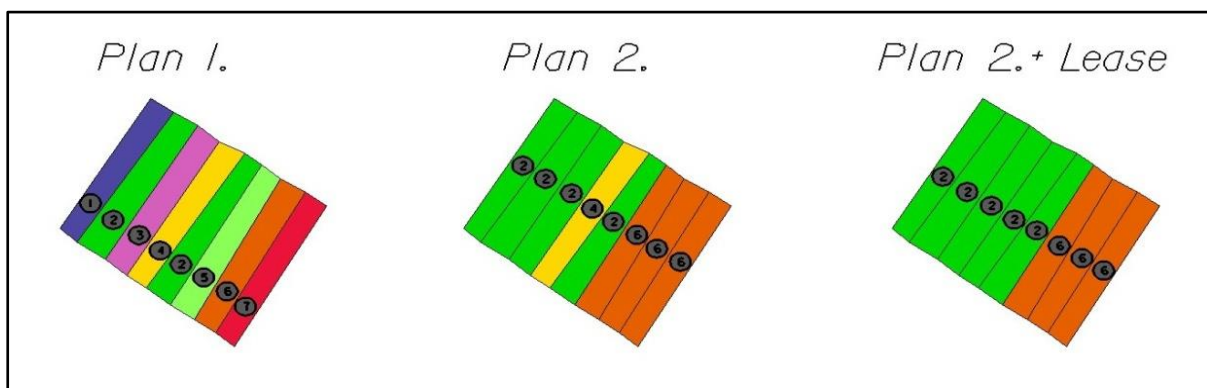
As of 2022, approximately 135,000 ha are leased to 9,500 tenants out of which approximately 56,000 ha are located in large blocks leased to in total 68 entities, while the rest are small parcels leased mainly to individual farmers or small commercial entities. There is an estimated portion of 105,000 ha still unleased state owned agricultural land and this is mainly land scattered in small parcels, with a certain portion of it already in a process of either conversion into nature (e.g. self-planted forest) or in reality converted to urban land. Thus, even without exact data, it is reasonable to assume that around 150,000 ha of state land, partly leased out and partly unutilized or informally used is located distributed in small and scattered parcels of arable agricultural land.

The management of small and scattered state land parcels, e.g. to rent them out and collect the rent, is relatively resource consuming compared with the revenue that it generates. This means

that both the active management and the privatization of state land has a great potential to bring unutilized agricultural state land into production. This is in particular the case if privatization of state land is implemented through land consolidation projects because the buyer has a very unique opportunity to have the purchased land consolidated with the consolidation of already owned land parcels (in a majority based land consolidation approach). In this way, the active use of the land consolidation instrument to privatize the small and fragmented state land parcels in the land consolidation project areas will in addition to addressing land abandonment also strongly contribute to the improvement of the local farm structure, in particular contribute to the facilitation of the necessary farm enlargement and a political vision to develop strong commercial family farms.

### Lease facilitation on top of land consolidation

Land consolidation has traditionally mainly had focus on improving the structure of the ownership of agricultural land. However, the consolidation of land ownership and land use can also be combined and integrated into the land consolidation process. This process is illustrated in Figure 10. When land consolidation and lease facilitation is combined, it is crucial that the sequence is right and that the consolidation of the ownership structure is completed before the lease facilitation begins. During the land consolidation feasibility study it could be clarified with each individual landowner what are his/her preferences for the land consolidation, in particular if the owner could be interested to sell or rent out land parcels as part of the process. If the parcels are for sale, the re-allotment planning should facilitate an agreement with a buyer (local farmer interested to purchase more land) and the land will be consolidated together with the parcels that the buyer already had before the project. If the owner does not want to sell but is interested to rent out, then the land of the owner can be consolidated next to the farmer who wants to rent it. In that case the land use is fully consolidated even when there are different owners.



