

NIDZHE - KAIMAKCHALAN
“REPUBLIC OF MACEDONIA” (RECOGNISED BY GREECE AS:
“THE FORMER YUGOSLAV REPUBLIC OF MACEDONIA”)

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Nidzhe Mt. is one of the most uninvestigated mountains in Macedonia from the biological point of view. There are only satisfactory data on the geographical, geomorphologic, geological and hydrological characteristics as well as the data for the population features and trends. However, available data show that this mountain is very interesting and suitable for conservation activities. The very low population density means that there are no obstacles for the protection of this region concerning the possible conflicts that may arise with economical and other human interests.



Climate and geographical characteristics

As a synonym of Nidzhe Mt. is often used Kajmakchalan Mt. However, in the most recent terminology Nidzhe is posed as a more adequate name. Name Kajmakchalan is used only for the highest peak of this mountain. This terminology is followed in this text, as well.

Nidzhe Mt. covers surface of about 900 km², thus $\frac{1}{3}$ belonging to Macedonia and $\frac{2}{3}$ to Greece.

Nidzhe Mt. is situated in the southern parts of the "Republic of Macedonia". On west it borders with Pelagonija Plain, on the north with Mariovo region and Selechka Planina Mt. On the east Nidzhe Mt. borders with Kozjak Mt. and on south-east with Kozhuf Mt. This border is represented by the river Satoka and river Poroj.

The highest peak of Nidzhe Mt. is Kajmakchalan, which is 2521 m above sea level. On the top of this peak there is a church built in the memory of the soldiers that died during First World War. Peak Nidzhe is 2360 m high and has the same name as the mountain. Besides Kajmakchalan and Nidzhe, most important peaks on the main ridge are Starkov Grob (1876), Sokol (1822) and Bela Zemja or Dobro Pole (1877).

The results of the structural and tectonic investigation of Mariovo and its surrounding area, show that this area belongs to the Pelagonian massive, built of Precambrian highly metamorphic rocks, gneiss and micaschists, into which granite boulders intruded. The Pelagonian massive and the rickety structures show no recent tectonic activity. According to the regional seismical-tectonic and the local structural-tectonic researches, the Mariovo region is suitable, from the seismic aspect, for funding and construction of all types of engineering objects.

Although Nidzhe Mt. is high mountain, there are not glacial forms registered. However, periglacial forms can be noticed on higher altitudes. Very interesting are the rocks on the peak Kajmakchalan in the form of mushrooms.

The hydrography network is well developed. There are numerous springs and rivers flows. The rivers are relatively short but are embedded into deep gorges and keep their flow throughout the year. Most important river flowing in the foothill area of Nidzhe is Crna Reka. There are four main tributaries of Crna Reka on the Macedonian side: Konjarka, Gradeshka Reka, Belica and Satoka.

The average air temperature in the zone of Scots pine forest is 7,1°C. The total annual precipitation is 1120 mm, but there are certain variations depending on the terrain exposition. Snowfalls are abundant and at some portions snow remains until the beginning of July.

On higher altitudes, the annual precipitation sum is 1500-2000 mm. On higher ground the precipitation is usually snow that forms snow cover of two or even more meters. It does not melt for the biggest part of the year and at the shade side of the mountain there are places where it does not melt at all.

Social aspect

Nidzhe Mt. and surrounding region of Mariovo is very low populated. Mariovo is the most uninhabited region in Macedonia. There are about 5 people per km² according the data from 1981 (Panov 1993). Today, this number is even lower.

Mariovo Area has extremely unfavourable traffic communication, which is an important precondition for the economy stagnation. It is very far from Skopje- Gevgelija road, and about 20 km from Prilep- Bitola road. In spite of that, Mariovo is not included in the road network, which would otherwise enable the economy rise and would stop the population emigration.

