Nexus Mapping Study for South-East Europe: Report for North Macedonia

Background Study for the SEE2020 Region Nexus Policy Dialogue Process

December 2018

Global Water Partnership Mediterranean

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

gef IW LEARN

Umwelt Bundesamt

Austrian Development Agency

Background

The Study was prepared in the framework of the following projects:

i. "*Water-Food-Energy-Environment Nexus Policy Dialogue Process in South East Europe*" funded through the Advisory Assistance Programme of the German Environment Agency in cooperation with the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety;
ii. GEF IW:LEARN Activity 2.3: *Supporting Regional Cooperation on Shared Water Resources through Dialogue*, and
iii. "*Promoting the Sustainable Management of Natural Resources in Southeastern Europe, through the use of the Nexus approach*" funded by the Austrian Development Agency.

The Study was drafted by "Fresh-thoughts Consulting GmbH" contracted by GWP-Med, with contributions by GWP-Med staff members. The findings, interpretations, and conclusions expressed in this work do not necessarily reflect the views of GWP-Med or the donor organisations.

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Version	Date	Changes included	Goes to
0a	3 May 2018	Initial draft by economy experts	FT-GUS
0b	3 May 2018	Content QA by FT	SPA
SPA	10 May 2018	Second draft by economy experts	FT-GUS
0d	13 May 2018	Content QA by FT (Guido Schmidt)	FT-MBL
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1	18 May 2018	Final QA draft report (Guido Schmidt)	GWP-Med
1_13.12.18	13 Dec 2018	Final draft by economy experts	FT-GUS
1a	13 Dec 2018	Final QA (Guido Schmidt)	GWP-Med

Table 1: Version history

1. Introduction

This Economy Report focuses on The Former Yugoslav Republic of Macedonia as a part of SEE2020 Region (including Albania, Bosnia and Herzegovina, Kosovo*[1], Montenegro and Serbia, within its wider geographic context). It is aimed as the conceptual and technical background to support and inform the Nexus Policy Dialogue process, ongoing since 2013 in SEE under the 'Petersberg Phase II / Athens Declaration Process' and Global Environment Facility's (GEF) programme "International Waters: Learning Exchange and Resources Network" (IW:LEARN) in cooperation with the Regional Cooperation Council (RCC).

Key Nexus Sectors	The Former Yugoslav Republic of Macedonia
Size (km^2)	25,713
Population (million inhabitants)	2.0
Economic growth (NomGDP EUR/capita)	4813
Water renewable resources (million m^3/yr)	6,372
Water abstractions (million m^3/yr)	1,123
Energy production (Mtoe/yr)	1.3
Energy imports (Mtoe/yr)	1.4
Energy efficiency (Mtoe/yr/capita)	3.48
Agricultural land (% of total)	49
Forest land (% of total)	38
Protected areas (% of total)	9.65

Table 2 Overview on key Nexus sectors in The Former Yugoslav Republic of Macedonia

1.1. Purpose of the study – Context

This Nexus Assessment has been prepared in the framework of the following projects:

- "Water-Food-Energy-Environment Nexus Policy Dialogue Process in South East Europe" funded through the Advisory Assistance Programme of the German Environment Agency in cooperation with the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety.
- GEF IW: LEARN Activity 2.3: Supporting Regional Cooperation on Shared Water Resources through Dialogue.
- "Promoting the Sustainable Management of Natural Resources in South-eastern Europe, through the use of the Nexus approach" funded by the Austrian Development Agency.

[1] This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and the ICJ Opinion on the Kosovo declaration of independence.

This Study will be used as the conceptual and technical background to support and inform the activities of the three projects above, as well as the Nexus Policy Dialogue process, which have the following objectives:

- Supporting the discussion for the preparation of a regional water, food, energy, environment Nexus Strategy/Roadmap under the SEE2020 and describing steps and actions for the introduction of the Nexus approach in the basin/aquifer management frameworks at and transboundary levels as a means towards sustainable management of water, land, energy and environment.
- Facilitating the discussions among the SEE2020 economies for the possibility of a Regional Integral Water Management Framework Agreement (RIWMFA) comprising, among others, regional means and tools to assist in addressing challenges related to transboundary water resources management (TWRM).
- Fostering cross-fertilisation of institutions and practitioners at regional and state levels.

The specific objectives of the Study are the following:

- Identification of the level of integration of management of natural resources related to Nexus (i.e. water, energy, food and ecosystems).
- Identification of interlinkages and potential benefits, trade-offs and conflicts among Nexus sectors (water, energy, food and ecosystems).
- Brief assessment of the level and status of cooperation for the management of transboundary basins in the SEE2020 region.

1.2. Methodology for the development of the study

The overall work is divided into four main tasks, which have been developed in sequence way overlapping in time, between August 2017 and September 2018, as shown in the figure below.

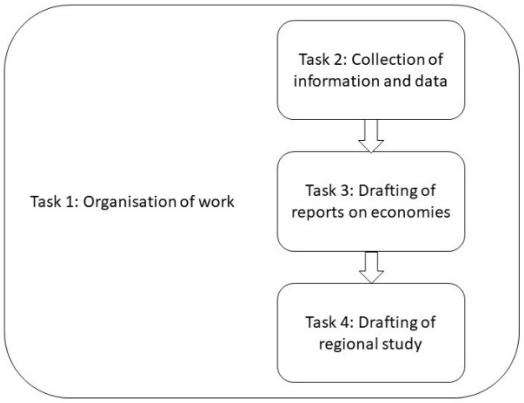


Figure 1: Schema of work developed for the study.

Based on the objectives established, data and information were gathered at the regional level and at the level of the economies. The Annex includes a list of literature, information sources, datasets and interviews.

For the Study, experts used several tools: desk research (relevant strategic documents, plans, programs; regional transboundary documents; statistical data for the economy; updated legislation; signed agreements regarding relevant nexus sectors; ratified conventions); contacting relevant institutions regarding missing data for some issues; and own knowledge and past experience.

The State Statistical Office and Ministry of Environment and Physical Planning (MoEPP) (regarding climate change issue) provided quality and reliable data. Some institutions provided information for several sectors (State Statistical Office). I Information from the water and ecosystems sectors was not available at the time of writing as information from the MoEPP did not come in time.

During the preparation of the report, different sources of information were used. Whilst the accessibility of data was rather limited for all sectors (e.g. water availability/month, water demand per sector, energy demand, electricity imports, food consumption, threatened species), their reliability is considered high for all the sectors.

2. Nexus Assessment for The Former Yugoslav Republic of Macedonia

2.1.1. Key data and trends

The average total annual consumption of water in The Former Yugoslav Republic of Macedonia is 3,519 million m^3/year. 84.7% is consumed by the energy production sector, around 342,555 million m^3/year are consumed by the agriculture sector, while consumption by the urban sector is on average 161,942 million m^3/year and by the industrial sector 327,676 million m^3 /year.

The Former Yugoslav Republic of Macedonia is strongly energy import dependent. It imports its entire demand for oil and petroleum products and natural gas, and, starting in 2000, electricity. The energy imports have grown during the past decade, and during the latest few years the imports of electricity have grown rapidly. In The Former Yugoslav Republic of Macedonia the energy production comes from coal combustion with 58%, after that hydropower at around 33%; 3% comes from natural gas, 3% from oil and another 3% from other sources. The main domestic generation facilities are the lignite-fired thermal power plants in Bitola and Oslomej (with capacity of 825 MW together), with the three generation

blocks at Bitola alone representing 699 MW. The total energy demand is 33,206 GW/h per year. The average energy consumption is 20,659 GWh/year. The highest demand for energy comes from the transport sector at 43%, followed by households with 30%.

About half of the total land area in the economy is classified as agricultural (1.26 million ha), out of which 516,644 ha (40.77%) are cultivated land and 749,772 ha (49.23%) are permanent pastures. Upland or mountainous forests cover 37% of the economy. The share of agricultural land in The Former Yugoslav Republic of Macedonia in 2016 equalled 51%, forests 37%, 5% urban areas and the rest is water bodies and industrial land. Agriculture is an important contributor to foreign trade. It represents 15-17% of the total economy's exports, although the economy remains a net importer of agricultural and food products, which accounted for about 15% of total imports in 2004-2005. Food production (2016 data) is based on fruits and vegetables (51%), followed by grains and cereals (29%) and dairy products (19%). Over 750,000 tons of vegetables are produced on a total area of about 60,000 hectares. Over 150,000 tons of fruit are produced on an area of about 15,000 hectares on some 7.6 million fruit trees, about half of which are apple trees. In 2016 total meat production in The Former Yugoslav Republic of Macedonia was 21,994 tonnes. According to the data from the census of agriculture in 2017, 20,377 ha were sown under industrial plants, of which tobacco was 16,376 (80.37%), sunflower 3,896 ha (19.12%) and poppy seed 105 ha (less than 0.5%).

The biodiversity is composed of 1,700 algal species; 3,200 vascular plants; over 2,000 fungi; 450 lichenes; 13,000 invertebrates; 85 fish species and cyclostomata; 15 amphibians; 32 reptiles; 333 birds and 84 mammal species. The endemism among these groups is large, with at least 150 endemic algae; 120 vascular plants; over 700 invertebrate species and 27 endemic fish. The economy's network of protected areas comprises 86 areas, covering 8.9% of the economy's territory (total territory is 25,713 km^2).

17 threats to biodiversity of very high priority have been identified: abandonment/lack of mowing; abandonment of pastoral systems, lack of grazing; open cast mining; continuous urbanization; disposal of household/recreational facility waste; disposal of industrial waste; trapping, poisoning, poaching; missing or wrongly directed conservation measures; groundwater pollution by leakages from waste disposal sites; diffuse groundwater pollution due to agricultural and forestry activities; burning down existing vegetation; reservoirs; surface water abstractions for agriculture (e.g. irrigation); surface water abstraction by hydro-energy; reduction of prey availability (including carcasses); temperature changes; droughts and less precipitation.

The gross domestic product (GDP) per capita in The Former Yugoslav Republic of Macedonia was last recorded at 0.012314 million EUR in 2017, when adjusted by purchasing power parity (PPP). The GDP per capita in the Economy, when adjusted by PPP, is equivalent to 73 % of the world's average.

Tertiary or the services sector comprising banking, telecommunications, real estate, and transportation contributing almost 60% of the GDP, making it the largest revenue earning and employment generating sector. The services sector provides employment to almost 50% of the total employed labour force in The Former Yugoslav Republic of Macedonia.

The manufacturing or industrial sector accounts for more than 28% of GDP and engages over 30% of the total labour force. Textiles, iron and steel, power generation, cement, chemicals and pharmaceuticals are the important manufacturing industries of The Former Yugoslav Republic of Macedonia.

The primary or agricultural sector contributes almost 12% towards The Former Yugoslav Republic of Macedonia's GDP. Nearly 20% of the labour force is employed in this sector.

The average unemployment rate from 1993-2017 in The Former Yugoslav Republic of Macedonia is 31.33%. In 2017 the unemployment rate for The Former Yugoslav Republic of Macedonia was 23.4 %.

Government debt as a percentage of its GDP in increased from 20.64% in 2008 to 39.98% in 2017.

Imports to have surged to 42.7% as purchases increased mainly for crude materials (9.2%); mineral fuels (32.8%); machinery and transport equipment (38%) and chemicals (44.2%). The most important trade partners are Germany, Great Britain, Greece, Bulgaria and Serbia. The top import origins of The Former Yugoslav Republic of Macedonia are Germany (803 mill. Eur), the United Kingdom (690 mill. Eur), Greece (546 mill. Eur), Serbia (489 mill Eur) and Russia (133 mill Eur).

Exports from the Economy have increased 47.1% as sales advanced for crude materials (66%); mineral fuels (2.7%); chemicals (44%); manufactured goods (68.4%) and machinery and transport equipment (48.9%). The most important trade partners are Germany, Great Britain, Greece, Bulgaria and Serbia.

2.1.1.1. Economy

Figure 1 shows the physical map of The Former Yugoslav Republic of Macedonia.

Figure 2 Physical map of The Former Yugoslav Republic of Macedonia[1]

Political map of The Former Yugoslav Republic of Macedonia shows governmental boundaries, capital, towns, highways, roads, tracks, railroads and airports in the Economy.

Figure 3 Political map of The Former Yugoslav Republic of Macedonia[2]

Key socio-economic data for The Former Yugoslav Republic of Macedonia including economy and population size and GDP are presented in Table 1, Figure 3 and Figure 4.

The economy is 25,713 km^2 with 2.022547 million inhabitants.

Nominal GDP for the year 2016 was 9.723 million EUR.

Economy size of The Former Yugoslav Republic of Macedonia	Sq.km	25,713
Nominal GDP for year 2016 (latest available)	Mio. EUR (current)	9,723
Key economic sectors by share of DGP (latest available)	% share	Agriculture, forestry and fishing – **10.2%** Mining and quarrying; Manufacturing; Electricity, gas, steam and air conditioning supply; Water supply; sewerage, waste management and remediation activities, Construction – **22.8 %**

		Wholesale and retail trade; repair of motor vehicles and motorcycles; Transportation and storage; Accommodation and food service activities; Public administration and defence; compulsory social security; Education; Human health and social work activities; Real estate activities, Information and communication, Professional, scientific and technical activities; Administrative and support service activities, Financial and insurance activities, Arts, entertainment and recreation; Other service activities; Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use – **53.4%**
Population size (latest available)	Mi. Persons	2.022547

Table 3 Key socio-economic data[3].

Figure 4 shows the evolution of the nominal GDP (in EUR) for The Former Yugoslav Republic of Macedonia. Nominal GDP has been growing by around 45% for the past 15 years.

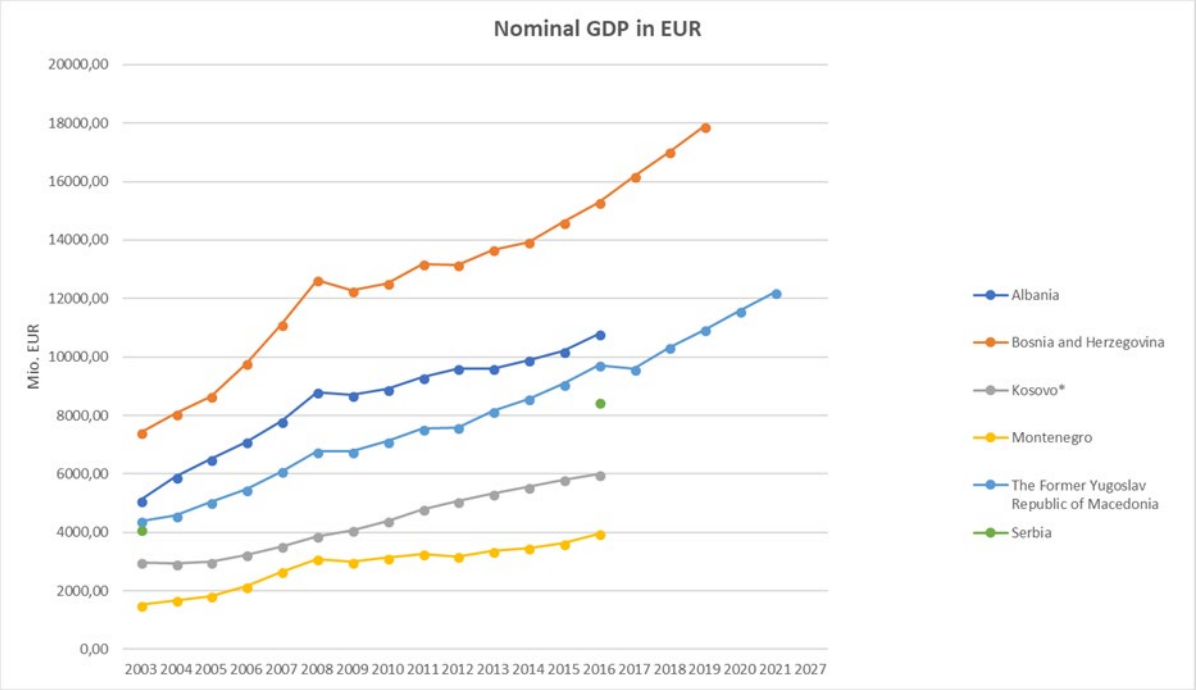


Figure 4 Evolution of Nominal GDP (in EUR)[4].

In The Former Yugoslav Republic of Macedonia and likely also in other economies, agriculture has always served as a shock absorber for the socio-economic and structural changes in industry and other sectors of the economy (Figure 5).