**Figure 10:** Illustration of lease facilitation on top of land consolidation. Source: Author's own elaboration.

### **5.2.3 Interventions to be applied with country-wide impact**

As mentioned in Section 5.2, it is recommended to complement the suggested interventions applied in a project based approach with a set of interventions that will have impact on addressing land abandonment and improving farm structures in a countrywide approach. It is recommended to develop and implement the following interventions that can countrywide application and impact:

- *Regular monitoring of land abandonment*
- *Land market development*
- *Enforced taxation of abandoned agricultural land*
- *Lease facilitation*
- *Active management and privatization of state owned agricultural land*

#### **Regular identification and monitoring of abandoned land**

In order to keep a database/register of abandoned land in MAFWE updated and have insight into the current situation and trends related to abandonment of agricultural land, a simple, fast and fairly accurate, operational system for the identification of land abandonment needs to be established. While the basis for establishment of such Register already exists in the Law on Agricultural Land, further regulation on the criteria for classification of agricultural land as abandoned, the methods for identification and inspection should be regulated in order to guarantee uniformity and accuracy of the data on land abandonment nationwide.

As presented in Section 4.2, the identification of abandoned agricultural land starts with establishing an initial database consisting of all agricultural land parcels in the country. This database is subject to further processing in order to identify cultivated and abandoned agricultural land. The basic source for obtaining the initial dataset of agricultural land is AREC as the official institution for the registration of properties and property rights. AREC registers land use per cadastral parcel but not the data if the land is cultivated or abandoned. The second relevant dataset is the extract of the LPIS, established and managed by MAFWE, where land parcels or part of land parcels are marked as cultivated land, identified as such in the process of subsidizing agriculture production. The combination of these two datasets (AREC and LPIS) provides information on land parcels that are cultivated. The rest of the agricultural land parcels, which are not registered in LPIS as cultivated land, are then subject to the further manual and visual inspection in combination with available imagery data.

The combination of AREC and LPIS datasets should be processed by MAFWE as one step, at the country level, while further manual and visual inspection per land parcel should be performed by the MAFWE regional branch offices. In this way, the manual, and time-consuming work, will be distributed among many already trained professionals at MAFWE branch offices who deal with LPIS on a daily basis and have closer information on the field conditions.

In the process of field inspection, it can be expected that unclear situations will emerge in the sense that it could not be decided if the land is abandoned or not in the office by visual interpretation of imagery data. Those unclear situations should be resolved by field investigation performed by professionals from MAFWE branch offices participating in the imagery interpretation. Field inspection should also be performed annually on 5-10% of all identified abandoned land parcels in order to validate the results on the areas already interpreted by desk investigation.

The data set of abandoned land in North Macedonia should when annually updated be transferred to the municipal authorities and there provide the currently missing data needed for collecting property tax of abandoned agricultural land as discussed in Section 4.1. See also recommendations below on enforced property taxation.

### **Land market development**

The policy response to land abandonment through support to further development of the agricultural land markets should focus at increasing the land market turnover and the mobility of land. The land markets, of both ownership and use rights, are key for the enlargement of farms and represent a main mechanism to provide access to land for new entrants, young farmers and for the development of small farms into commercial family farms.

In the context of land abandonment, the land markets can stimulate the transfer of land from passive landowners to active farmers and thus support the structural development and generational renewal of family farms. The land market leads in some cases to higher land fragmentation, therefore it requires guidance through regulation. The agricultural land turnover of 0.5% (see Section 3.3) shows that the agricultural land sales market in North Macedonia is functioning but is still relatively weak with a limited number of transactions and would require support measures to accelerate the necessary structural transformation of agriculture.

The market turnover is low for several reasons. Only a limited amount of land is offered on the market every year because individuals often hold land rights for many other reasons than only agricultural production, including the prestige value, lifestyle value and family traditions, and for storing wealth if confidence in money as a repository of value is low (Ciaian et al. 2012). Furthermore, absent landowners, transaction costs, cadastral and land registration errors, unresolved inheritance cases and informal transactions and low trust between the potential land market participants prevent land from becoming available on the market.