Table 1. Land use in the villages' area of the foothills of Nidzhe Mt. in 1981 (From Panov 1993)

Village	Area [km ²]	Agricultural land [ha]	Pastures [ha]	Forests [ha]
Zhivojno	29.8	1218.7	1500.1	-
Sovik	16.2	421.2	1056.2	80.3
Skochivir	90.5	323.1	3836.0	4729.0
Budimirci	40.5	737.8	1903.3	1936.3
Grunishte	18.2	352.6	1229.8	190.2
Staravina	60.0	1042.3	1357.5	3547.6
Gradeshnica	83.8	1471.3	2046.5	4755.4
Zovik	22.3	644.8	1287.9	257.8
TOTAL	361.3	6,211.8	14,217.3	15,496.6
Percentage	100	17.2	39.3	42.90



Because of the low population density it is easy to conclude that there is small human pressure on the large carnivores and other plant or animal species on Nidzhe Mt. On the other hand, the number of cattle, goats and sheep is very low in the Mariovo region meaning that this food source for large carnivores can be neglected.

There are no tourist objects on Nidzhe Mt. These regions are very distant from the bigger cities or other settlements, so the mountaineers rarely visit Nidzhe Mt.

The Nidzhe Mountain is rich in miscellaneous natural attractions: geomorphologic, biogeographic, hydrographic and others, still due to bad traffic communication all these tourist motifs are not exploited.

Main human activities and consequently anthropogenic influence is performed by the forestry districts that are cutting wood on the whole mountain area.

Forestry

Three forest management units manage the forest in the part of Mariovo belonging to Bitola: Nidzhe 1, Nidzhe 2 and Kajmakchalan.

The total afforestation area is 14,835.30 ha with wood quantity 2,352.962 m³ and annual growth of 49,165.04 m³ while the annual cutting quantity of 31,294 m³.

As for the purpose of the enterprise units, these woods have exclusively economic character, except for the boundary zone. There is no protection of woods with special purpose. According to their area and annual cutting quantity, there is no big difference between coniferous and broad-leaved trees. It has to be stressed out that the wood quality is twice bigger in the case of coniferous trees.

As for the wood structure, the high-trunk forests dominate with 10,119.79 ha area, with wood quantity 2,108.777 m³ and cutting quantity of 28,025 m³. As for the tree species varieties, the commonest are: Black pine, Scots pine, fir, beech and oak.

The vertical forest zones that are exploited range from 700m to 1700 m altitude.

Review of the forest fund in the separate forest management units: In the forest management units Nidzhe 1 and Nidzhe 2 the total forest area is 8,755.6 ha and the total wood quantity 1,649.980 m³. The annual growth is 25,842.04 m³ and the annual cutting quantity is 1,977 m³. All of these forests have economic character and are preserved.

In the forest management unit Kajmakchalan, the forest area is 6,079.70 ha, the wood quantity is 703,136 m³ and the annual growth 23,323 m³. The average cutting quantity is 11,519 m³.

The pure oak plantations are mostly found in all three forest management units: Nidzhe 1, Nidzhe 2 and Kajmakchalan.

Scots pine on Kajmakchalan is represented with 77.3% of the total wood quantity of the coniferous forests and then follows Nidzhe 2 with 66.2%. In Nidzhe 1 the Scots pine participates with the smallest amount of wood quantity exploitation of the coniferous trees - 14.8%. In all forest management units, the participation of Scots pine wood quantity is 55.7%. The development and the natural renewal of the Scots pine forests on Nidzhe Mt. are problems that deserve broader attention, since Scots pine forests are important source of wood, which is essential raw material for the overall development of Mariovo and the "Republic of Macedonia". Over 75% of the Scots pine forests in Macedonia grow on Nidzhe Mountain.

Specific plans on Forestry Management: Three plans on forestry management exist, prepared by the Ministry of Agriculture, Forestry and Water Management: Nidzhe 1, Nidzhe 2 and Kajmakchalan. The plans are revised every ten years.

According to the plan Nidzhe 1 made for period 2002-2010 in the woodland there are oak and beech fir forests. In other three parts there are oak-beech and pure fir forests.