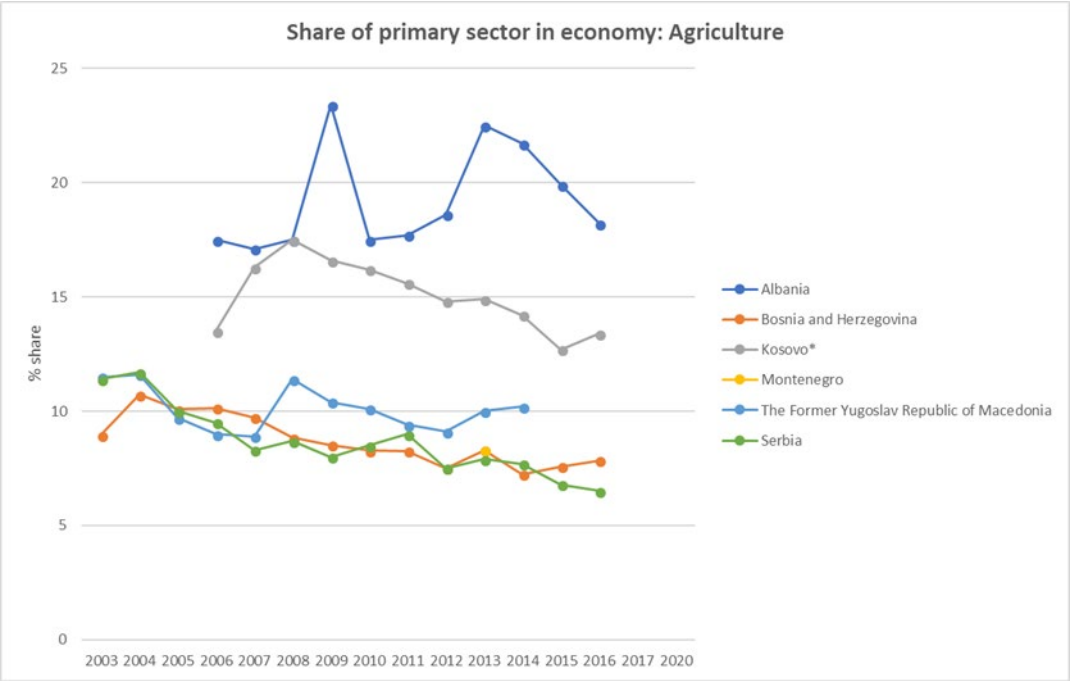


Figure 5: Share of primary sector in economy: Agriculture

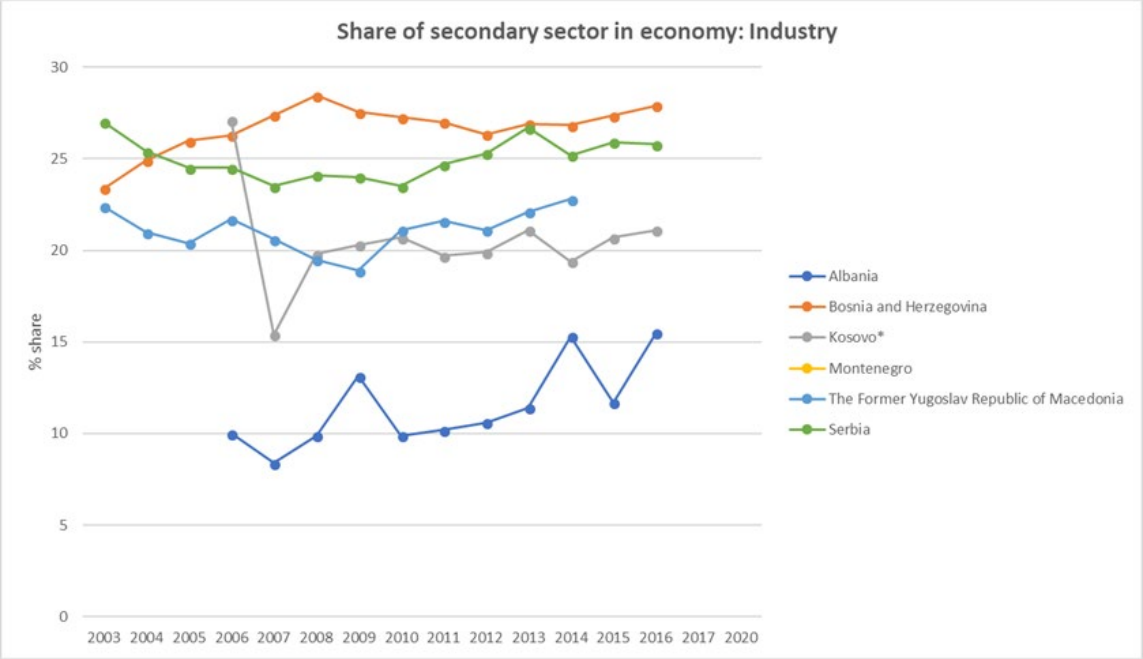


Figure 6 Share of secondary sector in economy: Industry

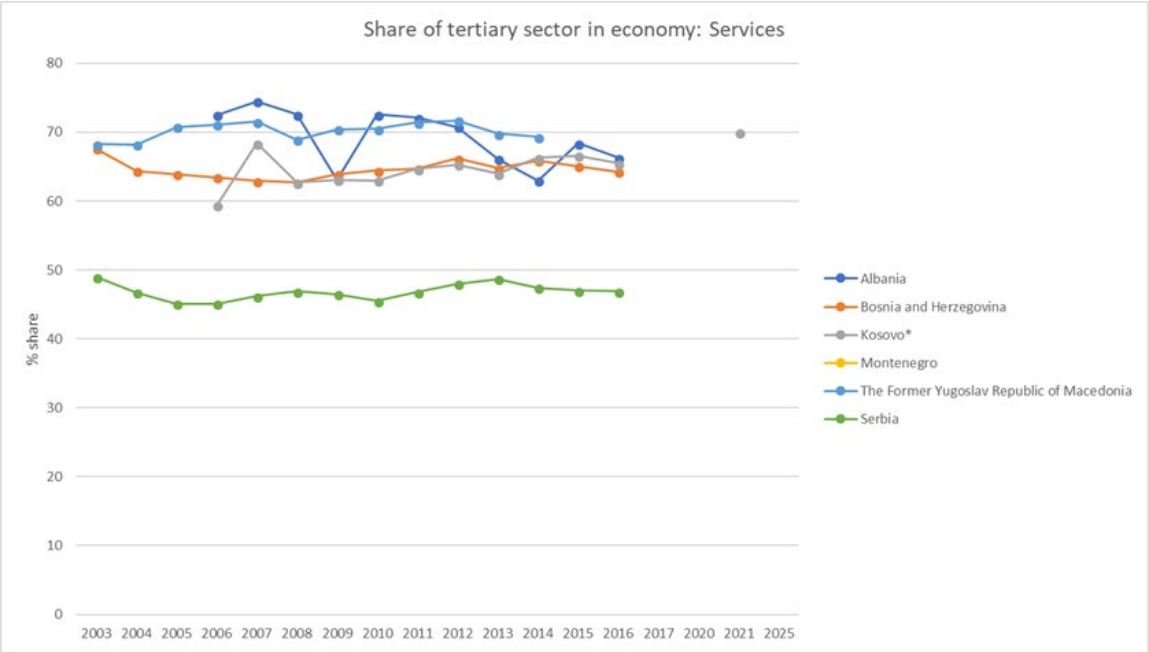


Figure 7 Share of tertiary sector in economy: Services

Figure 8 shows that the employment rate has grown by almost 10% in the past 7 years. There is a lack of data on poverty, but from the figure it is evident that poverty has been slowly decreasing in the last years.

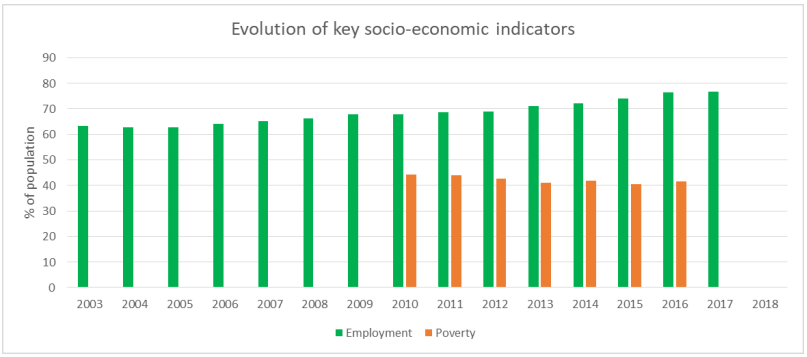


Figure 8 Evolution of key socio – economic indicators[5].

The Gini index represents the (in)equality of wealth distribution, and The Former Yugoslav Republic of Macedonia show slight improvements over the past years.

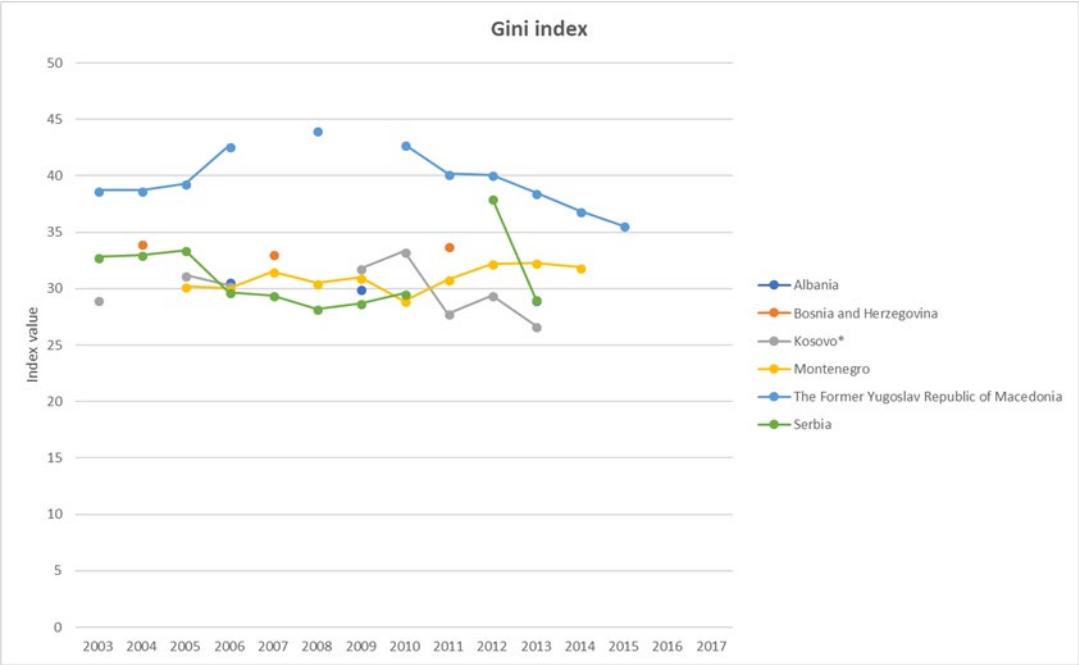


Figure 9 Gini Index

2.1.1.2. Water

Water flows, including the lakes, occupy 56,000 ha or 2% of the whole territory. The total annual available resources of surface waters in the economy are estimated at 6,372,000,000 m^3. The annual average available surface water for the average dry year reaches up to 4.5 billion m^3. Most of these resources are in the Vardar River Basin (72%); others include the Crn Drim (26%) and the basin of the river Strumica (2%)[6].

The following map presents the surface water bodies (rivers and lakes) of The Former Yugoslav Republic of Macedonia.

Figure 10 Hydrological map of The Former Yugoslav Republic of Macedonia[7].

There are mainly local water supply systems for cities, towns and villages. Many of them, originally constructed for the city or town, have been extended in order to meet the water demands of the local rural areas.

Water plays a major role for the energy sector (hydropower, cooling water), and the agricultural sector in particular for The Former Yugoslav Republic of Macedonia. The water availability per economy varies significantly in the region, and The Former Yugoslav Republic of Macedonia has the lowest availability. The Former Yugoslav Republic of Macedonia has furthermore faced a reduction of the annual values of the average discharges in the past years.

In the Economy there is growing awareness of the limits of water resources. Due to climate change, the availability and demand for clean, safe and quality water in the long term is uncertain. Proper quantification and rationalization of water consumption is essential for understanding and creating equitable and effective use of water. Thus, identification of key water consuming sectors in the Economy is necessary for sustainable water management. Around 2% from the total territory in The Former Yugoslav Republic of Macedonia is covered by surface water. The total water resources are estimated at 6.4 billion m^3 (UNECE, 2011). Three-fourths of the Economy's area is viewed as semi-arid (World Bank, 2003) and agriculture is a major water use sector, consumes around 44% from the total water demand.

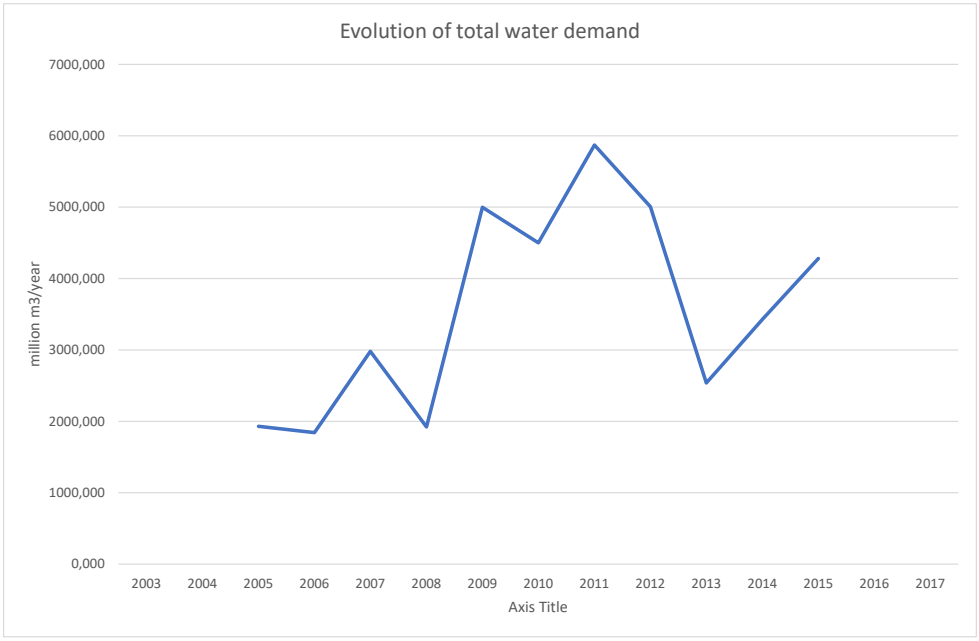


Figure 11 Evolution of the total water demand in The Former Yugoslav Republic of Macedonia in past 15 years[8]

The figure above shows the total water demand in The Former Yugoslav Republic of Macedonia in the past 15 years. There is quite a change in the trend in 2008 and 2013. Both of these years were very rainy coupled with low demand by the agriculture sector. Water demand is directly connected to the agriculture, since this sector consumes around 44% of the total water demand in the economy.

The water exploitation index (WEI) reflects the pressure of abstraction on water, with values above 20 % indicating water scarcity, whereas values higher than 40% indicate severe water scarcity. According to the Economy level data, The Former Yugoslav Republic of Macedonia WEI is 18 (Figure 7), which means the Economy is close to a water 'scarce' situation (Source: Nexus Regional Study).

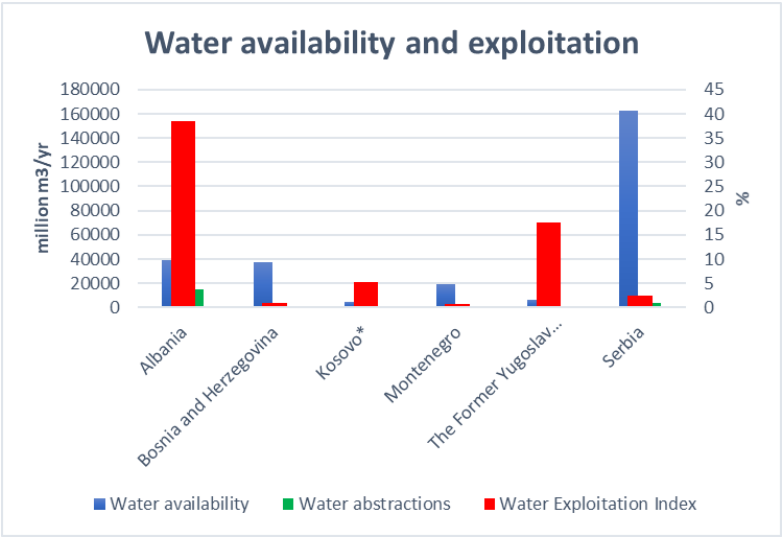


Figure 12 Water availability and Water Exploitation Index (in %), latest year available[9].

The Former Yugoslav Republic of Macedonia face pressure from water consumption, as shown by the river basin related Water Exploitation Index +.

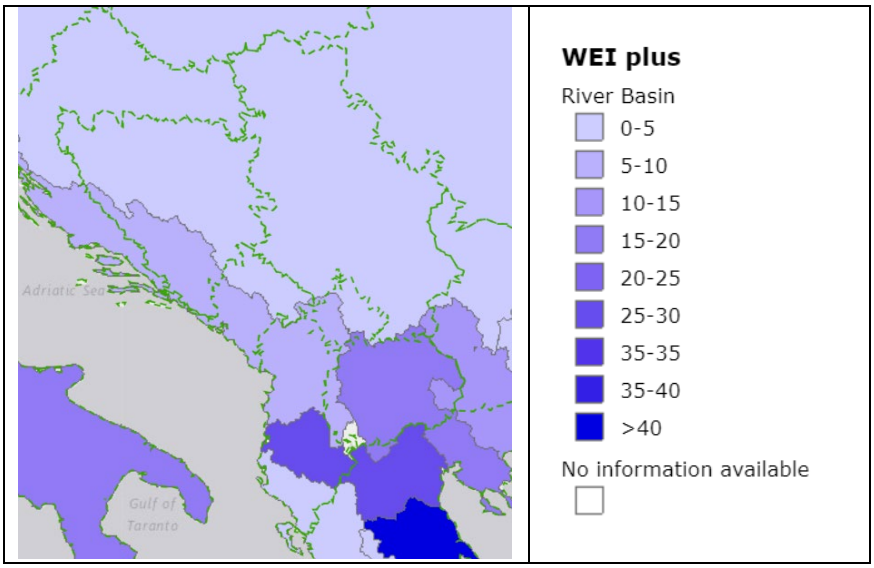


Figure 13 WEI + (January 2012)[10]

The average annual consumption of water in The Former Yugoslav Republic of Macedonia (for the period 2003 – 2015) is 3,589 million m^3, thus leading to an overall very high water consumption index of 55% for normal and 77% for dry years, far beyond sustainable levels.