Finally, agricultural land markets in general, and in North Macedonia in particular, are characterized by uneven access to information of different actors in the land market, which creates imbalances of power in transactions. The sellers are not aware of all the potential buyers, while the buyers are not aware of all the potential sellers. Comprehensive information about market prices is usually not available and the availability of land on the market is often only announced through relatives and social networks. Thus, enhancing land market information, is also key for development of more active and efficient land markets.

## **Enforced taxation of abandoned agricultural land**

As discussed in Section 4.3, there are several and inter-connected reasons why private owners of agricultural land sometimes do not utilize or ensure that other farmers utilize the land that they own.

As discussed in Section 4.1 taxation of (abandoned) agricultural land is often not enforced by the local governments in North Macedonia. It means that it is in reality without any cost of the owner to leave the land abandoned. In principle, owners of real estate property including agricultural land have rights and in the case of North Macedonia these rights are protected and secured according to the Constitution and through the land register. However, usually property rights also give the owner duties and obligations, including to pay to the society a property tax. It is the assessment based also on the experiences from countries where land taxation is enforced that an efficient property taxation of agricultural land provides a strong incentive for the owner to have an income from farming the land or alternatively to sell or lease out the land on the agricultural land markets. In this way, an enforced property taxation will, throughout the country, contribute to bringing suitable land into production.

An additional but strongly related issue is that many land parcels in rural areas are not used in accordance with the land use category that is registered in the land register, e.g. registered pasture land or forestry land is used or could be used as arable agricultural land. As part of the suggested regular monitoring of land abandonment, it is recommended to also check the registered land use and make attempts to update and correct where needed.

## **Lease facilitation**

A lease facilitation instrument is applied in some European countries (Spain, Galicia), Italy, France and Portugal) with the overall objective to connect owners of agricultural land that are not farming their land with active local farmers interested in renting more land (FAO 2022b). Lease facilitation is usually understood as a variation of land banking (FAO 2022a).

Lease facilitation can be described as a process of conclusion of lease agreements between landowners not using their agricultural land and local farmers interested to farm more land on the basis of rental agreements. The process is facilitated by a public authority (Land Bank) acting as an impartial intermediary, and where the parties do not necessarily directly interact (FAO 2022b).

In the context of land abandonment, the lease facilitation instrument can transfer land from landowners who are not interested in or able to cultivate their agricultural land to active farmers interested in farming more land. Land lease facilitation can help address one of the common situations in many countries in the region when individuals neither farm the land themselves nor lease it out to other farmers but keep their agricultural land as passive capital. In such cases, mediation by a trusted, impartial intermediary (or a so-called honest broker) between the landowners and the active local farmers would benefit both parties.

Lease facilitation usually implies i) the existence of a public institution facilitating the conclusion of lease agreements between private owners of agricultural land and local active farmers interested to farm more land, and ii) the existence of a legal framework, although simplified lease facilitation is also possible without a specific legal framework.

The key instrument in the process is an updated and accurate database of land plots (a web-based information system), at national level, available for rent and sale and under which conditions. The information in the database should be frequently (at least once a week) updated with new land plots becoming available for lease or sale but also showing which plots have been rented out.

The purpose of lease facilitation is usually to develop the land use market, reduce land abandonment and strengthen local food production by connecting owners (often absent from the village where the land is located) and local farmers, including to provide access to land for new entrants and young farmers. The lease market facilitation and development can improve the farm structures, spur efficiency and enlarge farms without major investments, and actively contribute to mitigation of land abandonment. Better regulating and stimulating the lease markets can be an alternative for low land mobility in the sales markets. Lease facilitation can offer stronger guarantees to the owners of not losing ownership over land, being paid according to the lease contract, as well as recovering the property in normal conditions for its use after the contract has ended. For the tenants it provides land under the long-term, secure lease agreements allowing to invest and reap benefits of the investment.

Land lease facilitation can as mentioned above be applied as a stand-alone instrument or in combination with other land management instruments such as land consolidation or land banking / active management of state land in a project based approach (see Section 5.2.2). Applying instruments in combination strongly increases their efficiency. When lease facilitation is applied together with land consolidation (i.e. in the same project areas), it is, as discussed in Section 5.2.2, necessary to first improve as much as possible the ownership structures (i.e. complete the re-allotment planning) and only in the final stage of the process in the best possible way to improve also the land use structure through the facilitation of long-term lease agreement on top of the adopted Re-allotment Plan. However, it is still recommended to establish a lease facilitation instrument and to apply it in a countrywide approach.