**Table 2. The distribution of forests and their surface in Nidzhe 1
(Management Plan for the period 2002-2010)**

Forest type	Surface [ha]	Altitude[m]
Forest of black ash and oak (<i>Orno-Quercetum petraeae</i>)	582.30	900-1200
Forests of black pine (<i>Seslerio-Pinetum nigrae</i>)	1398,20	900-1700
Pine Forests (<i>Pinetum silvestris nigrae macedonicum</i>)	1274,00	900-1800
Submontane beech forests (<i>Festuco heterophyllae-Fagetum</i>)	36,80	1150-1300
Mountainous beech forest (<i>Calamintho grandiflorae-Fagetum</i>)	139,30	1200-1600
Subalpine beech forests (<i>Fagetum subalpinum scardo-pindicum</i>)	157, 20	1550-1800
Fir and beech forests (<i>Abieti Fagetum macedonicum</i>)	1511,70	1200-1700

Hunting

Nidzhe, Staravina and Bach are three of the 17 hunting grounds that form the hunting ground region of Bitola. The forest management report, provided every ten years, contain data on the population movement dynamics compared to the expected number that should be present on the hunting ground in a period of 10 years. Species of special interest to the ground are evident regularly.

According to the Ministry of Agriculture, Forestry and Water Economy information, state investment is needed in hunting as economic activity in the "Republic of Macedonia". There is a current process of leasing games on concession and an expected preparation of development project to return part of the fund gathered through game usage. The population that lives in the area on and around Nidzhe is interested in giving concession. A good example is the Nidzhe and Staravina hunting ground where

Hunting and Fishing Association Kajmakchalan from the village of Staravina is a concessionaire. In the past two years they have managed the grounds well, preventing illegal hunters from Greece.

Poaching is a frequent and serious occurrence in the "Republic of Macedonia" and Nidzhe Mt. that needs the Government's involvement and solution. It is also a problem that involves the Ministry of Internal Affairs and the courts.

Poaching of roe deer and wild boar is the most usual. There are attempts for bear shooting registered, as well. The same can happen in the future due to organisation problems in the hunting association and at the state level in prevention of this kind of crime.

Vegetation

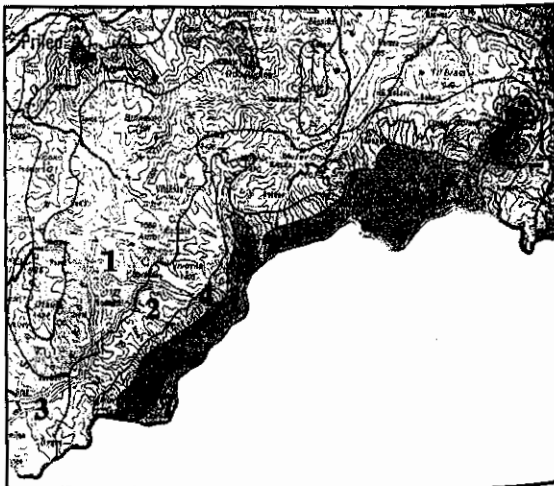
Vegetation of Nidzhe Mt. is very interesting since it is diverse and different compared to other Balkan mountains. The map on Figure 1 shows the distribution of vegetation on the area of Nidzhe Mt., Mاريو and the neighboring regions. It is important to notice that the vegetation of Nidzhe Mt. continues, almost without interruption on Kozjak Mt. and Kozhuf Mt. thus forming a long continuous forest belt.

The division of vegetation is performed on the basis of Filipovski et al. (1996) where the main criteria used are the climate, distribution of soils and vegetation. This division corresponds to the biome division published by Matvejev (in: Lopatin & Matvejev 1995). Besides the work of Filipovski et al. (1996), Classification of Palearctic Habitats (Devilliers & Devilliers-Derschuren 1996) was used.

Seven vegetation zones corresponding to seven biomes are present on Nidzhe Mt. According to Matvejev there are 9 biomes on the Balkan Peninsula. Presence of seven biomes in this relatively small region shows its great diversity from the biodiversity point of view.