Of that total use, 84.7% is used by the energy production sector with yearly averages amounting to 2.98 million m^3 (2003 – 2015). The total use of water by the energy sector doubled in the past 15 years. The economy does not provide data on the water consumption for cooling of TEPP.

Water consumption by the agriculture sector is 342,555 million m^3 per year. In 2012 the peak water consumption for agriculture was 1,353.2 million m^3. Irrigation is an important water consumer in The Former Yugoslav Republic of Macedonia (2007: 12.62%).

The urban sector has total average water consumption of 161,942 million m^3/year. The industrial sector uses on average 327,676 million m^3 every year. The figure below shows the water cycle of an average year. According to the statistical data, water needs of the industry and the mining are mostly provided from surface waters (watercourses, reservoirs, lakes).

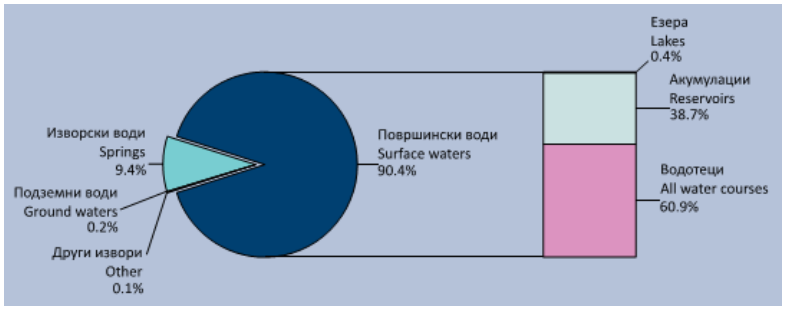


Figure 14 Water supply in industry and mining[11].

In the period 2011-2015, fresh water for technical purposes was used the most (approximately 95%).

Drinking water is safely managed for a large proportion of the population in the Economy (91%). The Former Yugoslav Republic of Macedonia is one of the economies with the largest inequalities when comparing access to safe sanitation (Source: WHO/UNICEF 2017).

The water flow of rivers is an indicator that shows the condition of the water quantity in the economy. This is monitored at reference and flux gauging stations, presented as total annual flow for a given period of time, in m^3/sec. There was increased water quantity, both at the reference and the flux gauging stations for 2004 and 2010, as a result of increased rainfall in that period.

For the past 15 years, the amount of water entering The Former Yugoslav Republic of Macedonia from upstream is 1,091.2 million m^3/year, while the water leaving the Economy downstream is 6,783 million m^3/yr.

There is reduction of the annual values of the average discharges for all river basins in The Former Yugoslav Republic of Macedonia. The same trend is defined for the minimal and maximal annual discharges for the whole territory of The Former Yugoslav Republic of Macedonia. Reduction is the most expressed for the river Bregalnica and for the river Strumica, i.e. in the central and south-eastern part of the Economy.

Oscillations of the water quantities which outflow from The Former Yugoslav Republic of Macedonia are much higher in the last 40 years. There is a linear descending trend of the water quantities, with a drop of around 70 million m^3 on annual level. (Source: Country Case, The Former Yugoslav Republic of Macedonia, (part I), Aguasan Workshop 27 June – 1 July 2016, Spiez, Switzerland).

In June 2004 high, intensive rainfall caused floods and flash floods in 26 municipalities in the economy located in the upper Vardar and in the Central South and South-Eastern part of The Former Yugoslav Republic of Macedonia. Economic losses experienced during the flash floods in 2004 show that 91.3% of the total damage is attributed to the agricultural production mainly in the south-eastern part of the Economy. The biggest losses have been experienced in the rural areas where households and cultivated areas have been flooded. In August 2016, the area of Skopje and the western parts of the Economy were flooded.

The largest availability with waters in The Former Yugoslav Republic of Macedonia is registered in spring (May) and autumn (November).

The consumption of water in the entire Prespa Watershed is 900,000 m^3. (Source: Prespa Lake Watershed Management Plan). The annual average available water in the Strumica basin is approximately 132 million m^3. The entire basin is characterized by high water

abstraction levels and irregular rainfalls, leading to over abstraction in drought years (water shortage of about 40% in an average dry year).

In the transboundary context, The Former Yugoslav Republic of Macedonia is included in Vardar River basin, Stumica River basin, Bihacka Morava River Basin and Drin River basin. Improvements are needed in the Economy for the monitoring of the aquifer and the protection zones system in place. In Drin River basin reduction of pollution from municipal wastewaters has been achieved in The Former Yugoslav Republic of Macedonia side of the lake, where a sewerage system was constructed. There are plans for the construction of additional systems in the area. The Former Yugoslav Republic of Macedonia has harmonized procedures for water quality monitoring in the Lake Ohrid and its tributaries. The Agreement for protection and sustainable development of Lake Ohrid and its watershed is operational from 2004.

2.1.1.3. Energy

The economy has enacted a long-term Energy Strategy until 2030, which defines the most favourable long-term development in the energy sector in order to provide safe and quality supply of energy to consumers.

The economy is strongly dependent on energy imports; The Former Yugoslav Republic of Macedonia has no sources of crude oil, natural gas and in recent years has faced the deficiency of electricity supply and increase in electricity imports starting from 2000. The increase of the fuel import and fuel prices on the global market contributed to growth of trade deficit in this economy.

The total energy demand in the past 15 years increases until 2008 and then decreased to the average value of 33,206 GWh per year. The following figure shows the percentage share of the energy production sources in The Former Yugoslav Republic of Macedonia.

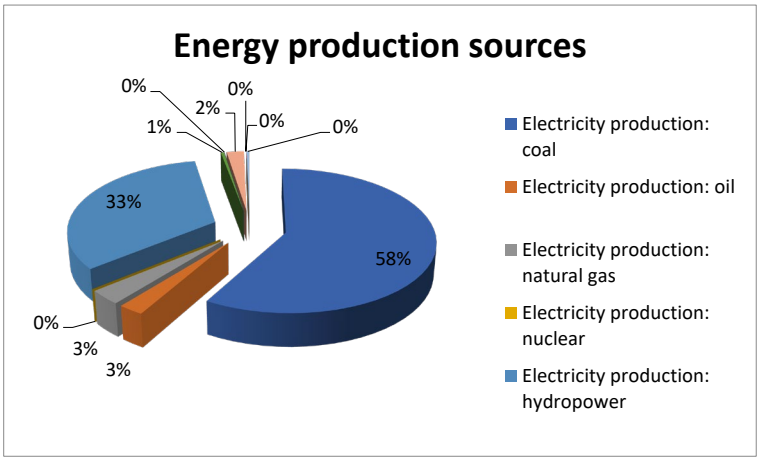


Figure 15 Energy production sources and percentage share[12].

In The Former Yugoslav Republic of Macedonia the energy production comes from coal combustion (58%), hydropower (33%), natural gas (3%), 3% from oil and other sources with less than 3%.

The Former Yugoslav Republic of Macedonia has the highest import share in the region (Figure 16).

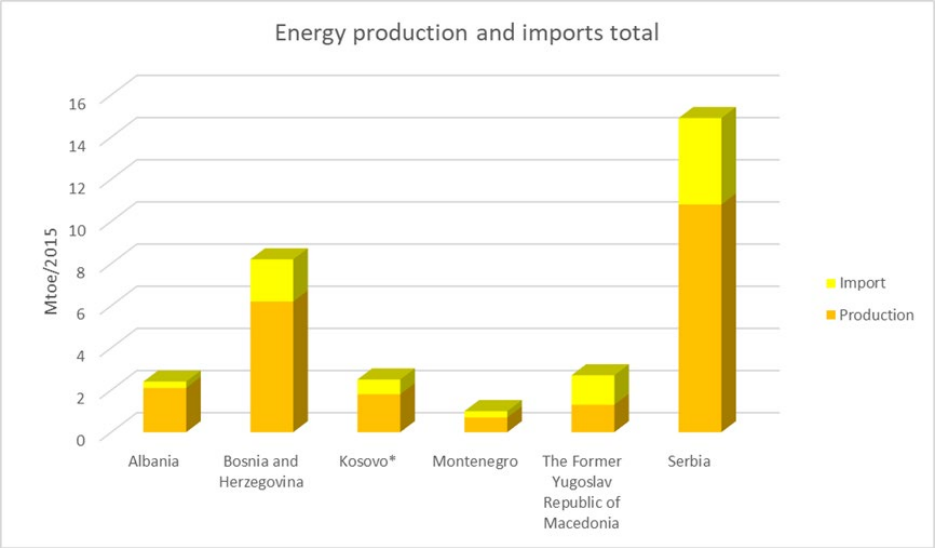


Figure 16 Energy production and imports of the SEE2020 economies in 2015[13]

The highest energy demand was in 2010. Over the past 15 years, supply has failed to keep up with demand, despite modest improvements in energy efficiency. The Former Yugoslav Republic of Macedonia showing the most significant and steady decline of the energy efficiency compared to the economic growth (Figure 9).

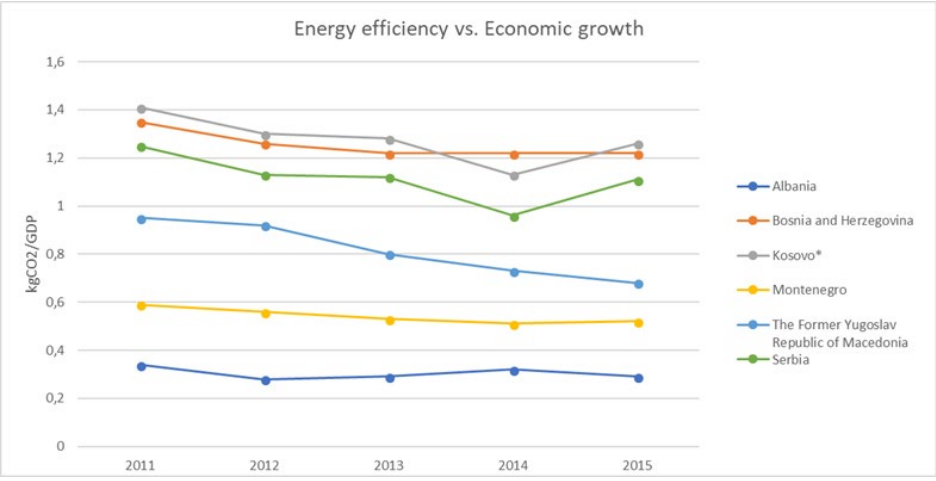


Figure 17 Evolution of energy efficiency compared to economic growth in The Former Yugoslav Republic of Macedonia and in the SEE2020 economies[14]

The total energy consumption in the past 15 years has constantly increased from 18,000-22,000 GWh per year. The average consumption is 20,659 GWh/year.

Energy consumption in The Former Yugoslav Republic of Macedonia is divided between households, industry, agriculture and transport. The highest demand of energy is transport sector by 43%, followed by households with 30% and transport by 26% (Figure 9). The transport energy consumption has doubled up in the last 15 years from 4,095 to 8,080 GWh/year.

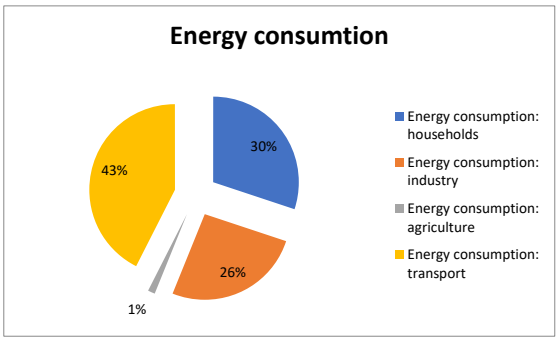


Figure 18 Energy consumption by sectors[15]

The Former Yugoslav Republic of Macedonia has exceptionally low energy consumption per capita (Figure 12) and exceptionally high energy consumption per unit of GDP in all sectors.

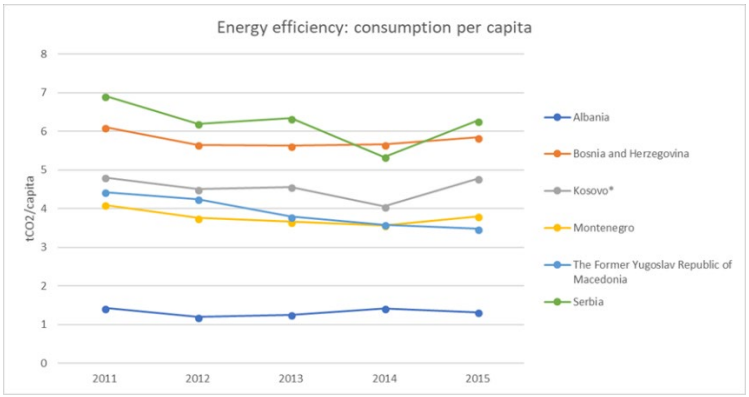


Figure 19 Energy consumption per capita (tCO2) in The Former Yugoslav Republic of Macedonia compared with the SEE2020 region[16]

The Former Yugoslav Republic of Macedonia is the only one economy which presents a clear and significant trend the efficiency/capita between 2011 and 2015.

The most used energy resources in the total consumption of primary energy are coal and crude oil with petroleum products, followed by the biomass, imported electricity, hydro power, natural gas and geothermal energy.

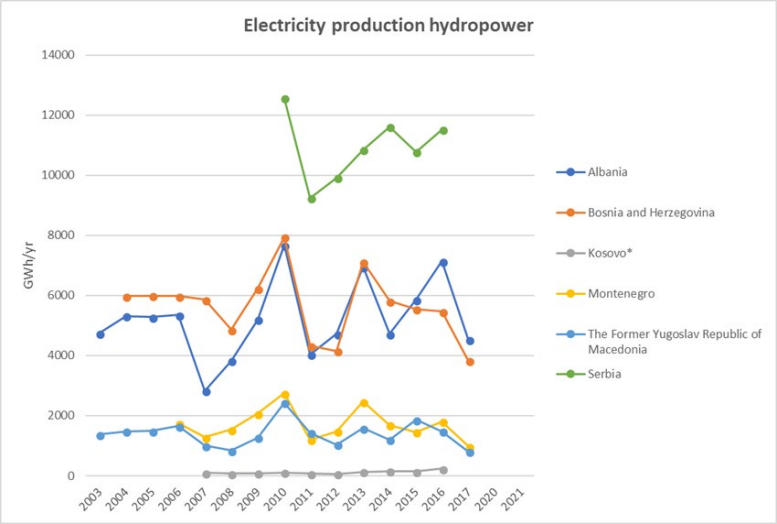
The energy consumption in The Former Yugoslav Republic of Macedonia is concentrated in four sectors: industry, residential sector, transport and commercial/service sector.

The energy infrastructure in The Former Yugoslav Republic of Macedonia comprises the electricity sector, coal, oil and petroleum products and natural gas sector as well as the heat production sector.

Electricity demand is dominated by large industrial users and households. The 10 largest industrial customers are mainly found in the metals and mining sectors. These largest industrial users used around 25 % of total electricity consumption in 2005–08. Households, meanwhile, consumed around 50 % of the total, and together with small industry and SMEs, consumption of these regulated consumers reached around 72 % of the total (including over 15 % in technical losses and theft).

Transmission (grid) losses accounted for the remainder. These percentages have shown a gradual trend of an increasing share of electricity usage by heavy industry, and a decrease in relative share of households. In 2009, however, the trend was reversed: as metal exports collapsed, heavy industry used only 17 % of total electricity in 2009, while regulated consumers (households, small industry and SMEs) together consumed 80 %.

Domestic electricity supply is mainly from thermal and hydro generation. The main domestic generation facilities are the lignite-fired thermal power plants in Bitola and Oslomej (together 800 MW), with the three generation blocks at Bitola alone representing 675MW. Both these generation facilities are owned and operated by the state-owned ELEM (Elektrani na Makedonija, or Electric Power Stations of The Former Yugoslav Republic of Macedonia). In addition, there is a back-up thermal power plant fuelled by heavy fuel oil in Negotino (210 MW capacity), which is not owned by ELEM. Hydroelectric generation represents the other main domestic electricity supply, with a total installed capacity amounting to 528 MW, out of which over 500MW is run by ELEM. As power plants, and in particular hydro power plants due to their dependence on hydrological conditions, cannot continuously be run at peak capacity, overall electricity generated by hydro facilities amounts to some 20 % of total. Further modest domestic generation capacity exists in geothermal, while there are plans for small wind farms also.



EFigure 20 Electricity production by hydropower (GWh/yr)

In the past years, the speed of construction of new hydropower plants is increasing, and The Former Yugoslav Republic of Macedonia is one of the hotspots of construction with the other countries in the region.