In case of country-wide implementation, the responsible authority makes no active solicitation, there is no defined geographic intervention area, and landowners and users find each other through the web-based information system (inquiries and contracts are still handled by the responsible authority). The lease facilitation instrument will when developed and operational need to be widely advertised through comprehensive awareness raising campaigns.

### **Active management and privatization of state owned agricultural land**

As discussed above in Section 5.2.2., 41 % of all arable agricultural land in North Macedonia is currently owned by the State (FAO 2019a) and furthermore it is reasonable to assume that



around 150,000 ha of state land, partly leased out and partly unutilized or informally used is located distributed in small (< 1 ha) and scattered parcels of arable agricultural land. This gives a great potential to use the existing state land to actively address land abandonment and improve the farm structures. This is the case in special intervention areas (project areas) as discussed in detail in Section 5.2.2. but an active management and privatization of state owned agricultural land parcels can also be applied in a countrywide approach and have significant impact on addressing land abandonment and improving farm structures. It is in this context recommended to adopt the amendments of the Law on sale of state-owned agricultural land prepared by MAFWE in 2020 with the support of FAO. If it is not assessed to be political feasible to adopt the full prepared amendment package, then it is alternatively recommended to adopt a more limited amendment of the law allowing the privatization of small parcels of state owned arable agricultural land (e.g. parcels smaller than 1 ha) both through land consolidation projects and where land consolidation is not planned through public auctions giving preference to owners and users of neighbouring parcels.

The active management and privatization of the state land, in particular the currently unmanaged small land parcels, has a great potential at the same time to address land abandonment and improve the farm structures, when local farmers such as owners and users of neighbouring land parcels are given preference. In this context it is recommended to follow up the amendment of the Law on sale of state-owned agricultural land with a countrywide awareness raising campaign on the new opportunities to purchase or rent state land.

#### **5.2.4 Establishing an enabling institutional framework**

The discussed package of interventions to be applied to address land abandonment and improve the farm structures in i) a project based approach (see Section 5.2.2) or ii) in countrywide application (see Section 5.2.3) is suggested to be followed up also by the establishment of an enabling institutional framework. FAO prepared in 2019 a short note on the possible establishment of an integrated Land Agency subordinated to MAFWE (FAO 2019b). It is recommended to use the prepared note as the basis for a revived discussion of the future institutional framework for an efficient implementation of the suggested interventions to address land abandonment, improve farm structures, improve management of state land, etc.

The introduction of the suggested instruments to address land abandonment and improve farm structures will require also significant efforts to also build up the necessary technical capacity to implement the instruments and enforce the legislation, both in MAFWE at central level, in the MAFWE regional branch offices and among the staff of a new Land Agency if it is established.