Figure 1. Vegetation of Nidzhe Mt. 1:500000
(From: Filipovski et al. 1996)

1. *Quercus-Carpinetum orientalis*,
2. *Quercetum frainetto-cerris macedonicum*
3. *Orno-Quercetum petraeae*
4. *Festuco heterophyllae-Fagetum*
5. *Calamintho grandiflorae-Fagetum*
6. *Fagetum subalpinum scardo-pindicum*
7. Alpine pastures



1. There is strong submediterranean influence in the foothill area of Nidzhe Mt. along Crna Reka as well as in the gorges along its tributaries in Marlovo plateau. The submediterranean influence comes to these regions from the valley of Vardar River and then through the valley of river Crna Reka. Characteristic forest association for this area is **Quercus-Carpinetum orientalis**. On the slopes with southern and south-eastern exposition this association climbs up to 1000 m. According to the Classification of Palearctic Habitats, this forest type corresponds to the forest type of *Albanian-Macedonian-Greek mixed Oriental hornbeam-downy oak forests*. Dendroflora of this forest type is represented by *Quercus pubescens*, *Q. virgilliana*, *Carpinus orientalis*, *Phyllirea latifolia* and *Asparagus acutifolius* and *Symphytum ottomanum* in the herb layer.
2. Second forest type is represented by the submediterranean and subcontinental association **Quercetum frainetto-cerris macedonicum**. This association is developing on the peripheral parts of the valleys as well as in the river valleys on higher altitudes on the whole area of the Balkan Peninsula. On slopes with southern exposition it developed up to 1100 m, although these sites are not presented on Figure 1.
3. Above submediterranean and subcontinental parts another oak forest can be noticed. Characteristic forest association is **Orno-Quercetum petraeae** which corresponds to Illirian-west Moesian Balkan oak - bitter oak forests according to the Classification of Palearctic Habitats. This forest type belongs to the group of Submediterranean-subcontinental thermophilous bitter oak and Balkan oak forests. Characteristic tree species are *Quercus cerris*, *Q. frainetto*, *Q. petraea*, *Q. dalechampii*, *Q. pedunculiflora*, *Q. pubescens*, *Q. virgilliana*, *Q. polycarpa*, *Carpinus orientalis* and *Fraxinus ornus*. Depending on the terrain exposition this forest appears at 900-1200 m altitude or higher.
4. Beech forests are presented in two more or less distinct types. The first one is characterised by the presence of elements of the oak belt. Characteristic association is **Festuco heterophyllae-Fagetum** that covers the northern slopes on lower elevations. It corresponds to the Moesian silver lime-hornbeam-beech forests according to the Classification of Palearctic Habitats. Dendroflora is represented by *Fagus sylvatica* (Illirian form "moesiaca"), *Carpinus betulus* and *Tilia tomentosa*.
5. Second beech forest type is the continental-montane beech forest (**Calamintho grandiflorae-Fagetum**). According to the Classification of Palearctic Habitats it corresponds to Macedonian-Thracian beech and fir-beech forests. Characteristic tree species are *Fagus sylvatica* (Illirian form "moesiaca") and *Abies borisii-regis*.
6. Subalpine forest belt is presented by subalpine beech forest - **Fagetum subalpinum scardopindicum**. This association is very similar to the previous one considering the floristic composition. However, the physiognomy of subalpine beech forest is very different. According to the Classification of Palearctic Habitats it is variation of the Macedonian-Thracian beech and fir-beech forests type.
7. The last vegetation belt is occupying the highest altitudes above subalpine forests. According to Kolchakovski the timberline in Macedonia is estimated at 2200 m. Alpine pastures of natural origin are spread only on the area of the highest peaks (Kajmakchalan and Nidzhe). Characteristic plant communities of alpine pastures belong to **Onobrycheto-Seslerietalia** and **Seslerietalia comosae** distributed according to the slopes exposition.

There is a very interesting phenomenon connected to the beech belt distribution and refugial character of the Nidzhe-Kozhuf region. This region is one of the largest refugial zones in Macedonia with numerous refugial sites. In the canyons and valleys on higher altitudes the vegetation of Pleistocene period is preserved. The beech forest is reduced and covers smaller areas. Beside beech, coniferous species can be registered: *Abies borisii-regis*, *Pinus sylvestris*, *Pinus nigra* ssp. *pallasiana* and *Pinus peuce* in these heterogenous beech stands. It can be noticed that the biodiversity of these forests is very high.

Some refugial communities are composed of relict tree species, thus forming homogenous communities. As most characteristic refugial associations the following three can be mentioned:

- Seslerio-Pinetum nigrae (-pallasianae) Em
- Arctostaphylo-Pinetum sylvestris Em
- Pinetum peucis calcicolum Em

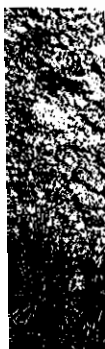
All these features concerning vegetation contribute to the enormous importance of the are of Nidzhe Mt. and Kajmakchalan.