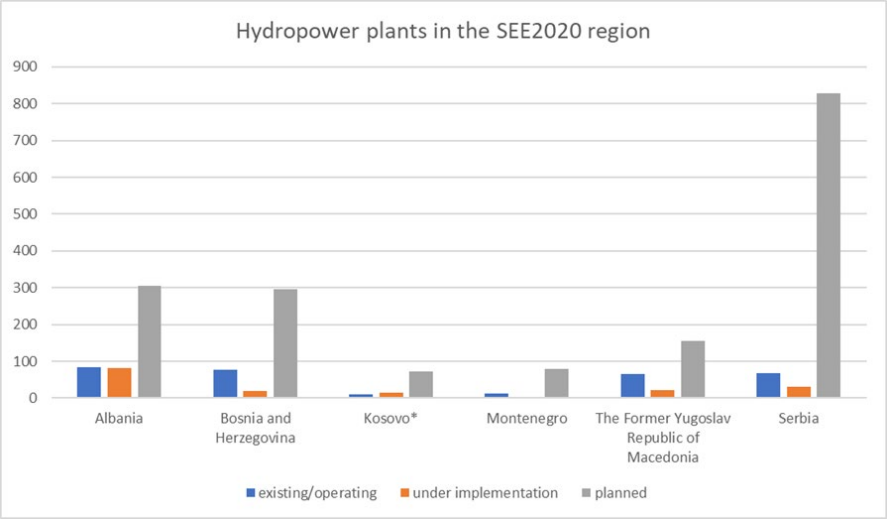


Figure 21 Hydropower plants in The Former Yugoslav Republic of Macedonia and the SEE2020 region

Regarding future projections, power production in the SEE2020 region will be affected by climate change, with relatively higher impacts on hydropower in The Former Yugoslav Republic of Macedonia, and significant effects on thermal power production.

Gross state electricity consumption represents the available and consumed total electricity in The Former Yugoslav Republic of Macedonia. This indicator presents the average consumption of electricity per capita. In the observed period 2000-2015, the average consumption increased by 23.6%. Over the years there has been a continuous increase in the average consumption, with the exception of 2001 and 2009.

In comparison to other European countries, the percentage share of natural gas in the final energy consumption in The Former Yugoslav Republic of Macedonia is very low while the percentage share of electricity consumption is very high. This particularly applies to the household sector.

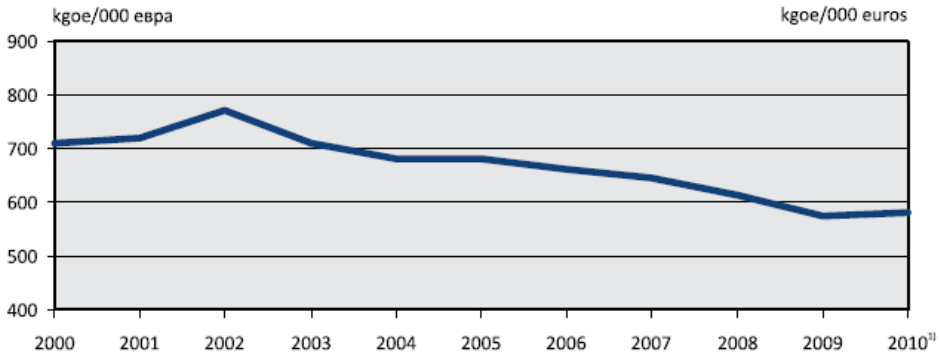


Figure 22 Energy intensity from 2000 to 2010[17].

According the State Statistical Office in 2010, the total primary production of renewable energy comprised of: wood (wood fuel, wood waste, other solid waste), 748,023 m^3; geothermal heat, 3,384.243 m^3; hydroelectricity, 2,429.283 MWh; and biodiesel 1,999 tonnes. The biggest consumers of wood (wood fuel, wood waste, other solid waste) in 2010 were households, with a share of 91%, while the other sections accounted for 9% of the final energy consumption (of wood). The biggest consumer of geothermal heat in 2010 was agriculture with 83.4%, while the other sectors participated with 16.6% in the final energy consumption (of geothermal heat). Distribution losses in geothermal heat were 10.45% of the total primary production.

Domestic generation capacity does not meet demand. With peak demand in The Former Yugoslav Republic of Macedonia at some 1,500 MWh, and hydro generation limited by water supply, it is clear that domestic generation capacity is insufficient to supply the market.

Energy market developments in The Former Yugoslav Republic of Macedonia in 2016 include further construction of an internal gas distribution network, continuation of liberalization of the electricity market, and increased regional cooperation for electricity and gas interconnections.

The Former Yugoslav Republic of Macedonia's state-owned power company was unbundled and partially privatized in the 2000s. The Austrian utility company EVN has been responsible for electricity distribution in the Economy since entering the market in 2006. State-owned MEPSO is The Former Yugoslav Republic of Macedonia's electricity transmission system operator. ELEM is economy's state-owned electricity producer. The electric power production system in the Economy consists of two thermal power plants with a total of 825 MW installed capacity, eight large and several small hydro power plants with 650 MW installed capacity. On a couple of occasions in 2016, the bigger thermal power plant "REK Bitola" was out of operation for a day or two due to unexpected breakdowns. There are two open pitch lignite mines with a total capacity of 7 million tonnes/year and estimated deposits for the next 15 years. Despite some investments in modernization, domestic production of electricity decreased by about 25 % in the last ten years, and electricity imports have risen to 34 % of total consumption.

The average annual import of electricity is 2,248GWh. The total annual production of electricity in 2016 was 4,912 GWh, which satisfied about 82 % of the total domestic electricity needs. The Former Yugoslav Republic of Macedonia has the highest import share of energy in the region (Source: IEA, 2017).

Since July 1, 2016, according to the government's plan for gradual liberalization of the electricity market in the period 2016 – 2020, an additional 158 legal entities joined the previous group of 271 companies eligible to choose their energy supplier on the free market. There are about 20 licensed energy suppliers in The Former Yugoslav Republic of Macedonia,

but only four to five of them are active. They supply electricity at free market prices to the eligible companies who have chosen that option, reducing their electricity cost by about 20-30 %. The government has been unable to attract investors to build three new large hydro power plants.

A natural gas transportation pipeline is operated by GA-MA, the gas transmission system operator jointly owned by the government and the largest oil distributor in The Former Yugoslav Republic of Macedonia Makpetrol, carries Russian gas from the Bulgarian border to Skopje. Gazprom owns the capacity within the pipeline. This pipeline currently supplies primarily industrial users in the cities of Skopje, Kumanovo, and Kriva Palanka. The government has established The Former Yugoslav Republic of Macedonia Energy Resources (MER) to oversee construction of an internal gas distribution network. The government continues to show interest in building natural gas interconnections with Greece and Bulgaria to diversify its sources of natural gas, perhaps through connections to the Trans-Adriatic Pipeline (TAP) or liquefied natural gas (LNG) terminals in Greece.

A 213-km oil pipeline with a capacity of 2.5 million tons per year connects oil storage facilities at the Greek port of Thessaloniki with OKTA's aging oil refinery outside Skopje. The pipeline and refinery are not in use; OKTA primarily operates as an oil trader in the Economy. The import of natural gas comes from Russia with an average amount of 130 million m^3 per year.

Renewable energy generation opportunities, such as investments in electricity generation from wind and solar – thermal systems are subject to quotas. There are also opportunities to promote more efficient use of electricity, through home insulation and installation of more efficient heaters and electromechanical devices. Also, liberal legislation provides opportunities for small projects and individual power plant construction and operation.

The Former Yugoslav Republic of Macedonia does not export a lot of electricity, only around 50GWh/year. Since there is no natural gas and petroleum in The Former Yugoslav Republic of Macedonia resources, the Economy only imports these energy sources in form of crude oil, on average amount of 21,459.82 bbl/day, but exports refined petroleum products mostly to Kosovo* and less in Serbia. However, exports have decreased since 2010 down to 2,830 bbl/day in 2016.

Residential buildings are the largest single consumer of energy in the Economy contributing for shaping of the environmental impacts especially because of the households inefficient use of electric heaters and mainly usage of fuel wood and coal for heating. In The Former Yugoslav Republic of Macedonia, according the national statistical data for 2017 , solid fuels are mainly used for households heating by stoves (85%); than central heating (6,7%) using mainly LPG and crude oil; electricity (6,5%); liquid fuels (1%) and other fuels 0,5%.

2.1.1.4. Food/Land/Agriculture

Land structure in The Former Yugoslav Republic of Macedonia is very heterogeneous (there are more than thirty types of soils) as consequence of the varied natural conditions for the soil creation (topography, climate, flora, geological formation and anthropogenic influence). In The Former Yugoslav Republic of Macedonia, mining remains a major economic and landscape-forming activity.

In 2016, about half of the total land area is classified as agricultural (1.26 million ha), out of which 516,644 ha (40.77%) are cultivated land and 749,772 ha (49.23%) are permanent pastures. Upland or mountainous forests cover 37% of The Former Yugoslav Republic of Macedonia.

From the total cultivated land, 417,456 ha (80%) was arable land and gardens, 59,437 ha meadows (12%), 26,000 ha vineyards (5%) and 15,856 ha orchards (3%).

The share of agricultural land in The Former Yugoslav Republic of Macedonia is 49%, forests by 38%, 2% water bodies and the rest 11% is other (urban area and industry).

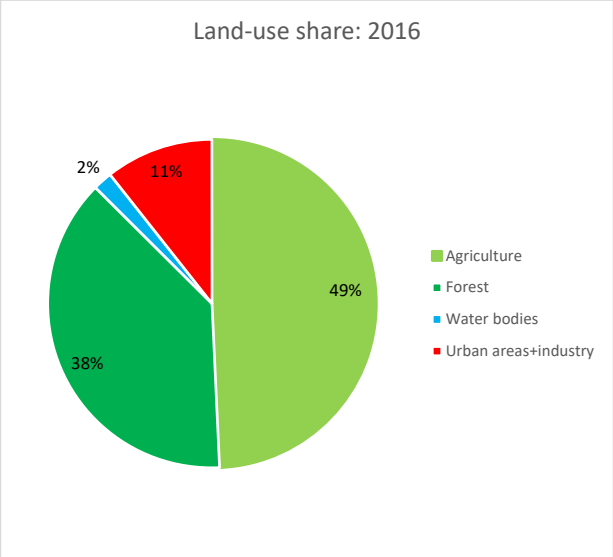


Figure 23 Land use share in The Former Yugoslav Republic of Macedonia [18]

Contributing to 10 % of GDP and around 20 % of employment, the agricultural sector continues to play an important role in The Former Yugoslav Republic of Macedonia's economy. In addition to primary agriculture, the agro-processing industry contributes another 6 % to GDP. The sector's share of the economy has remained fairly stable since the mid-1990. An important transformation is currently taking place, with increasing fruit and vegetable production replacing more traditional products such as cereal. However, the structure of the sector functions as an impediment to growth. Small-scale farmers with revenues below EUR 2,000 per year dominate the sector and constitute 58 % of total holdings. Over 90 % of all agricultural holdings in The Former Yugoslav Republic of Macedonia

have revenues below EUR 8,000 per year. The average size of individual holdings is below 1.5 ha divided into on average 0.5 ha parcels. Agricultural practices of these farmers limit access to markets and are often not environmentally sustainable. The adaptation deficit of The Former Yugoslav Republic of Macedonia farmers is large, meaning that farmers even under current agro-climatic conditions are using sub-optimal seeds and production methods. The agro-processing industry is operating at only 40 % of its capacity with inadequate input supplies being one of the obstacles to utilizing its full capacity. (Relevance regarding Agriculture for Green Growth in The Former Yugoslav Republic of Macedonia, Macedonian Green Growth and Climate Change Analytics Centre). The evolution of food statistics in the past 15 years is presented in the figure below.

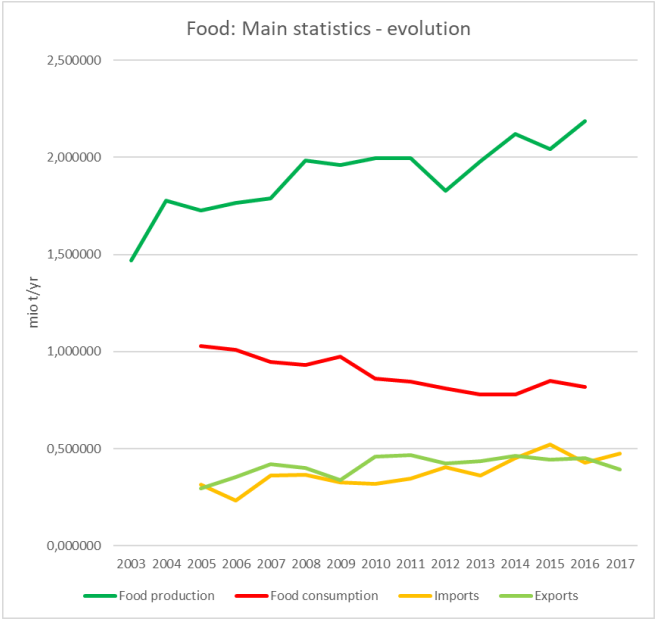


Figure 24 Evolution of food statistics[19].

Agriculture political commitments are targeted for ensuring stabile production of cheaper and quality food, providing enough food quantity for the population, sustainable development of rural areas, increasing of agriculture competitiveness, ensuring a stable level of income from agricultural economy, optimal utilization of natural resources by respecting of the nature and environmental protection principles.

Future agriculture policy according the Economy's strategy for agriculture and rural development includes long-terms strategic objectives such as: increasing of agriculture competitiveness on integrated regional markets in European Union and South-eastern Europe (SEE) by implementation of measures for increasing of agricultural production efficiency, construction of public and private institutes, improving revenue on the farm etc.

Agriculture is an important contributor to foreign trade. It represents 15-17% of the total Economy's exports, although The Former Yugoslav Republic of Macedonia remains a net importer of agricultural and food products, which accounted for about 15 % of total imports

in 2004-2005. World Trade Organization membership increased possibilities for export expansion but also competition on the domestic market from imported products. The relative share of agro-food and fishery exports in the total trade for the period from 2000-2006 averaged 16.8%, whereas, in the same period, the relative share of imports was 13.7%. Food production in 2016 is based on fruits and vegetables by 51%, followed by grains and cereals by 29% and dairy products with 19% (Presented on Figure 13).

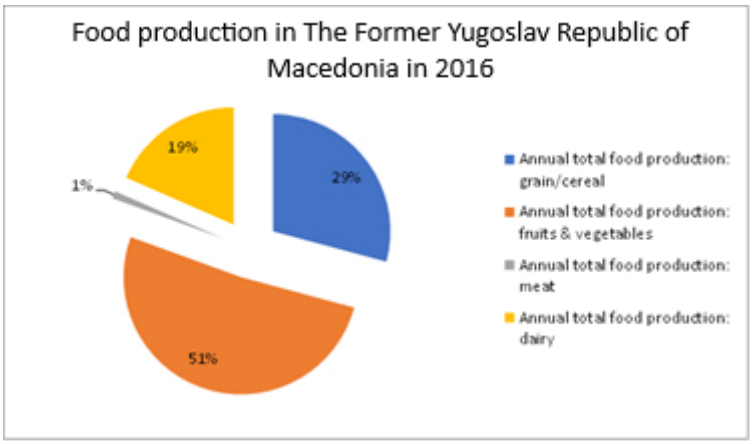


Figure 25 Food production in The Former Yugoslav Republic of Macedonia for 2016[20].

Vegetables are the most important sub-sector within Economy's agriculture. Over 750,000 tons of vegetables are produced on a total area of about 60,000 hectares. The land area devoted to vegetables and output has been growing steadily in recent years. The Former Yugoslav Republic of Macedonia is a net exporter of processed and preserved vegetables, particularly processed peppers and other preserved vegetables such as gherkins, cucumbers and mushrooms. Annual data for vegetable production in the Economy within the last 13 years is presented in Figure 14.

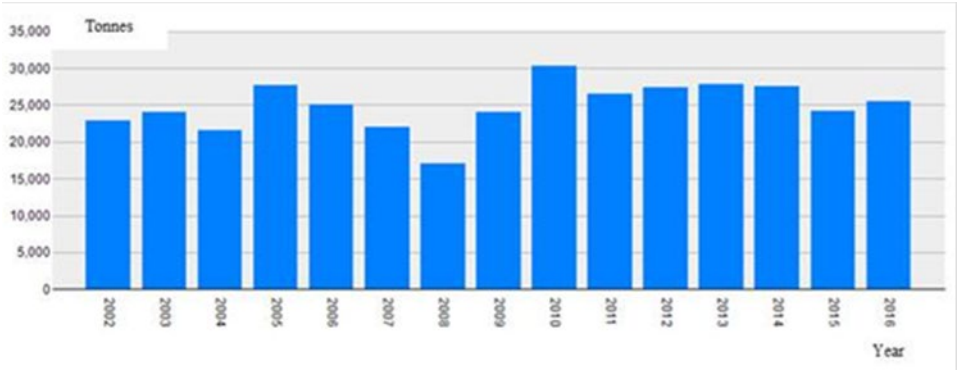


Figure 26 Annual data for vegetable production within the last 13 years[21].

Fruit production in The Former Yugoslav Republic of Macedonia is mainly concentrated in areas about 300 to 800 meters above sea level in the western part of The Former Yugoslav Republic of Macedonia. Due to different altitudes, there are many different microclimate areas with special climatic conditions suitable for fruit production. Over 150,000 tons of fruit

are produced on an area of about 15,000 hectares on some 7.6 million fruit trees, about half of which are apple trees. Annual data for fruit production within the last 13 years is presented in Figure 15.