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## Annexes

### Annex 1: Land regulation indicators and the scores for North Macedonia

Indicator	Variable description	Variable categories	North Macedonia Score	Comment justifying the score (optional, e.g. reference to the Law or similar)
<b>Measures to protect the tenant/ Tenant Protection Index (TPI)</b>				
Minimum rental contract duration	Minimum duration of a rental contract	1= Existence of a minimum rental contract duration 0= No restrictions	0	N/A
Maximum rental price	Maximum price per hectare that is rented	1 = Existence of a maximum price 0 = No maximum price	0	N/A
Automatic rental contract renewal	Regulations in terms of automatic renewal of the rental contract at the end of the duration of the contract	1= Existence of automatic renewal with the duration of the initial contract 0.5 = Existence of automatic renewal with a limited duration 0= No automatic renewal	0	N/A
Conditions for rental contract termination	Regulations in terms of rental contract termination	1 = Termination is possible at the end of the contract and if some specific conditions are fulfilled 0 = Termination is possible at the end of the contract	0	N/A
Pre-emptive right for tenant	Pre-emptive right by the tenant	1= Existence of a pre-emptive right by the tenant 0= No pre-emptive right by the tenant	0	N/A
<b>Measures to protect the small owner-cultivators/ Owner Protection Index (OPI)</b>				
Restrictions nationality buyer for legal entities	Nationality buyer in case of legal entities	1= Prohibition that legal entities with shares owned by foreigners buy land 0.5=Prohibition that legal entities with a majority of the shares hold by foreigners buy land, but no restrictions when only minority of the shares is foreign owned 0.125= A foreign legal entity is allowed to buy or rent any plot of agricultural land, except in specific regions 0= No restrictions	1	* The score applies to acquisition of ownership rights over agricultural land only (purchase, inheritance etc). The leasing of agricultural land is not prohibited for both foreign natural persons and companies, however a prior consent of the Minister of Justice and positive opinions from the Minister of Agriculture and Minister of Finance are required. Ref Law: Law on Property and Other Real Rights OG 18/2001, Art 246
Restrictions nationality buyer for natural persons	Restrictions on transactions by foreign natural persons	1= Prohibition of a foreign natural person to buy a particular plot of agricultural land unless they have been staying and farming in the country for at least three years and they rented the particular plot before 0.75= Prohibition of a foreign natural person to buy a plot of agricultural land unless they have been staying and farming in the country for at least three years and they rented agricultural land before 0.5= A foreign natural person is allowed to buy or rent any plot of agricultural land in case he wants to stay and farm in the country 0.125= A foreign natural person is allowed to buy or rent any plot of agricultural land, except land in specific regions 0= No restrictions	1*	* The score applies to acquisition of ownership rights over agricultural land only (purchase, inheritance etc). The leasing of agricultural land is not prohibited for both foreign natural persons and companies, however a prior consent of the Minister of Justice and positive opinions from the Minister of Agriculture and Minister of Finance are required. Ref Law: Law on Property and Other Real Rights OG 18/2001, Art 246
Other restrictions for the new owner	Restrictions (other than nationality of the new user) that need to be fulfilled by the new owner (e.g. competences)	1= Existence of restrictions on the new owner 0= No restrictions	0	N/A
Maximum sales price	Minimum sales price per hectare that is sold	1= Existence of a maximum sales price 0= No maximum sales price	0	N/A
Pre-emptive right neighboring farmer	Pre-emptive right by the neighboring farmer	1= Existence of a pre-emptive right by a neighboring farmer 0= No pre-emptive right by a neighboring farmer	1	Law on Agricultural Land OG Art 15
Maximum transacted/owned area	Limitations to the maximum transacted agricultural area	1 = Existence of regulations on the maximum agricultural area that is transacted 0 = No regulations	0	N/A
<b>Measures to protect the nonfarm owner</b>				
Minimum rental price	Minimum rental price per hectare that is rented	1 = Existence of a minimum rental price 0 = No minimum rental price	0*	N/A * Exception: Minimum rental price established by the Law on Agricultural Land for state owned land
Maximum rental contract duration	Maximum duration of a rental contract	1= Existence of a maximum rental contract duration 0= No restrictions	0*	N/A * Exception: Minimum rental contract duration established by the Law on Agricultural Land for state owned land
<b>Measures to prevent fragmentation</b>				
Minimum plot size	A minimum plot size below which a plot cannot be subdivided for a transaction	1 = Existence of a minimum plot size 0 = No minimum plot size	1	Law on Agricultural Land OG 135/07 Art.15a
Pre-emptive right coowner	Pre-emptive right by the coowner	1= Existence of a pre-emptive right by the co-owner 0= No pre-emptive right by the co-owner	1	Law on Agricultural Land OG 135/07 Art 15