Flora

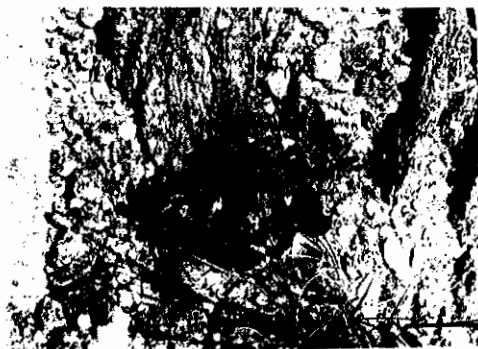
Floral composition is the best-studied feature of Nidzhe Mt. from biological point of view. There are many data presented in the Flora of the "Republic of Macedonia" (Micevski 1985-2001). The analysis of floral composition shows that there are many endemic species as well as characteristic and important submediterranean species.

Endemic species are mostly distributed in the belt of pine pastures. *Dianthus kajmaktzalanicus* grows on higher altitudes on silicate substrate. Other interesting plant species are *Viola eximia*, *Viola doerfleri*, *Saxifraga pedemontana*, *Sempervivum octopodes* ssp. *cymosa*, *Pyrola chlorantha*, *Soldanella macedonica*, *Sedum alpestre* var. *kajmaktzalanica* etc.

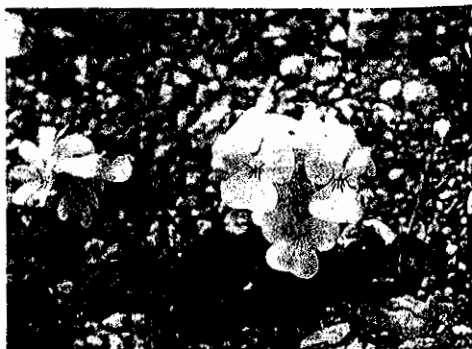
Dendroflora of Nidzhe Mt. is very diverse and represents a mixture of species from many phytogeographical areas. There are some relict species among them such as *Ostrya carpinifolia*, *Pinus mugo*, *Pinus nigra* ssp. *pallasiana* and *Pinus peuce*.



kajmaktzalanicus



Viola doerfleri



Viola eximia / Slavcho Hristovski

Fungi¹

Diversity of fungi on Nidzhe Mt. extraordinary having in mind the rich dendroflora as well as the diversity of plant associations. In the oak forests most interesting species are *Deadalea quercina*, *Peniophora meridionalis* and *Leccinum aurantiacum*. Beech forests are characterized by the presence of *Geastrum fornicatum*, *Lycoperdon molle* and *Hericium ramosum*, the last one being common for the mixed beech-fir forests. Molika pine in its isolated forests on Nidzhe Mt. provides substrate for species such as: *Suillus sibiricus* ssp. *helveticus*, *S. plorans*, *Chroogomphus helveticus* etc. Other pines (Scot pine and Black Pine) are substrate for other important species: *Dichomitus squalens*, *Meruliopsis taxicola* and *Phellinus pini*.

Fauna

Invertebrates: Faunal composition of Nidzhe MT. is the most obscure. There are some scarce data concerning butterflies, ground beetles and some other insects. Among these groups, there are some endemic and rare species, which are of importance in the conservation efforts of the region.

Ground beetles (Carabidae) are represented by some local endemic species such as: *Nebria aetolica kaimakcalanica*, *Pterostichus ottomanus kajmakcalensis*, *Tapinopterus purkynei* and *Calathus purkynei* and some subendemic species or subspecies: *Carabus intricatus macedonicus*, *Cychrus semigranosus balcanicus*, *Trechus thessalonicus*, *Molops matchai*, *Molops rufipes belasicensis* and *Zabrus aetolus purkynei*.

Among spiders there are few species registered which from the most important are *Philodromus hadzii* and *Philodromus pelagonus*.