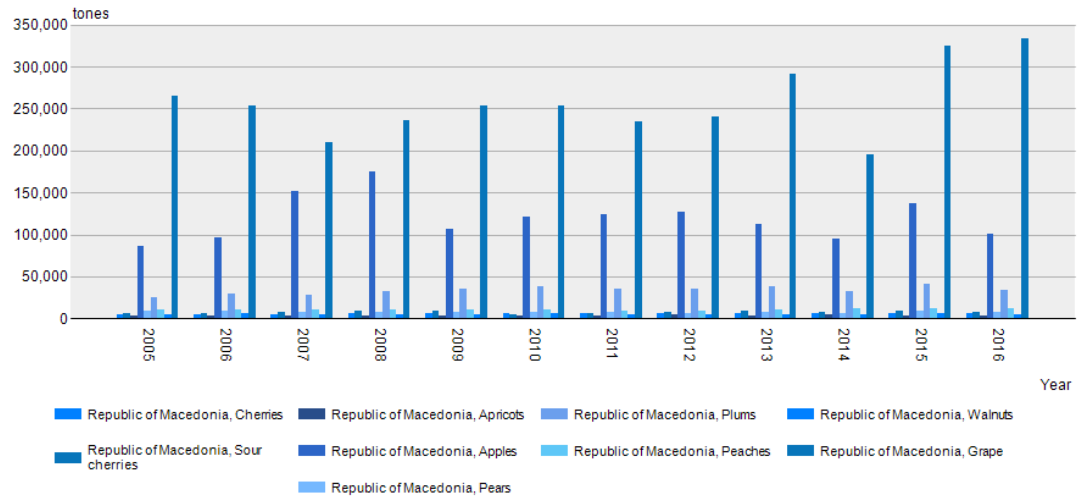


Figure 27 Annual data for fruit production within the last 13 years[22].

Organic farming is of low relevance within the SEE2020 economies, represented with 3,245 ha in The Former Yugoslav Republic of Macedonia.

Of the total crop production area, the share of cereals is the highest, with more than 60% of all crops in general. Since 1995 cereal crops have a low but steady increase. Annual data for cereals production within the last 15 years is presented in Figure 16.

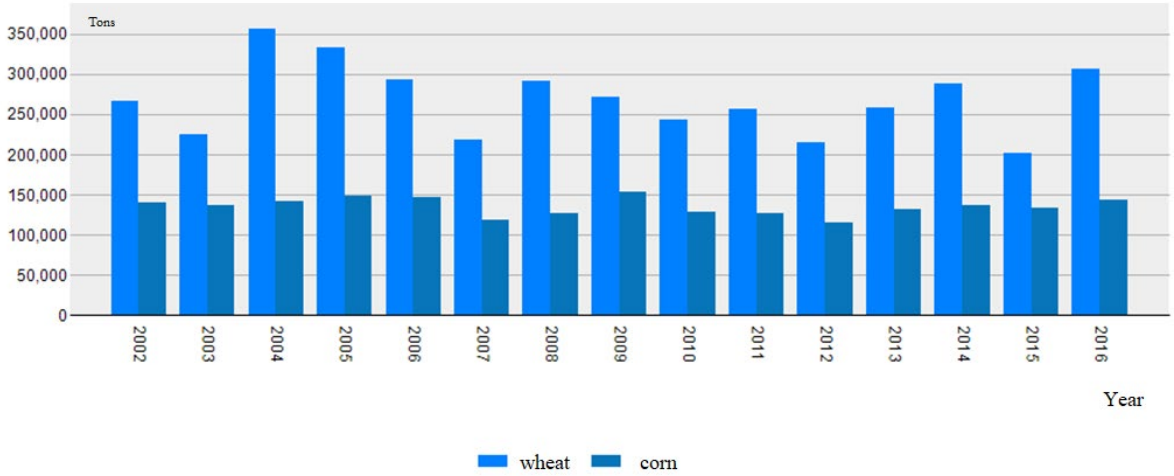


Figure 28 Annual data for cereals production within the last 15 years[23].

In Drin region in The Former Yugoslav Republic of Macedonia, irrigation practice struggles with poor technical conditions, poor or even no maintenance, not fully constructed, insufficient and poor hydromechanical equipment, large number of water users, small size of the plots, bad financial situation of the Water Management Organisations, low Law enforcement, huge

water losses, poor services, low revenue collection rates, decreasing demand from farmers, low institutional capacity of WMOs, bad overall management in water sector etc.

In 2016 total meat production in The Former Yugoslav Republic of Macedonia, 994 tonnes. Annual data for meat production within the last 15 years is presented in Figure 17.

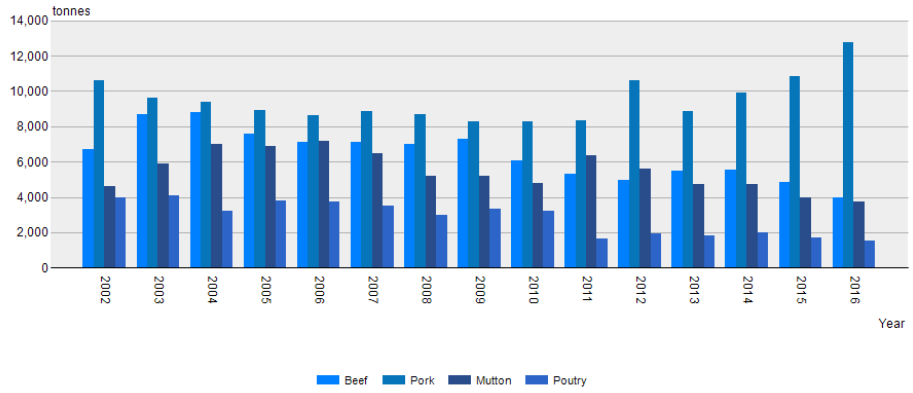


Figure 29 Annual data for fruit production within the last 15 years[24].

According to the data of the State Statistical Office, the production of cow milk in 2016 was 403,044,000 litres, which is 11.6% more than in 2015. An increase of 0.8% in 2016 was registered in the production of sheep's milk, while the production of goat's milk grew by 24.2% compared to the previous year. The increase in goat milk and cheese production is due to the higher demand on healthy and organic food in The Former Yugoslav Republic of Macedonia. Annual data for milk production within the last 15 years is presented in Figure 18.

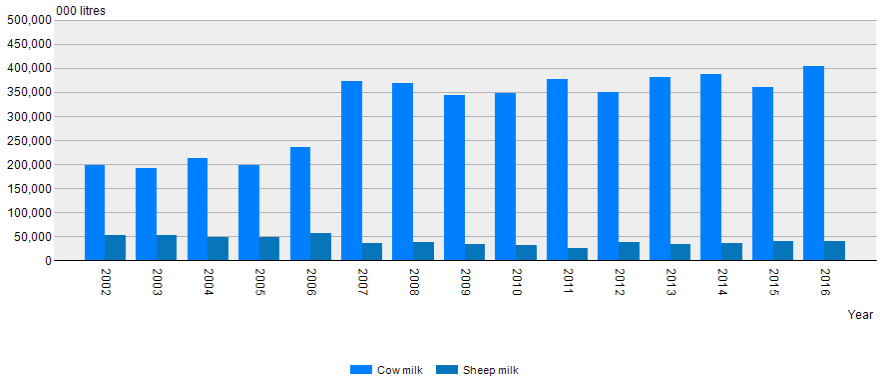


Figure 30 Annual data for milk production within the last 15 years[25].

In 2016, agribusiness (including agriculture, forestry, and fisheries) accounted for 9.89 % of GDP and around 17 % of the total number of persons employed in The Former Yugoslav Republic of Macedonia.

Exports of agriculture and food products in 2016 constituted 12.25% of economy's total exports. The top markets for agriculture and food products are the EU and Western Balkan

economies (Serbia, Kosovo*, Albania, and Bosnia and Herzegovina), accounting for (approximately 82.3 % of the total exports). The main export products from The Former Yugoslav Republic of Macedonia are fresh and processed vegetables and fruits (34.8 % of total agricultural exports), tobacco (24 %), grains (13.5 %), and beverages (12 %). The main import products are meat (beef, poultry, and pork accounted for 20 % of total agriculture imports), fruits and vegetables, grains, coffee, tea, and spices.

Food and beverage processing are significant industries in The Former Yugoslav Republic of Macedonia, as well as fresh fruits and vegetables. Processed foods include both semi-finished products (including frozen, dried, and concentrate) and finished products (canned and preserved). Over 75 % of the processed foods are exported, mostly to the EU and to neighbouring countries. Most of the food-processing facilities are in private hands.

The Former Yugoslav Republic of Macedonia is a producer of industrial crops, i.e. plants that are used as the basic raw material for processing in the industry, mainly in textile production clothing, cigarette production, oil, sugar, pharmaceuticals industry, etc. From the industrial crops in The Former Yugoslav Republic of Macedonia, tobacco and sunflower traditionally are mostly cultivated.

According to the data from the census of agriculture in 2017, from the 20,377 ha of industrial plants, tobacco cultivation was 16,376 (80.37%), sunflower 3,896 ha (19.12%) and poppy seed 105 ha (less than 0.5%).

In the general structure of The Former Yugoslav Republic of Macedonia agriculture, industrial crops have had the greatest increase in area, with an increase in their share in the total area cultivated from 9% to 12%, which is mainly due to the growth of tobacco areas. With government support policies through subsidies, tobacco production has been steadily growing. Annual data for tobacco production in The Former Yugoslav Republic of Macedonia is presented in Figure 19.

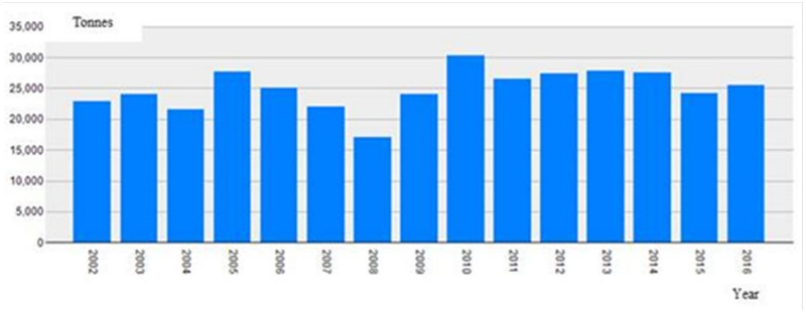


Figure 31 Annual data for tobacco production in the Economy[26].

2.1.1.5. Ecosystems

The biodiversity is composed of 1,700 algal species, 3,200 vascular plants, over 2,000 fungi, 450 lichenes, 13,000 invertebrates, 85 fish species and cyclostomata, 15 amphibians, 32

reptiles, 333 birds and 84 mammal species. The endemism among these groups is large, with at least 150 endemic algae, 120 vascular plants, over 700 invertebrate species and 27 endemic fishes. A complete understanding of the biodiversity in the economy is incomplete due to scarce or missing data on some taxonomic groups.

From 2003-2013, the status and the trends of economy's biodiversity was analysed. Within this period, the volume of knowledge of biodiversity increased, especially in some of its components. Around 250 taxa new to science have been described (6 plants, more than 170 taxa of diatomeous algae and 48 invertebrate species). A lot of species have been registered for the first time (23 higher plants, 237 fungi species, while the estimate of the number of invertebrates has risen from around 10,000 to more than 13,000 species). A quantitative assessment of the population of certain priority species (e.g. Balkan lynx, several bird species) has been made, and trends in the populations of certain bird species (Griffon Vulture, Egyptian Vulture, Lesser Kestrel, Imperial Eagle) have been documented.

Currently, the economy's network of protected areas comprises 86 areas. Assigned protected area in the Economy is 2,300.97 km^2. The Economy assigned protected areas according to IUCN classification categories are given in Table 2.

No. of category	Category of protection according to IUCN	Number of areas/sites	Coverage km^2
Ia	Strict Nature Reserve	2	77.87
Ib	Wilderness Area	-	0,00
II	National Park	3	1,148.7
III.	Natural Monument	67	790
IV	Nature Park	12	30.4
V	Protected landscape	1	1.00
VI	Multipurpose Area	1	253
Total		86	2,300.97

Table 4 Economy assigned protected areas according to IUCN classification[27]

The share of protected areas in The Former Yugoslav Republic of Macedonia is presented in Figure 32.

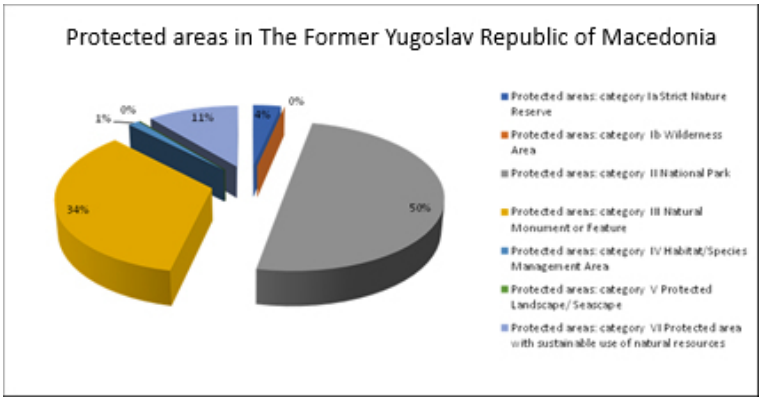


Figure 32 Protected areas by category in The Former Yugoslav Republic of Macedonia[28]

The figure shows that in The Former Yugoslav Republic of Macedonia the main protected areas are of Category II by 50%, 34% from III Category, VI Category with 11%, 4 % I Category and 1% Category IV.

The Former Yugoslav Republic of Macedonia is economy with 9,65% share of protected areas in 2018. (Source: UNEP-WCMC (2018).

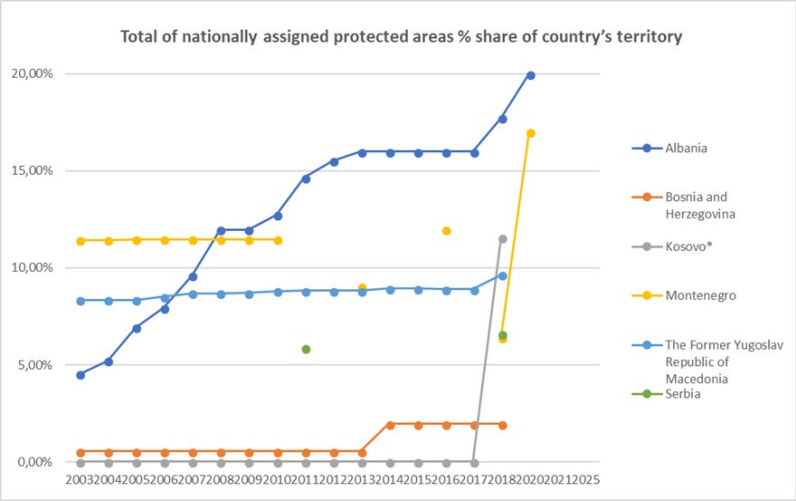


Figure 33 Protected areas as a share of The Former Yugoslav Republic of Macedonia 's territory[29]

The total estimation of the "economic value" of the economy's biodiversity was conducted in 2007 and 2013. The the value differs from € 3,200,689 in 2007 to € 225,000 in 2013. The application of the ecosystem services concept and the related concept of environmental economic valuation ("economic value") was conducted within the Study "Valuation of natural values of Shar Planina and estimation of their market value", published in 2007 and financed by the MOEPP. According to the study, the "economic value" of natural resources on Shar Planina has been estimated at €3,200,689, i.e. a sum that the residents in the cities and villages around the mountain are willing to pay annually for the protection and improvement of the state of the environment of Shar Planina. Also, in 2013, a Study on the economic values of ecosystem services in Ezerani Nature Park was conducted. According to this study, the estimation of environmental economic valuation shows that the annual sum of all tangible benefits from Nature Park Ezerani amounts to about €225,000 (divided: fishing within the borders of the Park (€22,200); sand collection (€182,000); hay for feeding sheep (€9,200); educational visits (€7,000); research (€2,400); and wildlife viewing (€1,800). (Source: Fifth Economy Report to the Convention on Biological Diversity of The Former Yugoslav Republic of Macedonia).

Until now, the Ecological Footprint within the economy has not been assessed.

In The Former Yugoslav Republic of Macedonia, small hydropower plants and water storage in river beds, as well as land abandonment are the most important causes of biodiversity decline.

Currently, 17 threats of very high priority to biodiversity have been identified: abandonment/lack of mowing; abandonment of pastoral systems, lack of grazing; open cast mining; continuous urbanization; disposal of household/recreational facility waste; disposal of industrial waste; trapping, poisoning, poaching; missing or wrongly directed conservation measures; groundwater pollution by leakages from waste disposal sites (WFD); diffuse groundwater pollution due to agricultural and forestry activities; burning down existing vegetation; reservoirs; surface water abstractions for agriculture (e.g. irrigation); surface water abstractions by hydro-energy; reduction of prey availability (including carcasses); temperature changes; droughts and less precipitation.

From among priority threats, two are related to agricultural sector, i.e. abandonment of traditional modes of meadows and pastures utilization through mowing and grazing, respectively. The main cause is depopulation of rural areas and low economic profitability of these activities in the absence of subsidies. Different plant communities from plane meadows are the most affected, especially the communities of *Hordeeto-Caricetum distantis*, *Cynosureto-Caricetum hirtae* and *Trifolietum resupinatibalansae*.

Many rural areas are highly fragmented, especially the area of Mariovo, eastern and north-eastern parts of The Former Yugoslav Republic of Macedonia. Although no specific indicators have been developed in The Former Yugoslav Republic of Macedonia (i.e. no monitoring of biological diversity priority components is performed with regard to meadows and pastures), these threats are the driving force of the decline of a number of species (5th Economy report on Biodiversity, MOEPP 2014 Skopje).

Another severe threat, primarily due to its irreversibility, is the construction of reservoirs. As by rule, river gorges are the most suitable places for their construction and they are often areas rich in rare (relict), endangered or endemic flora and fauna. In certain cases, small hydropower plants are constructed within the boundaries of protected areas, mainly in mountainous areas. Studies on artificial lakes Matka and Mantovo indicated the prevalence of a small number of species resistant to pollution (i.e. *severe disturbance of the fauna of macrozoobenthos*). Surface water intakes for irrigation, through construction of water accumulations, lead to the same problem, and in some cases (e.g. Dojran Lake, and especially Prespa Lake) there is direct pumping of water for the purposes of agriculture, which contributes directly to the reduction of water quantity in the Lakes and severe problems with the vegetation and fauna (5th Economy report on Biodiversity, MOEPP 2014 Skopje).