*Annex 2: Table of land abandonment in North Macedonia by municipalities*

<b>Municipality</b>	<b>Total area [ha]</b>	<b>Total agricultural area [ha]</b>	<b>Total arable area [ha]</b>	<b>Total arable abandoned [ha]</b>	<b>Total arable abandoned [%]</b>
Aerodrom	2112	289	56	37	65
Aracinovo	3131	2702	1663	402	24
Berovo	59853	25160	7142	2622	37
Bitola	78890	50418	25792	6471	25
Bogdanci	11456	6991	3530	869	25
Bogovinje	14165	9521	3912	2073	53
Bosilovo	16198	12255	7260	305	4
Brvenitsa	16489	8881	4221	1785	42
Butel	5454	2084	783	231	30
Cair	334	8	1	0	0
Caska	81932	37925	7240	4104	57
Centar	753	23	10	8	83
Centar Zupa	10315	5609	767	659	86
Cesinovo Oblesovo	13234	11365	7036	415	6
Cucer Sandevo	23572	9554	3562	1646	46
Debar	15019	7306	2113	1142	54
Debrca	42131	15675	9724	5570	57
Delcevo	42240	19117	10435	6026	58
Demir Hisar	48020	19679	6175	2590	42
Demir Kapija	31098	12899	3251	402	12
Dojran	15572	5617	2271	498	22
Dolneni	41243	30219	19124	5392	28
Gazi Baba	11183	5591	3268	708	22
Gevgelija	48354	10655	5092	929	18
Gorce Petrov	6683	4692	2025	1231	61
Gostivar	51653	27080	3038	1580	52
Gradsko	23626	17822	7416	742	10
Ilinden	9705	6963	4404	730	17
Jegunovtse	17681	7890	3546	996	28
Karbinci	22908	14901	7502	917	12
Karpos	3598	1650	1031	434	42
Kavadarci	100429	38379	11855	1403	12
Kicevo	82371	34373	7673	5506	72
Kisela Voda	3368	1836	1254	476	38
Kocani	35773	17120	5395	1383	26
Konce	23307	9213	4257	503	12
Kratovo	37542	22203	9697	5656	58
Kriva Palanka	48081	28405	8122	5228	64
Krivogastani	8912	7442	5272	105	2
Krusevo	19067	10164	2816	626	22
Kumanovo	50948	40700	28446	3922	14
Lipkovo	27134	10191	5357	1421	27
Lozovo	16689	14834	8154	840	10
Makedonska Kamenica	19290	8863	3361	2202	65
Makedonski Brod	88898	31663	1924	1696	88
Mavrovo i Rostuse	67491	30270	343	307	90
Mogila	25563	22245	15648	1215	8
Negotino	48205	35316	10991	479	4
Novaci	75353	52314	19605	10548	54
Novo Selo	23781	10360	4919	486	10

Ohrid	39422	18515	7253	4501	62
Pehcevo	20820	11522	3543	1378	39
Petrovec	20196	13354	7132	3906	55
Plasnica	5444	1703	688	386	56
Prilep	119912	78808	35493	18609	52
Probistip	32559	22564	9965	3834	38
Radovis	49714	19073	9205	710	8
Rankovce	24074	14457	4502	1730	38
Resen	74004	25480	10614	4947	47
Rosoman	13290	10873	6577	357	5
Saraj	22912	11891	5546	3093	56
Sopiste	22210	13758	4396	2938	67
Staro Nagoricane	43253	31878	12536	1617	13
Stip	58204	39274	14221	3612	25
Struga	48566	24613	9188	2206	24
Strumica	32153	13990	7886	1142	14
Studenicani	27615	11928	4283	3257	76
Suto Orizari	755	525	435	189	44
Sveti Nikole	48306	39672	23207	2978	13
Teartse	13649	9234	3492	627	18
Tetovo	26179	16912	5595	3254	58
Valandovo	33106	10312	5514	620	11
Vasilevo	23060	13231	6460	260	4
Veles	42755	28170	12641	3761	30
Vevcani	2280	1586	403	104	26
Vinica	43265	20678	8174	3864	47
Vrapciste	15738	10160	3283	1389	42
Zelenikovo	17696	4663	2771	2041	74
Zhelino	20094	6746	3679	2297	62
Zrnovci	5582	2100	1671	133	8
<b>Total</b>		<b>1344105</b>	<b>548828</b>	<b>175255</b>	<b>32</b>