Birds: As for the other animal groups, data about birds are very scarce. The most important is the presence of bearded vulture, one of the endangered species on the Balkan Peninsula and in Europe. There is information about few other birds of prey: Long-legged Buzzard (*Buteo rufinus*), Kestrel (*Falco tinunculus*), Goshawk (*Accipiter gentilis*) and Sparrowhawk (*Accipiter nisus*).

Large Carnivores

Bear: The presence of bears in investigated areas was confirmed by the study in the frames of a previous Balkan Net project. The greatest majority of questioned people saw or were told about bear signs during the last years. According to the performed questionnaires there are approximately 2-3 bears on Nidzhe Mt. Although the Bear is under strict protection, several "attempts" of poaching were registered.

Wolf: According Donchev (1996) wolf is present on Nidzhe Mt. Wolf is recorded (killed) for the areas of Bach, Zhivojno, Skochivir, Gradeshnica, Staravina and Budimirci.

Wolf population number is stabile with some fluctuations in the past. Exact population number is hard to

¹ We would like to thank Dr. Mitko Karadelev for his information about fungi of Nidzhe Mt.

estimate. However, by our opinion based on the data of Donchev (1996) there are approximately 20-30 wolf specimens on Nidzhe Mt.

Lynx: The last record of Lynx for Nidzhe Mt. is registered in 1971 (Miric 1981). Since then, there are no data for the Lynx presence in this region. We have to have in mind that since 1980 there are no serious investigation about Lynx in this region, so the absence of Lynx should be confirmed by some future study. According to the information of the local people the Lynx does not exist on Nidzhe Mt.

Ungulate species are represented by species common for other neighboring mountains. The red deer is extinct species while other mammals can be considered as not seriously threatened: wild boar (*Sus scrofa*), roe deer (*Capreolus capreolus*), hare (*Lepus europaeus*) etc.

Protection status of Nidzhe Mt. and protection efforts

There is no legal protection for any part of Nidzhe Mt. The closest protected area is the river canyon of Gradeshka Reka in Mariovo region.

According to the new Spatial Plan of the "Republic of Macedonia", two areas on Kajmakchalan are denoted for protection (as natural reserves):

- Redir - well preserved Scots pine forests on its southern border of distribution
- Belo Grotlo - unique phenomenon of Molika pine of limestone

**Figure 2. Areas on Nidzhe Mt. denoted for protection (Physical Plan 1982).
Areas for protection are marked only provisionally (According to Nastov 1998)**



1. Kajmakchalan (area with special natural characteristics),
2. Redir (strict natural reserve) and
3. Belo Grotlo (strict natural reserve)

In village Staravlna there is an abandoned school with all predispositions for an information center. After its repairmen and adaptation it can be used not only as local, but also as regional information center of Mariovo. Considering the fact that Nidzhe Mt. and Mariovo are uninvestigated this object can be used as research center, as well, in order to estimate the values of this interesting region.

Threats

Threats to the natural habitats and plant or animal species on Nidzhe Mt. are less expressed than in other region in Macedonia. Human activities and in this scopes forestry represent main threats to the natural environment.

Human activities: Considering the low population density in the area of Nidzhe Mt. as well as neighboring regions (Pelagonija and Mariovo) and low human activities there are no significant threats to the natural habitats and species.

Forestry: The main threat is represented by the activities of woodcutting performed by the forestry enterprise "Kajmakchalan". Timber exploitation is controlled only by this forestry enterprise according to its ten-year management plans.

Poaching: Regular hunting can not be taken as a significant threat, but poaching has to be taken in consideration.

Collection of plants: The Mountain Nidzhe is rich in forest fruits. There are blueberries, raspberries, pinecones, as well as other plants that the population collects and sells. Such are: Common juniper, linden for tea, medical plants such as thyme, St John's wort, mushrooms, as well as snails, etc. As more characteristic case, the collection of *Gentiana punctata* can be noticed.

Recreation activities: Hiking in the area of Kajmakchalan is not regular activity. Seldom mountaineering tours are organized by the Mountaineers Society "Pelister" from Bitola. On the Greek side of the Mountain there is a ski resort with cable trolley and ski lift going to the top of the peak Kajmakchalan.