Population of the floating plant *Salvina natans* in the shore area of Dojran Lake, between Star Dojran and Nov Dojran, was endangered by water discharge from the Lake in 1988. In the course of the construction of the Kozjak hydro accumulation in the lower course of the River of Ocha, parts of the populations of the plant *Thymus oehmianus* were destroyed. Part of the populations of the endemic species *Viola kosaniniie* was devastated and fragmented during the construction of the access road between the village Nova Breznica and the Kozjak

dam. The same situation occurred with part of the population of *Phyllitis scolopendrium* (rare species of fern), which was devastated in the gorge of the Treska River after the construction of an access road and a dam.

The number of threatened species presented yearly is given in the following figure.

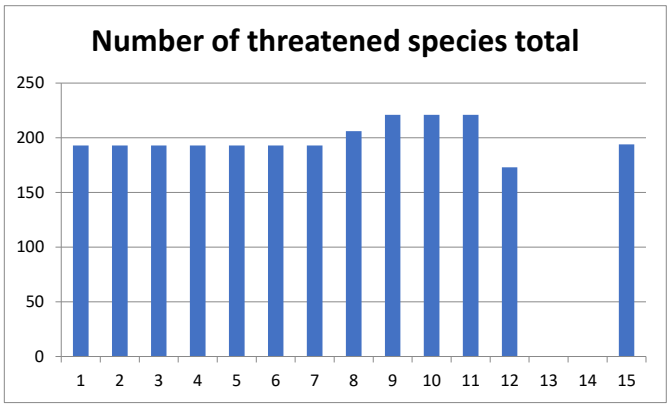


Figure 34 Total number of threatened species in The Former Yugoslav Republic of Macedonia[30].

The above-mentioned threats have threatened many species and reduced the coverage of priority habitats. The following table presents the threatened species in The Former Yugoslav Republic of Macedonia by year.

Number of threatened species	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2017
Mammalia (mammals	20	20	20	20	20	20	20	20	24	24	24	24	24
Aves (birds)	69	69	69	69	69	69	69	69	69	69	69	69	69
Reptilians (reptiles)	8	8	8	8	8	8	8	8	10	10	10	10	10
Amphibia (amphibians)	2	2	2	2	2	2	2	2	4	4	4	4	4
Fishes	29	29	29	29	29	29	29	29	36	36	36	36	36
Mosses	12	12	12	12	12	12	12	20	20	20	20		20
Lichens	7	7	7	7	7	7	7	7	7	7	7		7
Mushrooms	46	46	46	46	46	46	46	51	51	51	51	30	

Table 5 Number of threatened species in The Former Yugoslav Republic of Macedonia[31]

The table shows low growth of endangered species throughout the years especially after 2011.

One of the priority threats is associated with the hunting sector and concerns poaching, which is the cause of the reduction in the populations of several species (roe deer, chamois), and directly (through killing) or indirectly (through reduction in the number of natural pray) of the Balkan lynx. Hunting with live snares and traps results in regular cases of bears being caught (three reported cases for the last four years). Illegal use of poisonous baits led to the

extinction of the Lammergeier and the Black Vulture and to the drastic reduction in the populations of Egyptian and Griffon Vultures. All these species contribute significantly to the circle of biomass and energy of ecosystem, so the consequences from their extinction (or reduction in number) will undoubtedly reflect on the functioning of whole ecosystems in which they reside.

2.1.1.6. Economic development

The evolution of nominal GDP in EUR in The Former Yugoslav Republic of Macedonia for the past 15 years is presented in the following figure:

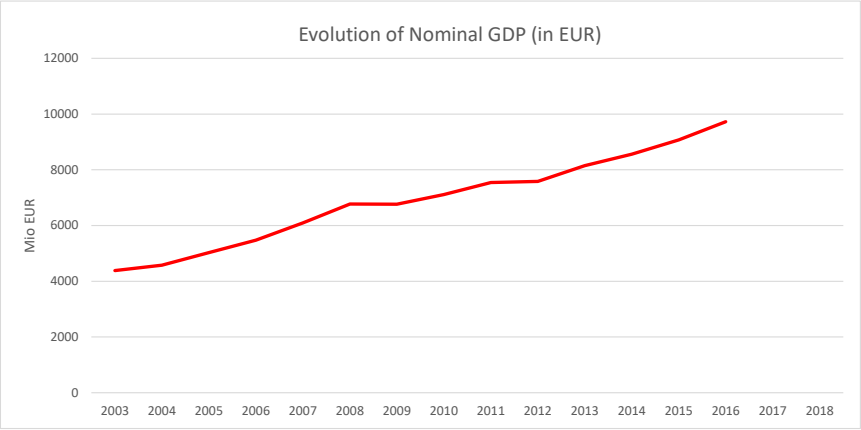


Figure 35 Nominal GDP in The Former Yugoslav Republic of Macedonia[32]

The figure shows a steady GDP growth of 45% in the past 15 years.

The Gross Domestic Product per capita in The Former Yugoslav Republic of Macedonia was last recorded at 4691 EUR in 2016. The GDP per Capita in The Former Yugoslav Republic of Macedonia is equivalent to 41 of the world's average. In 2017, GDP based on PPP for The Former Yugoslav Republic of Macedonia was 25,615.45 million EUR. GDP based on PPP of The Former Yugoslav Republic of Macedonia increased at an average annual rate of 4.95 %. The Gross Domestic Product per capita in the Economy was last recorded at 0.012314 million EUR in 2017, when adjusted by purchasing power parity (PPP). The GDP per Capita, in The Former Yugoslav Republic of Macedonia, when adjusted by Purchasing Power Parity is equivalent to 73 % of the world's average.

The Former Yugoslav Republic of Macedonia during its independence in 1991 September was the least developed of the Yugoslav economies. Absence of proper infrastructure, collapse of Yugoslavia, Greek economic embargo and UN sanctions collectively retarded economic growth and development of The Former Yugoslav Republic of Macedonia. The economy grew on average 5% annually between 2004 and 2008, driven mainly by domestic consumption and exports (notably metals and textile products).

However, the economy has been mired into a political crisis since 2015, which has slowed the growth both in 2016 and 2017. After a series of contraction and stagnation during the

first three quarters of 2017, the economy speeded up in the last quarter of the year (1.2%) while the overall annual growth remained flat (on the other hand growth remained more robust according to IMF at 2.5% in 2017). The economic activity is expected to pick up gradually as the World Bank forecasts a 3.2% growth in 2018, 3.9% in 2019 and 4% in 2020 (3.2% in 2018 and 3.4% in 2019 according to IMF estimates)[33].

Though The Former Yugoslav Republic of Macedonia has been economically stable, it has remained unsuccessful in attracting foreign direct investments. Even, extensive tax benefits and business reforms have not proved successful in attracting overseas investments. High unemployment and existence of a substantial grey market are characteristics of The Former Yugoslav Republic of Macedonia's economy.

Tertiary or services sector comprising banking, telecommunications, real estate, and transportation contributing almost 60% of GDP is the largest revenue earning and employment generating sector. The services sector provides employment to almost 50% of the total employed labour force in The Former Yugoslav Republic of Macedonia.

The manufacturing or industrial sector accounts for more than 28% of GDP and engages over 30% of total occupied labour force. Textiles, iron and steel, power generation, cement, chemicals and pharmaceuticals are the important manufacturing industries of The Former Yugoslav Republic of Macedonia.

The primary or agricultural sector contributes almost 12% towards The Former Yugoslav Republic of Macedonia's GDP. Nearly 20% of the occupied labour force is employed in this sector. Vegetables, fruits, grapes, and tobacco are the main agricultural products. Milk and its products, and poultry are the other primary activities. Food processing and wine making are key agriculture-based industries. Agriculture has always served as a shock absorber for the socio-economic and structural changes in industry and other sectors of The Former Yugoslav Republic of Macedonia.

Among the commodities exported, wine, food items, textiles, tobacco, and iron and steel are prominent. The imports include automobiles, machineries and equipment's, food products, fuels, and chemicals. Serbia, Greece, Turkey, Russia, Germany, Italy, Belgium, Spain, Bulgaria, Slovenia and Croatia are the predominant trading partners of The Former Yugoslav Republic of Macedonia (Economic Reform Programme, 2018-2020)

Share of GDP by sector in 2014:

- Primary Agriculture: 10.2%
- Secondary Industry: 22.8%
- Tertiary Services: 46.5%
- Others: 20.5%

The distribution gives the percentage contribution of agriculture, industry, and services to total GDP. Agriculture includes farming, fishing, and forestry. Industry includes mining, manufacturing, energy production, and construction. Services cover government activities, communications, transportation, finance, and all other private economic activities that do not produce material goods.

In 2017, unemployment rate for The Former Yugoslav Republic of Macedonia was 23.4 %. Unemployment rate of the Economy fell gradually from 34.5 % in 1998 to 23.4 % in 2017. It was the lowest jobless rate since the series began in 1993, as the number of unemployed persons fell by 10.6 thousand to 208.5 thousand and the number of employed rose by 14.1 thousand to 745.2 thousand. Also, the labour force participation rate increased to 56.8 % from 56.6 % a year ago. Unemployment Rate in the Economy has moved around 31.33 % from 1993 until 2017, reaching an all-time high of 38.70 % in the first quarter of 2005 and a record low of 21.90 % in the fourth quarter of 2017.

The socio-economic indicators are presented in the following figure:

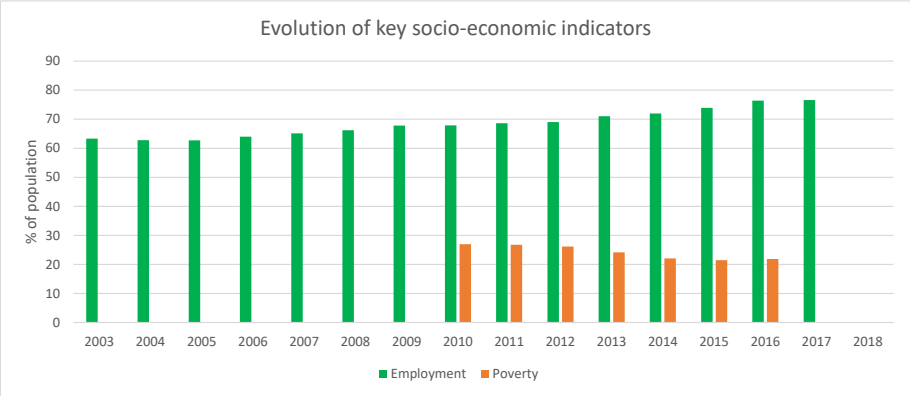


Figure 36 Socio-economic indicators of The Former Yugoslav Republic of Macedonia[34]

The Former Yugoslav Republic of Macedonia recorded a government debt equivalent to 39.98% of Economy's Gross Domestic Product in 2017. Government Debt to GDP in the Economy averaged between 20.64% in 2008 to 39.98% in 2017.

External debt in The Former Yugoslav Republic of Macedonia decreased to 7,710.22 EUR Million in the third quarter of 2017 from 7,786.78 EUR Million in the second quarter of 2017. External Debt in the Economy averaged 4,669.87 EUR Million from 2004 until 2017, reaching an all-time high of 7,786.85 EUR Million in the first quarter of 2017 and a record low of 2,080.17 EUR Million in the fourth quarter of 2004.

The Former Yugoslav Republic of Macedonia is the 101st largest export economy in the world. In 2016, the Economy imported 6,824.9 million EUR and exported 5,007.2 million EUR, resulting in a trade ration of 1,817.7 million EUR.

Imports to The Former Yugoslav Republic of Macedonia surged 42.7% year-on-year as purchases increased mainly for crude materials (9.2 %); mineral fuels (32.8 %); machinery & transport equipment (38 %) and chemicals (44.2 %). The most important trade partners were: Germany, Great Britain, Greece, Bulgaria and Serbia.

Exports from The Former Yugoslav Republic of Macedonia increased 47.1% year-on-year as sales advanced for crude materials (66%); mineral fuels (2.7 %); chemicals (44 %); manufactured goods (68.4 %) and machinery & transport equipment (48.9 %). The most important trade partners were: Germany, Great Britain, Greece, Bulgaria and Serbia. The top import origins of The Former Yugoslav Republic of Macedonia are Germany (803 mill Eur), the United Kingdom (690 mill Eur), Greece (546 mill Eur), Serbia (489 mill Eur) and Russia (133 mill. Eur).

The top export destinations of The Former Yugoslav Republic of Macedonia in the SEE region are Serbia, Greece and Croatia. The figure shows the % of overall trade in the SEE region.

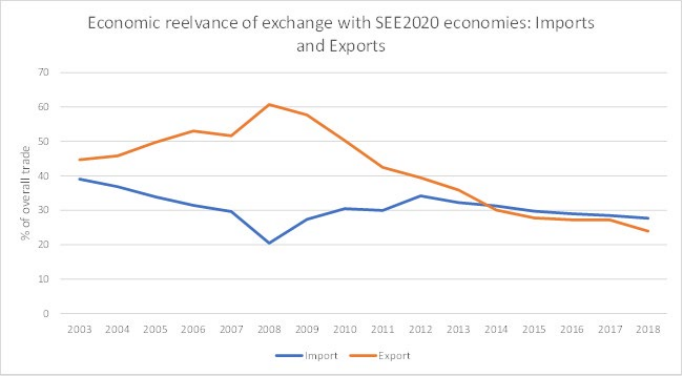


Figure 37 Economic relevance of exchange with SEE2020 economies: export-import[35]

The figure shows that after 2012 the trade in the SEE region dropped slightly. This is due to foreign investments in the economy that came with the opening of the Technological Industrial Development Zones (TIDZ) in The Former Yugoslav Republic of Macedonia.

2.1.2. Institutional setting

Each sector has its own institutional setting and depending on the extent to which the relevant sector is concerned with other sectors, more institutions are responsible. Their mutual coordination and specific responsibilities are defined in the relevant legislation and secondary legislation for the relevant sector.

A detailed description of the institutional set-up for each of the sectors (water, energy, food/land/agriculture, ecosystems, and economic development) is detailed in this chapter.

Relevant institutions in water sector (Figure 25) are:

1) Ministry of Environment and Physical Planning (MOEPP),

2) Ministry of Agriculture, Forestry and Water-Economy (MAFWE),
3) Hydro-meteorological Service
4) Ministry of Transport and Communications (MTC),
5) Ministry of Economy (ME),
6) Ministry of Health (MH);
7) The Republic Institute for Health Protection (RIHP)
8) Department for water management
9) Ministry of education and science
10) Institute for Public Health (IPH)
11) Hydro-Biological Institute (HBI)
12) State Environmental Inspectorate (SEI)

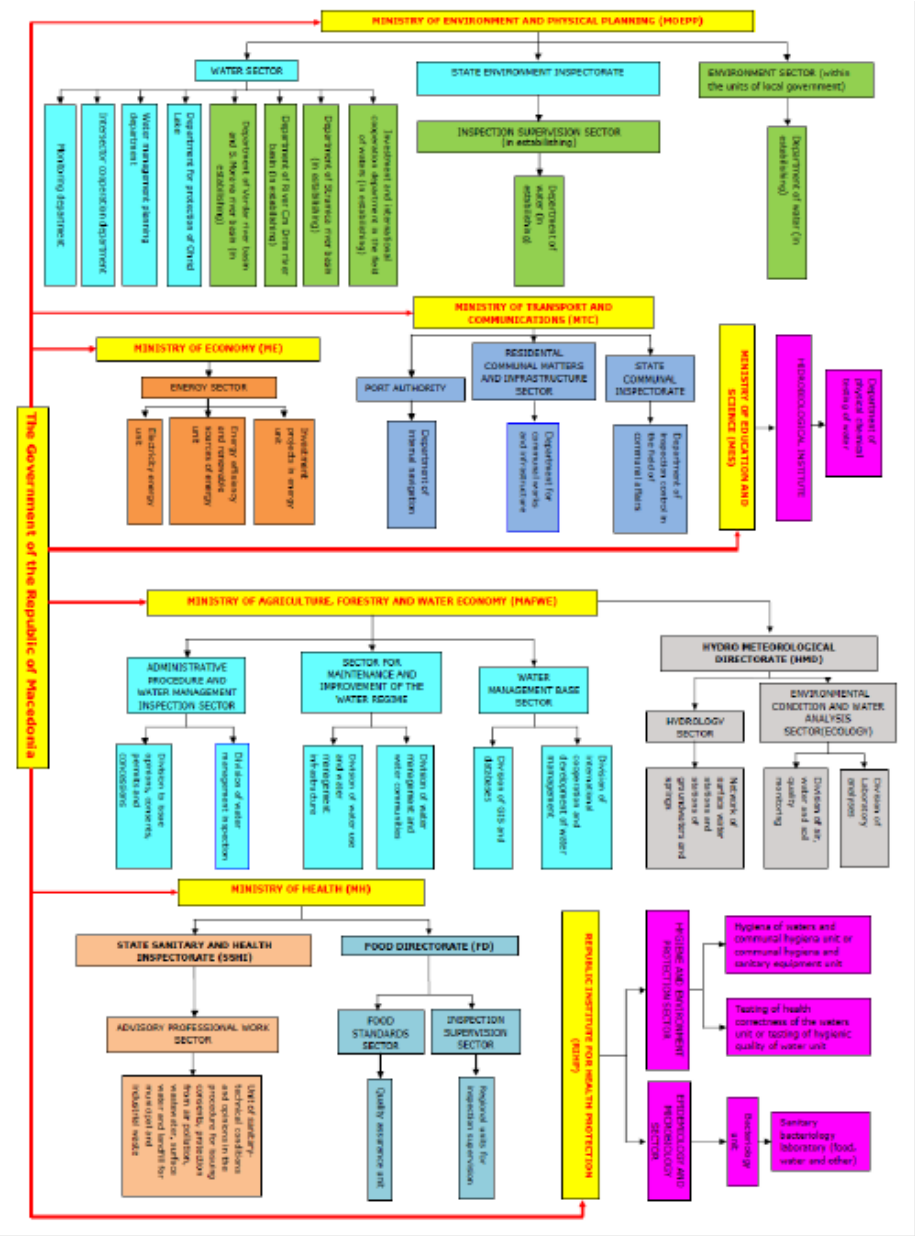


Figure 38 Responsibilities and obligations in water sector in The Former Yugoslav Republic of Macedonia[36].