*Annex 3: Table of land abandonment by soil class categories in North Macedonia, % of total abandoned*

Municipality	Percentage of abandoned agricultural land per land class							
	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8
Aerodrom	6.7	38.3	51.0	3.9	0.0	0.0	0.0	0.0
Aracinovo	0.0	0.0	0.7	4.0	13.6	43.1	23.1	15.6
Berovo	0.1	0.3	0.5	3.1	5.8	20.4	37.3	32.6
Bitola	1.3	4.2	10.2	20.8	11.7	14.8	14.2	22.7
Bogdanci	4.9	6.2	9.8	14.5	25.8	29.1	7.0	2.6
Bogovinje	1.3	5.4	9.6	9.5	7.2	10.6	19.1	37.4
Bosilovo	26.6	2.2	1.6	42.7	1.1	17.5	7.4	0.8
Brvenitsa	1.4	11.6	19.9	12.9	15.2	15.9	6.8	16.3
Butel	5.7	5.6	47.0	19.3	13.9	5.4	3.0	0.0
Cair	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Caska	0.6	2.1	7.1	12.8	23.6	32.2	16.6	5.1
Centar	0.0	0.0	35.8	22.0	27.5	12.9	1.8	0.0
Centar Zupa	0.0	4.1	10.7	14.9	18.7	16.4	16.9	18.3
Cesinovo Oblesevo	1.8	1.2	4.8	5.8	26.6	29.9	19.3	10.7
Cucer Sandevo	0.0	0.2	2.9	12.5	16.6	20.2	27.3	20.4
Debar	1.9	6.7	10.4	27.0	26.7	15.9	5.2	6.2
Debrca	0.0	0.4	2.4	4.9	10.6	18.7	36.1	27.0
Delcevo	0.1	0.3	1.0	2.4	7.2	13.9	27.8	47.3
Demir Hisar	0.0	0.7	3.8	7.2	14.1	22.2	29.8	22.4
Demir Kapija	0.0	2.1	1.6	16.2	14.3	27.1	30.5	8.2
Dojran	0.1	0.4	4.2	10.9	16.6	30.2	29.8	7.9
Dolneni	0.1	2.0	13.9	28.6	33.0	18.6	3.6	0.3
Gazi Baba	8.3	19.0	13.5	14.5	12.0	16.5	10.7	5.5
Gevgelija	6.7	8.9	14.2	15.4	18.3	24.5	6.4	5.5
Gorce Petrov	2.0	8.7	3.6	8.0	13.5	23.4	27.5	13.3
Gostivar	8.7	15.0	20.3	24.5	15.3	8.6	5.9	1.7
Gradsko	1.6	2.4	8.2	20.8	19.6	39.4	6.0	1.9
Ilinden	0.1	0.8	11.1	28.3	17.0	28.5	11.9	2.3
Jegunovtse	0.5	3.3	11.1	19.8	16.4	18.7	17.9	12.3
Karbinci	0.3	1.7	4.0	7.9	11.6	25.7	30.5	18.4
Karpos	0.9	7.1	14.1	16.7	13.1	35.0	12.6	0.5
Kavadarci	0.0	0.1	2.2	2.8	14.5	42.4	21.8	16.3
Kicevo	4.4	9.0	8.8	11.4	14.2	18.1	15.6	18.4
Kisela Voda	1.4	1.8	6.8	28.2	23.4	23.5	12.1	2.8
Kocani	1.9	2.9	0.8	2.4	5.4	13.2	34.0	39.3
Konce	0.0	0.0	0.3	7.1	36.7	33.7	13.5	8.7
Kratovo	0.2	0.5	2.0	4.3	10.3	23.1	27.8	31.8
Kriva Palanka	0.0	0.2	0.6	1.8	3.2	9.9	25.4	58.9
Krivogastani	0.1	0.9	15.9	35.8	24.9	16.9	4.5	1.0
Krusevo	0.0	0.1	1.4	7.6	10.4	22.1	26.9	31.5
Kumanovo	0.6	2.1	3.3	9.1	20.1	32.7	22.5	9.6
Lipkovo	0.2	0.5	3.1	7.6	13.7	21.5	25.3	28.2