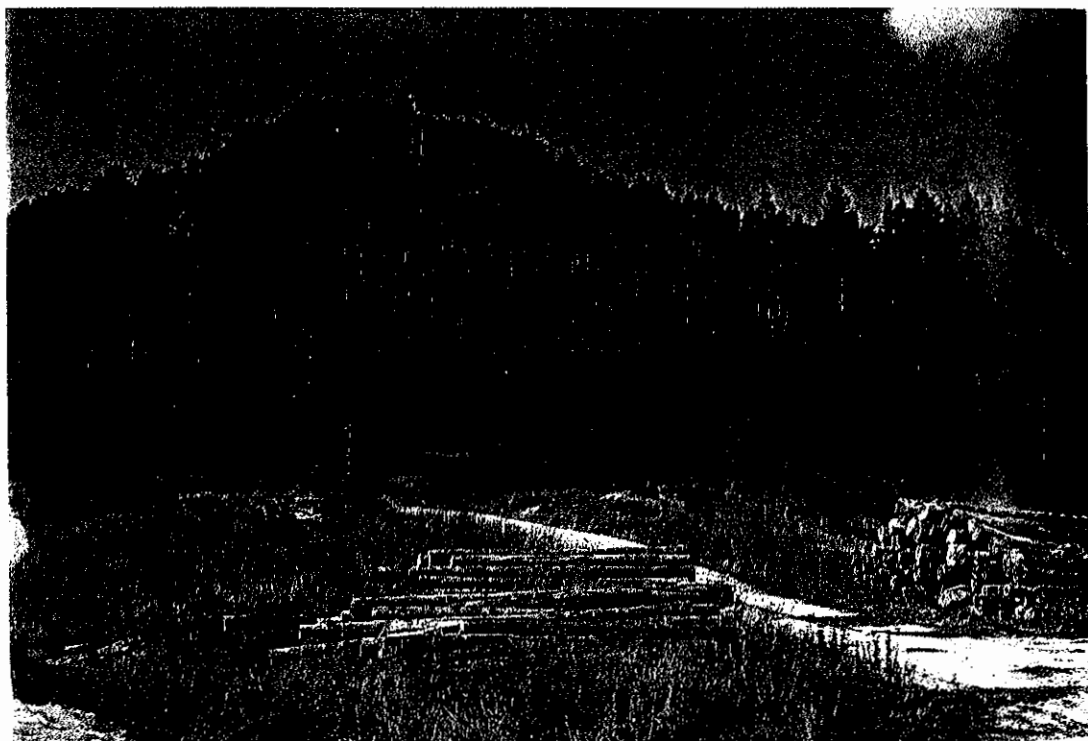
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Part of the national visions for development to 2020

The development of the area, due to the present economic and political situation, is exceptionally slow. Seen from a global frame, the future of the area is part of the national strategy for economic development of the "Republic of Macedonia". The strategy was created by the Macedonian Academy of Sciences and Art, with a note that beside development, it is also focused on modernization. The vision (strategy) for the "Republic of Macedonia" to the year 2020 includes several segments that relate to the researched Kajmakchalan area. Considering the fact that the population is low, the migration policy is making effort to diminish the reasons of uncontrollable migration from the villages, to change the migration streams for a better usage of the human, natural and material resources in the area. Furthermore, the strategy envisions larger degree of coordination of the migrations with the development needs, stimulation of daily commuting of the population and the workers and stimulation of the return of migrants from abroad and productive engagement of their cash resources.

In the researched Kajmakchalan area there are no information centers. It has not been used as a tourist destination yet. For example in the Municipality of Staravina there are only two telephone numbers - one in the Municipality offices, and the other in the Post Office. The segment on tourism is validated in the National development strategy to 2020 as a vision of what should and what can be done to use the existing area capacity. Inside as stated that the national wealth is not seriously included, nor it is oriented towards



tourist activities. Also, it is stressed that the transit tourism has significant development chances, on a condition to construction a complete and differentiated program for the interesting localities (archaeological, cultural, historical, natural, etc.). The private initiative should be stimulated toward that objective, or concessions for foreign capital should be given. The eco-food production and its supply to the tourist market can contribute the development of profitable tourist circulation. For larger investments necessary beyond 2002, and without which it will be impossible to stimulate the development objectives, it is stated that tourism needs foreign capital in different forms (direct investments, partnership, concessions and credit).

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