Relevant institutions in energy sector are:

1) Ministry of Economy (MOE)
2) Ministry of environment and physical planning (MEPP)
2) Energy Agency (EARM)
3) Ministry of Transport and Communications (MTC),
4) MANU- Research Centre for Energy, Informatics and Materials (ICEIM)
5) Electricity Transmission System Operator of The Former Yugoslav Republic of Macedonia (MEPSO)
6) Several academic institutions.
7) Energy Regulatory Comission

Relevant institutions for food (agriculture/land use) are:

1) Ministry of Agriculture, Forestry and Water Economy (MAFWE)
2) The Water Community (WCs)
3) Agency for Financial Support to Rural Development (IPARD)
4) State Agency for Agriculture Promotion and Development (NEA) – Agriculture Extension Service (AES)
5) Food and Veterinary Agency (FVA)
6) Ministry of Environment and Physical Planning (MOEPP),
7) State Inspectorate for Agriculture (SIA)
8) Republic Agency for Spatial Planning (ASP)
9) Municipalities
10) Ministry of Culture (MC)
11) Ministry of finance (MF)
12) Ministry of economy (ME)
13) Ministry of education and science (MES)

Relevant institutions for ecosystems (nature protection) are:

1) Ministry of Environment and Physical Planning (MOEPP)
2) Ministry of agriculture, forestry and water-economy
3) Ministry of culture
2) Public Enterprises for state parks: Galicica, Mavrovo, Pelister.
3) Republic Agency for Spatial Planning (ASP)
4) Public enterprises for state parks management

Coordination mechanisms between the institutions dealing with the fields/sectors of focus are listed below.

Water sector:

- The establishment and management of the international river basin districts is a competence shared between MEPP and the Ministry of Foreign Affairs (MFA).
- The Ministry of Economy (ME) is responsible for cooperation with MEPP to prepare proposals for concessions for water use. Its area of competence covers ground waters, use of mineral and thermo-mineral re-sources and electricity generation.
- The cooperation between MEPP and MH ensures the link between water management and protection of human health.
- The role of the Institute for Public Health (IPH) in water management is related with the monitoring of drinking water and surface waters. The IPH is obliged to submit data from the monitoring to MEPP on a regular basis.
- In the area of water management, the activity of the Department for Protection and Rescue (DPR) is related to the specific responsibility to cooperate with MEPP in consultations on measures for protection against floods.
- The municipalities are also responsible for water supply, water protection, prevention and control of water pollution permitting the discharge of wastewater from B installations (integrated environmental permits) except for those in protected areas and cooperate with the MEPP regarding the water issues.

Energy sector:

- Main responsible institutions regarding the energy issues in The Former Yugoslav Republic of Macedonia are: Ministry of Economy, Energy Agency of The Former Yugoslav Republic of Macedonia, Energy Regulatory Commission, Electricity Transmission Operator (MEPSO), ELEM.

Food (Agriculture/ land use) sector:

- LSG units in the agriculture and forestry sector have only limited responsibilities, e.g. adopting strategies for local development for issues stipulated in the Law on agriculture and rural development and Strategies for rural development. The strategies are prepared by Local Action Groups for the development of rural areas with a previous consent from the MAFWE.
- Branches of the MAFWE, being part of the structure of municipalities, are responsible for the implementation and enforcement of related policies and laws at the local level.
- The Food and Veterinary Agency is responsible for the coordination of legislation and control systems for food safety between the competent institutions in The Former Yugoslav Republic of Macedonia, as well as communication with the institutions of the

European Union for the activities set out in Chapter 12 - Food Safety, Veterinary and phyto - sanitary policy.

- Complete authority and supervision in the organic production system is carried out by the State of Inspectorate for Agriculture (SIA) and the Food and Veterinary Agency (FVA). Also, each entity applying for financial support in the organic production is subject to control by the Agency for Financial Support to Rural Development (IPARD).

- Vertical and horizontal coordination, as well as participation in the area of agriculture and rural development, is achieved through the Council for Agriculture and Rural Development, a consultative mechanism for policies and programs for the development of agriculture and rural development. The Council enables participation of a variety of stakeholders, such as representatives of agricultural associations, central government institutions, economic chambers, representatives of academic institutions in the agriculture sector, association of consumers, association in the area of environmental protection and representatives of LSG units.

- The Government of The Former Yugoslav Republic of Macedonia has established a Council for Food and Feed Safety, which aims to providing scientific advice and technical support in relation to policies and areas that have a direct and indirect impact in this area. The Council is chaired by the Director of the Food and Veterinary Agency. Sixteen institutions are members of the Council: Food Agency, MANU, the Medical, Pharmaceutical, Veterinary and Agricultural faculties, several institutes, representatives from the ministries of health and agriculture and the chambers of commerce are included. The Council is a permanent body and meets at the request of the President at least four times during the year, if necessary more often. Citizens' associations, trade unions, government officials and other experts can attend the Council sessions.

Ecosystems:

- Protection and monitoring of nature and biodiversity conservation falls within the responsibilities of the MEPP and MAFWE, involving several of their agencies, offices and inspectorates.

- The MEPP (Administration for Environment) is responsible for the administrative and expert supervision of the Public Institutions/National Parks.

- Since 2009, there is a Council for nature protection consisting of 8 members (Minister for Environment, representative from ZELS, MANU, State University, NGO).

Identification of potential overlaps of responsibilities

The Ministry for Environment and Physical Planning is in charge of formulating and implementing environmental policy and is the coordinating body for sustainable development issues. Water management is undertaken at the basin level, but responsibilities are still fragmented. The new Law on Waters (2008), which transposes the EU WFD, transferred competencies on water resource management from the Ministry of Agriculture, Forestry and Water Economy to the Ministry for Environment and Physical Planning.

Basin management authorities, the State Environment Inspectorate and other bodies under the Ministry are responsible for law enforcement. Other ministries and bodies also have direct or indirect responsibilities regarding water resources, as well as natural resources and environmental management.

The MOEPP shares some responsibilities with other ministries:

- The MAFWE is responsible for the collection, treatment and final disposal of animal by-products.
- It is jointly responsible with the Ministry of Economy (ME) and Ministry of Finance (MF) for packaging waste and other end-of-life products.
- Compliance of the market with the related requirements is monitored by the State Market Inspectorate (within the ME).
- It prepares and inspects, in cooperation with the Ministry of Health, the implementation of regulations regarding medical waste and dangerous waste management.
- The MF is responsible for the approval and application of economic instruments such as fees/charges/surcharges/earmarked taxes; management of earmarked funds; and cost recovery mechanisms for municipal solid waste investments and services.
- For natural disasters, there are evident overlaps in the planning, programming, organization, management, command, coordination, implementation, financing and monitoring of timely and effective prevention.

According to the Law on waters, the Council of Water was established with the aim of consideration of water management issues, harmonization and coordination of different needs and interests regarding waters, as well as proposing various measures for preserving the protection and continuous improvement of the water regime in the territory of The Former Yugoslav Republic of Macedonia. The Council of Water is comprised of 9 representatives from different institutions (MoEPP, MoH, MoTC, MoE, MAFWM, ZELS, MANU, NGO, representative from the Council for management with Vardar water basin).

2.1.2.1. Identification of recent changes (since 2013) in the institutional set-up

At the beginning of the 2016, the adoption of the Law on the determination of water services pricing included an additional institution in the water management system. It tasked the **Energy Regulatory Commission (ERC)** of The Former Yugoslav Republic of Macedonia with the responsibility to determine tariffs for water management services, i.e. determining the tariffs for the supply of raw water and water drinking, collection and disposal of urban waste water and wastewater treatment. Previously, these tariffs or prices were defined by Public Utilities and Mayors and got approval by municipal councils. Price regulation of water services helps water services providers to better plan their costs, increase their efficiency and appropriate target investments to improve the quality of their services.

The Energy Regulatory Commission has jurisdiction over the procedures and criteria for price setting, but also enforces the operations of the water services providers with regard to the application of the law. Taking into account the timetable for implementation, all water services providers that provide water services to areas larger than the 10.000 population equivalent, and which provide raw water for water supply systems, are obliged to start the procedure for the setting of prices by January 1, 2018 and the rest until January 1, 2019.

The monitoring of water quality remains the responsibility of the Ministry of Environment and physical planning.

The amendments to the Law on Inspection in 2013 introduced a systemic framework for the establishment of a separate autonomous state body: the Inspection Council, which was established in 2014. The Inspection Council is an independent state body acting as a legal person, formed in order to implement the scope of responsibilities defined by the law, in particular the coordination of the work of the inspectorates.

2.1.3. Legislation

In order to fulfil the criteria for full membership, The Former Yugoslav Republic of Macedonia adopted the state Programme for Adoption of the Acquis Communautaire (NPAA) in 2007. The NPAA, which is periodically revised, comprises the plans for the harmonization of the economy's legislation with the EU legislation, the necessary institutional strengthening for implementation of the legislation, as well as the necessary resources for realization.

The Former Yugoslav Republic of Macedonia has become a Party to the main multilateral conventions and protocols explicitly recognizing the link between environmental protection and the human rights norms covering many environmental issues like Environmental Impact Assessment (EIA), Strategic Environmental Assessment (SEA) in the economy and transboundary context, climate change, biodiversity, public information, public participation in the decision-making process and access to justice, transboundary air pollution and air

monitoring, ozone layer, chemicals like persistent organic pollutants (POP), nature protection, etc.

From 2004 to 2017, primary legal acts related to air quality and air management, water management and water quality, waste management, nature protection, industrial pollution control, noise, have been prepared and adopted by The Former Yugoslav Republic of Macedonia Parliament in the form of legal acts.

The EU environmental legislation has been transposed into the legislation for almost all environmental sectors. In some sectors, there is still a lack of legislation prescribing where the applicable standards will be prescribed (e.g. emissions to soil and Law on soil quality). Some of this secondary legislation has been prepared in the frame of the international project but they are still not adopted.

According to the Energy Community Agreement, The Former Yugoslav Republic of Macedonia harmonizes its legislation with the existing legal regulation of the European Union (acquis communautaire) for energy, environment, competition, renewable sources, energy, and energy efficiency and oil reserves. The strategic objectives of The Former Yugoslav Republic of Macedonia in the energy sector, among which is the determination to align with acquis communautaire, have been incorporated in the Law on Energy.

Food in the Economy is regulated by the Law on Food Safety along with other secondary legislation. The harmonization of the legislation with the EU legislation is carried out in accordance with the Program for the Adoption of the Acquis (NPAA) adopted by the Government of The Former Yugoslav Republic of Macedonia for activities related to food Safety, veterinary and phytosanitary policy.

In recent year following laws have been changed:

Law on Energy

The draft new Law on energy, which needs to be adopted, provides an opportunity for citizens to choose from whom they receive electricity from, opening the energy market and enabling more competitive prices. The legislation will be harmonized with the third package of EU energy measures.

Law on Food safety

With the new amendments to the Law on Food Safety in 2015, harmonization of the domestic laws with the EU regulation was achieved, including provisions on food information to be provided to consumers, as well as the responsibilities of food operators for information related to the content food or its labelling.

The amendments provide a legal framework for the establishment of a Council for Food safety and animal Feed safety, as well as establishing a network for data collection and database.

The main acts of legislation in The Former Yugoslav Republic of Macedonia related to each field/sector of focus including their main objectives are given below;

2.1.3.1. Water

Primary legislation:

- Law on Waters ("Official Gazette of The Former Yugoslav Republic of Macedonia " no. 87/08, 06/09, 161/09, 83/10, 51/11, 44/12, 23/13, 163/13 180/14, 146/15 and 52/16)

This law regulates issues related to surface waters, including permanent watercourses or watercourses in which water, lakes, reservoirs and springs occasionally flow, groundwater (hereinafter: waters), coastal land and water habitats. The law regulates water management, including the distribution of waters, the protection and preservation of waters, as well as the protection against the harmful effects of waters. Water management facilities and services, organizational setup and financing of water management, as well as the conditions, manner and procedures under which water can be used or discharged is also governed by the law.

Main objectives:

- Achieving an integrated and coordinated water regime on the territory of The Former Yugoslav Republic of Macedonia.
- All waterbodies to achieve 'good status' and to prevent any further deterioration in the existing status of surface waters and groundwater.
- All waters to be classified on the basis of their ecological status.

Other objectives:

- Availability of water in good quality in accordance with the principles for sustainable management of drinking waters, food production, agriculture production, industry, hydro energy and others;
- Protection, conservation and improvement of water resources, water ecosystems and their users;
- Identification and regulation of dangerous substance; and
- Biological diversity protection and human health.

Secondary legislation:

- Decree on classification of waters ("Official Gazette of The Former Yugoslav Republic of Macedonia " no. 18/99 from 31.09.1999);

- Decree on the categorization of watercourses, lakes, accumulations and groundwater ("Official Gazette of The Former Yugoslav Republic of Macedonia " no. 18/99);
- Decision on the determination of the boundaries of the river basin areas ("Official Gazette of The Former Yugoslav Republic of Macedonia" no. 107/12);
- Rulebook on the content and the manner of preparation of river basin management plans ("Official Gazette of The Former Yugoslav Republic of Macedonia" no. 148/09)
- Rulebook on the methodology for the assessment of river basins (“Official Gazette of The Former Yugoslav Republic of Macedonia" no. 148/09);
- Rulebook on the content and the manner of preparation of the program of measures ("Official Gazette of The Former Yugoslav Republic of Macedonia " no. 148/09);
- Rulebook on the content and the manner of preparing the information on the cartographic representations of the activities for water monitoring ("Official Gazette of The Former Yugoslav Republic of Macedonia " no. 148/09);
- Rulebook on the methodology for the content, method and procedure, the revision of the Water Management Basis of The Former Yugoslav Republic of Macedonia ("Official Gazette The Former Yugoslav Republic of Macedonia" no. 148/09)
- Rulebook on the criteria for determining the zones sensitive to the discharge of urban wastewater (*) ("Official Gazette of The Former Yugoslav Republic of Macedonia" no. 130/11 from 26.09.2011)
- Rulebook on the conditions, manner and emission limit values for discharge of wastewater after their purification, the manner of their calculation, taking into account the special requirements for protection of protected zones (*) ("Official Gazette of The Former Yugoslav Republic of Macedonia" no. 81/11);
- Rulebook on the detailed conditions, method and maximum permissible values and concentrations of the parameters of purified waste water for their reuse ("Official Gazette of The Former Yugoslav Republic of Macedonia" no. 73/11);
- Rulebook on the detailed conditions for collection, removal and purification, the manner and conditions for the design, construction and exploitation of urban wastewater treatment systems and stations, as well as the technical standards, parameters, emission standards and quality standards for pre-treatment, removal and purification of wastewater, taking into account the load and method for purification of urban wastewater discharged in areas sensitive to the discharge of urban waste water ("Official Gazette of The Former Yugoslav Republic of Macedonia" no. 73/11);
- Rulebook on the manner and procedure for sludge use, the maximum values of concentrations of heavy metals in the soil in which the sludge is used, the values of the concentrations of heavy metals in the sludge in accordance with its purpose and the maximum annual quantities of heavy metals that can are introduced into the soil ("Official Gazette of The Former Yugoslav Republic of Macedonia" no. 73/11);

- Rulebook on hazardous and harmful substances and substances and their emission standards that can be released into the sewage system or in a drainage system, in surface or underground water bodies, as well as in coastal lands and aquatic habitats (*) ("Official Gazette of The Former Yugoslav Republic of Macedonia" no. 108/11);
- Rulebook on the conditions, manner and emission limit values for discharges of wastewater after their purification, the manner of their calculation, taking into account the special requirements for protection of protected zones (*) ("Official Gazette of The Former Yugoslav Republic of Macedonia" no. 81/11);
- Rulebook on the methodology, the reference measurement methods, the method of monitoring the wastewater, including the sludge from the treatment of urban wastewater (*) ("Official Gazette of The Former Yugoslav Republic of Macedonia" no. 108/11);
- Rulebook on the form and content of the request for non-issuance of the permit, i.e. failure to submit a decision for refusal of the request for issuing the water use permit, i.e. permit for extraction of sand, gravel and stone from the river beds and shores of the surface water bodies ("Official Gazette of The Former Yugoslav Republic of Macedonia" no. 129/11)
- Rulebook on prescribing the criteria for the determination of zones susceptible to nitrates ("Official Gazette of The Former Yugoslav Republic of Macedonia" no. 131/11 from 28.09.2011);
- Rulebook on the form and content of the request for non-issuance of the license i.e. failure to submit a decision for refusal of the application for issuing a permit for discharge ("Official Gazette of The Former Yugoslav Republic of Macedonia" no. 129/11)
- Program for amending the program for water management for 2012 ("Official Gazette of The Former Yugoslav Republic of Macedonia" no. 99/12);
- Program for water management for 2012 ("Official Gazette of The Former Yugoslav Republic of Macedonia" no. 12/12);

2.1.3.2. Energy

Primary legislation:

- Law on Energy ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 16/11, 136/11, 79/13, 164/13, 41/14, 151/14, 33/15, 192/15, 215/15, 6/16, 53/16 and 189/16)

This law regulates: the goals and implementation of the energy policy, the energy activities and the way of regulating the energy activities, the construction of energy facilities, the function of the Energy Regulatory Commission, the electricity market, the natural gas market, the market of natural gas crude oil and oil derivatives and the market for thermal or

geothermal energy, the conditions for achieving energy efficiency and the promotion of the use of renewable energy sources and other issues from the energy field.