Lozovo	0.3	5.3	8.6	23.3	32.4	28.0	2.0	0.2
Makedonska Kamenica	0.0	0.0	0.2	0.6	3.2	6.0	14.8	75.2
Makedonski Brod	0.7	0.7	4.5	7.9	16.1	30.5	30.8	8.8
Mavrovo i Rostuse	0.0	0.2	0.6	7.3	31.7	38.4	17.4	4.4
Mogila	1.8	1.6	1.5	5.1	20.5	42.7	22.4	4.5
Negotino	0.0	0.1	0.8	2.8	4.9	13.6	45.6	32.2
Novaci	0.0	0.2	0.9	3.0	9.0	27.2	31.3	28.3
Novo Selo	0.1	1.1	0.1	2.0	8.6	12.0	51.6	24.5
Ohrid	0.0	0.3	2.4	3.8	8.0	28.2	37.3	20.0
Pehcevo	0.0	0.2	1.2	6.4	18.7	23.8	26.7	23.0
Petrovec	0.0	2.9	4.9	9.7	17.3	36.6	23.1	5.5
Plasnica	0.2	6.2	12.7	22.1	17.7	12.1	9.2	19.8
Prilep	0.2	0.5	1.3	4.5	15.5	35.3	29.8	12.9
Probistip	0.0	0.2	0.8	3.6	11.2	29.8	32.9	21.5
Radovis	0.0	1.3	3.9	5.9	15.3	22.6	25.8	25.2
Rankovce	0.3	0.9	2.6	7.1	17.4	26.9	26.5	18.2
Resen	1.8	9.9	8.4	12.7	9.1	15.2	25.6	17.2
Rosoman	0.2	0.0	2.5	10.9	20.5	30.9	21.2	13.7
Saraj	0.2	0.8	2.2	6.3	9.8	23.6	30.7	26.6
Sopiste	0.0	0.0	4.6	11.4	17.6	25.9	22.9	17.5
Staro Nagoricane	0.0	0.7	2.0	4.7	14.1	30.2	26.1	22.2
Stip	0.1	0.3	2.3	8.7	27.3	39.4	17.1	4.8
Struga	0.3	2.0	4.2	7.8	14.6	19.7	18.3	33.2
Strumica	4.7	1.9	3.0	11.4	28.9	25.6	20.9	3.6
Studenicani	0.0	0.0	0.6	3.5	7.5	32.1	28.3	27.9
Suto Orizari	0.0	0.0	0.5	0.8	98.7	0.0	0.0	0.0
Sveti Nikole	0.2	4.2	5.0	18.1	45.6	21.1	4.7	1.1
Teartse	0.2	2.5	15.1	21.3	15.9	22.0	22.4	0.6
Tetovo	1.1	3.8	6.7	4.8	5.3	17.9	36.1	24.4
Valandovo	0.5	3.2	2.4	9.1	32.1	30.6	17.7	4.4
Vasilevo	0.0	0.3	5.0	9.8	28.7	35.1	20.3	0.7
Veles	0.9	2.4	7.2	14.5	26.9	31.3	12.7	4.0
Vevcani	5.7	30.7	22.6	16.0	12.7	11.9	0.4	0.0
Vinica	0.3	1.5	3.8	5.5	9.6	20.3	28.5	30.5
Vrapciste	1.5	7.4	28.4	11.5	6.0	11.8	19.6	13.9
Zelenikovo	0.0	0.1	3.6	3.9	5.8	27.7	34.8	24.1
Zhelino	0.0	1.3	3.4	5.0	7.2	17.6	25.3	40.2
Zrnovci	1.9	20.0	16.7	12.2	10.1	17.6	15.5	5.9
<b>North Macedonia</b>	<b>0.8</b>	<b>2.3</b>	<b>4.7</b>	<b>8.8</b>	<b>14.5</b>	<b>24.3</b>	<b>24.0</b>	<b>20.7</b>