Main objectives:

- Securing reliable, safe and quality energy and energy fuel supply to consumers;
- Establishing an efficient, competitive and financially sustainable energy sector;
- Encouraging competition on energy markets with respect for the principles of non-discrimination, objectivity and transparency;
- Integrating The Former Yugoslav Republic of Macedonia's energy markets into the regional and international energy markets, pursuant to the commitments assumed under the ratified international treaties;
- Increasing energy efficiency and promotion of the use of energy from renewable sources; and
- Environmental protection from the adverse effects of particular activities in the energy field.

Secondary legislation:

- Rulebook on energy control ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 94/13)
- Rulebook on Amendments to the Rulebook on Energy Control ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 18/15),
- Rulebook on Energy Performance of Buildings ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 94/13),
- Rulebook on amending the Rulebook on energy performance of buildings ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 7/15),
- Rulebook on amending the Rulebook on energy performance of buildings ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 176/15),
- Rulebook on Renewable Energy Sources (RES) ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 113/11),
- Rulebook on amending the Rulebook on Renewable Energy Sources ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 73/15),
- Rulebook on Highly Efficient Combined Plants ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 128/11),
- Rulebook on energy balances and energy statistics ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 138/11),
- Rulebook on information system ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 125/15),
- Amendment of the Rulebook on the information system ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 231/15),

- Decision on the total installed power of preferential electricity producers produced by each separate renewable energy source ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 56/13),
- Decision on the goals and annual dynamics of the increase in the share of RES energy in the final energy consumption ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 100/11),
- Energy Audit Advancement Program ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 198/15),

2.1.3.3. Food, Land &Agriculture

Primary legislation:

- **Law on Food Safety** ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 157/10, 53/11, 1/12, 164/13, 187/13, 43/14, 72/15, 129/15, 213/15 and 39/16);

The purpose of this law is to provide a high level of protection of human health and consumer interests in relation to food, especially taking into account the diversity of food supply including traditional foods, ensuring the effective functioning of the internal market, the general principles and responsibilities, the way to provide a scientific basis, successful organizational arrangements and procedures to support the decision-making process in the field of food hygiene and animal feed.

Main objectives:

- Providing a high level of protection of human health and consumer interests, especially taking into account the diversity of food supply including traditional foods;
- Ensuring efficient functioning of the internal market;
- Setting general principles and responsibilities; and
- Providing a scientific basis, successful organizational arrangements and procedures to support the decision-making process in the field of food hygiene and animal feed.

Law on the Safety of Animal Feed ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 145/10, 53/11, 1/12, 33/15, 149/15, 53/16)

This Law regulates the basic and special requirements for animal feed, the basic principles and responsibilities of the operators of animal feed, organizational structures for animal feed safety and official controls on animal feed. This law applies to all phases of production, processing and distribution of feeding stuffs, except for primary production intended for own household needs.

Law on Spatial and Urban Planning ("Official Gazette of The Former Yugoslav Republic of

Macedonia" No. 199/14, 44/15, 193/15, and 31/16).

This law regulates the conditions and the system of spatial and urban planning, the types of planning documentation and the procedure for its preparation and adoption, as well as other issues in the field of spatial and urban planning.

Main objectives:

- Planning of space;
- Defining and reviewing the content of the plans;
- Designing and procedure of adoption of the plans;
- Allocation of construction land; and
- Deciding on the terms for constructing and supervision over the law enforcement.

Law on Agricultural Land ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 135/07, 17/08, 18/11, 148/11, 95/12, 79/13, 106/13, 164/13, 39/14, 130/14, 166/14, 72/15, 98/15, 154/15, 154/15, 215/15, 7/16 and 39/16)

This law regulates the use, disposal, protection and conversion of agricultural land.

Main objectives:

- Rational use of agricultural land as a limited natural resource;
- Protection of agricultural land; and
- Provision of legal certainty for the owners and users of agricultural land.

Law on the Quality of Agricultural Products ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 140/10, 53/11, 55/12, 106/13, 116/15, 149/15,193/15);

This law regulates the markets for agricultural products, quality standards, classification, quality labeling and the information system for cereals and rice, animal feed, fresh fruits and vegetables, eggs and poultry meat, beef, pork, sheep and goat meat, milk and dairy products, bee products. It also regulates the protection of agricultural and food products with a geographical name and the designation for a guaranteed traditional specialty, control and supervision over the implementation of the provisions of this law.

Main objectives:

- Regulation of the quality standards for agricultural products;
- Regulation of the markets for agricultural products;
- Regulation of information system for the markets for agricultural products;
- Protection of agricultural and food products with a geographical name and a designated traditional specialty;
- Review measures and activites undertaken by the bodies and institutions for

ensuring the quality of agricultural products; and
- Define the working conditions to be fulfilled by operators and institutions that perform quality control in the field of agriculture.

Law on Agriculture and Rural Development ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 49/10, 53/11, 126/12, 15/13, 69/2013, 106/13, 177/14, 25/15, 73/15, 83/15, 154/15, 11/16, 53/16, 120/16 and 163/16).

This law regulates the planning of agricultural development and rural development; the goals of the agricultural policy; planning, monitoring and evaluation of the agricultural policy; partnership with social and economic partners in the field of agriculture; measures for arranging and supporting agricultural markets; direct payments and rural development; state aid in agriculture and rural development; forms of organization and association in agriculture; control of the implementation of the measures; and supervision over the implementation.

Main objectives:

- Ensure stable production of quality and cheaper foods and providing the population with sufficient quantities of food;
- Increase the competitiveness of agriculture;
- Ensure a stable level of income for the agricultural holding;
- Sustainable development of rural areas; and
- Optimal utilization of natural resources with respect to the principles for the protection of nature and the environment.

Law for Forests ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 64/09, 24/11, 53/11, 25/13, 79/13, 147/13, 43/14, 160/14, 33/15, 44/15, 147/15 and 39/16).

This law regulates the planning and management with respect to thecultivation, protection and use of forests protection as natural resources and forest land; the achievement of the commonly-used forest functions; the law and obligations of using forests; financing; and other issues of relevance to forests and forest land according to the principle of biological, economic, social and environmental acceptability.

Main objectives:

- To ensure permanent preservation of the forest area, increase forest value and provide the highest growth according to the natural conditions at the place of growth; and
- To ensure sustainable management, planning, forest management and preservation of forests and forest land in a manner and extent that permanently maintains and promotes their production ability, biodiversity, renewable and

vitality in the interest of current and future development of the economic, ecological and social functions of the forest without disruption to the ecosystem.

Secondary legislation:

- Rulebook on nutrition and health claims for commercial purposes in labeling, presentation and advertising of food ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 65/13).
- Rulebook on additives used in food production ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 31/12),
- Rulebook on amending and supplementing the Rulebook on additives used in food production ("Official Gazette of The Former Yugoslav Republic of Macedonia", No.114/13)
- Rulebook on the general requirements for the safety of materials and products coming into contact with food ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 160/12).
- Rulebook on the special requirements for the safety of plastic materials and products that come into contact with food ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 144/13).
- Rulebook on the special requirements for the safety of ceramic products coming into contact with food ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 1/13).
- Rulebook on the special safety requirements for individual substances or groups of substances that come in contact with food N-nitrosamines and substances transformed into N-nitrosamines and released from nipples and elastomer or rubber squeegee ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 1/13).
- Rulebook on the special requirements for the safety of products and materials coming into contact with food made from film regenerated cellulose ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 147/14).
- Rulebook on the special requirements for the safety of active and intelligent materials and products that come into contact with food ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 64/14).
- Decision for checking and reviewing shipments of plastic kitchenware made of polyamide and melamine originating or supplied from China and Hong Kong upon importation into The Former Yugoslav Republic of Macedonia ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 195/14).
- Rulebook on the special requirements for food safety produced by innovative technologies ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 29/12).
- Rulebook on the special requirements for food safety, treated with ionizing

radiation (Official Gazette of The Former Yugoslav Republic of Macedonia No. 63/2014).

- Rulebook on the special requirements for the safety of food supplements ("Official Gazette of The Former Yugoslav Republic of Macedonia", No. 12/12 and 80/13)
- Rulebook on amending the Rulebook on the special requirements for the safety of food supplements ("Official Gazette of The Former Yugoslav Republic of Macedonia", No. 80/013)
- Rulebook on amending the Rulebook on the special requirements for the safety of food supplements ("Official Gazette of The Former Yugoslav Republic of Macedonia", No. 17/2015)
- Lists of authorized substances that can be used in the production of food supplements, food for special nutritional use and fortified food, except for food for which there are special regulations for the use of certain substances;
- Lists of banned substances that cannot be used in the production of food supplements, food for special nutritional use and fortified foods;
- Rulebook on special requirements for food safety for special nutritional use ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 158/11)
- Rulebook on Amendments to the Rulebook on Specific Requirements for Food Safety for Special Nutritional Use ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 80/13)
- Rulebook on the composition and labeling of food products for persons intolerant to gluten ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 62/12)
- Rulebook on special requirements for food safety for special nutritional use - food intended for use in diets with limited energy value in order to reduce weight ("Official Gazette of The Former Yugoslav Republic of Macedonia" No.156 / 11 and No. 53 / 12)
- Rulebook on the special requirements for food safety for special nutritional use - dietetic food for special medical purposes ("Official Gazette of The Former Yugoslav Republic of Macedonia" No.157 / 11, no.70 / 12 and no. 112 / 12)
- Lists of authorized substances that can be used in the production of food supplements, food for special nutritional use and fortified food, except for food for which there are special regulations for the use of certain substances.
- Rulebook on the special requirements for the safety of natural mineral water ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 127/12).

2.1.3.4. Ecosystems

Primary legislation:

- **Law on Environment** ("Official Gazette of The Former Yugoslav Republic of Macedonia"no. 53/05, 81/05, 24/07, 159/08, 83/09, 48/10, 124/10, 51/11, 123/12, 93/13, 187/13 42/14, 44/15, 129/15, 192/15, 39/16)

This law regulate the rights and the responsibilities of The Former Yugoslav Republic of Macedonia, municipalities, the City of Skopje and the municipalities of the City of Skopje, as well as the rights and the responsibilities of legal entities and natural persons, in the provision of conditions required to ensure the protection and improvement of the environment.

Main objectives:

- Preservation, protection, restoration and improvement of the quality of the environment;
- Protection of human life and health;
- Protection of biological diversity;
- Rational and sustainable utilization of natural resources; and
- Implementation and improvement of measures aimed at addressing regional and global environmental problems.

Law on nature protection ("Official Gazette of The Former Yugoslav Republic of Macedonia"no. 67/04, 14/06, 84/07, 35/10, 47/11, 148/11, 59/12, 13/13, 163/13 и 41/14, 146/15);

This Law regulates nature protection by protecting biological and landscape diversity, including the protection of natural heritage, in and outside protected areas.

Main objectives:

- Determining biological and landscape diversity and the extent to which they are endangered;
- Creation of conditions and undertaking of measures for nature protection for the purposes of conservation and sustainable management of biological and landscape diversity, as well as sustainable and rational use of natural wealth;
- Spatial planning and organization;
- Incorporation of the conditions and measures into the plans on natural wealth management in certain economic activities,
- Monitoring and reporting on the state of nature, public information on the state of nature, as well as enabling public participation in nature protection decision-making;
- Adoption and implementation of strategies, programmes, action plans, management plans, conditions and measures for nature protection;
- Encouragement and supporting nature protection through public awareness

raising, especially in the education process;
- Sustainable use of natural wealth and awarding a status of natural heritage;
- Establishment of a system of nature protection and management;
- Linking and harmonizing the state with the international system for nature protection; and
- Encouragement of scientific research in the area of nature protection.

Secondary legislation:

- Law on Proclamation of the Prespa Lake for a Monument of Nature ("Official Gazette of The Former Yugoslav Republic of Macedonia"
- Order prohibiting collection for use and trade of plant species of gentiana lutea and gentiana punctata ("Official Gazette of The Former Yugoslav Republic of Macedonia" no. 86/06),
- Order prohibiting collection for use and trade of autochthonous species of self-sown fungi-morels of the genres morchella, verpa and pitchoverpa ("Official Gazette of The Former Yugoslav Republic of Macedonia" 161/08 and amedments of the Order 56/09, 86/10, 108/12),
- Decision to establish Council for Nature Protection ("Official Gazette of The Former Yugoslav Republic of Macedonia" no. 113/09),
- Decree declaring the forest areas around Mavrovo Field Park ("Official Gazette of The Former Yugoslav Republic of Macedonia" no. 10/49),
- Amendment of the Law proclaiming forest landscape around Mavrovo fields for Park ("Official Gazette of The Former Yugoslav Republic of Macedonia" no. 20/49),
- Law for amendment of the Law proclaiming forest landscape around Mavrovo fields for Park (“Official Journal of SFRY no.23/52 and amendment 16/65),
- Law on the Protection of Ohrid, Prespa and Dojran Lake (“Official Journal of SFRY no. 45/77 and amendment 8/80, 51/88, 10/90, and Official Gazette of The Former Yugoslav Republic of Macedonia no. 62/96 ”)
- Programme for the Protection of Ohrid, Prespa and Dojran Lakes (“Official Journal of SFRY no. 7/87”),
- Decision for proclaiming forest landscapes of Shar Planina for forest reserve and hunting ground (“Official Journal of SFRY no. 41/77”),
- Law for Proclamation of Ornithological Site “Ezerani” on Prespa Lake for Strict Natural Reserve (“Official Gazette of The Former Yugoslav Republic of Macedonia no. 37/96),
- Law on the Proclamation of Ornithological Site “Tikvesh” in the Gorge of Crna Reka for Strict Natural Reserve (Official Gazette of The Former Yugoslav Republic of Macedonia No. 35/97)
- Rulebook on the application of protection measures in the Strict Natural Reserve “Ezerani” on Prespa Lake (Official Gazette of The Former Yugoslav Republic of

Macedonia No. 29/97) ,

- Law on the Proclamation of the Site "Ploche-Litotelmi" for Strict Natural Reserve (Official Gazette of The Former Yugoslav Republic of Macedonia No. 71/03)
- Law on the Proclamation of the Site "Smolarski Vodopad" for Natural Monument ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 35/06),
- Law on the Proclamation of the Site "Markovi Kuli" for Natural Monument ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 49/06),
- Decision on the acceptability of the proposal for proclamation of the site "Kuklica" for protected area in the category of Natural Monumen ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 18/07),
- Law on the Proclamation of the site Kuklica for Natural Monument ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 103/08),
- Decision on the acceptability of the proposal for re-proclamation of part of the mountain Pelister for protected area in the category of Park ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 40/07),
- Decision on the acceptability of the proposal for re-proclamation of Lake of Prespa for protected area in the category of Natural Monument ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 31/09),
- Decision on the acceptability of the proposal for re-proclamation of Lake of Dojran for protected area in the category of Natural Monument ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 31/09),
- Decision on the acceptability of the proposal for proclamation of the site Monospitovo Swamp for protected area in the category of Natural Monument ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 33/09),
- Decision on the acceptability of the proposal for re-proclamation of Matka Canyon for protected area in the category of Natural Monument ("Official Gazette of The Former Yugoslav Republic of Macedonia" No. 80/09).

Multi or bilateral agreements/conventions	Ratified by The Former Yugoslav Republic of Macedonia (Year)
Convention on Environmental Impact Assessment in a Transboundary Context	1999
Protocol on Strategic Environmental Assessment	2013
Multilateral Agreement among the Countries of South-Eastern Europe for implementation of the Convention on Environmental Impact Assessment in a Transboundary Context	2011
Rio Convention on Biological Diversity	1997
Convention on International Trade in Endangered Species of Wild Fauna and Flora	1999
Convention on Conservation of Migratory Species of Wild Animals	1999
Convention on the Conservation of European Wildlife and Natural Habitats	1997
Helsinki Convention on Watercourses and International Lakes	2015

Multi or bilateral agreements/conventions	Ratified by The Former Yugoslav Republic of Macedonia (Year)
Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat	1997
Aarhus Convention on access to information, public participation in decision-making and access to Justice in environmental matters	1999
Protocol on pollutant release and transfer registers (to the convention on public participation	2010
United Nations Framework Convention on Climate Change	1997
Kyoto Protocol	2005
Energy Community Agreement	2006
WHO Framework Convention on Tobacco Control	2006

Table 6 International multi- or bilateral agreements//conventions undersigned by The Former Yugoslav Republic of Macedonia in the different Nexus fields

2.1.3.5. Potential conflicts in economy legislation

Potential conflicts (gap) with regard to economy legislation relevant to Nexus sectors are the **lack of Law on Soil,** which would precisely define the quality of soils suitable for food production and the limit values of heavy metals, chemicals (pesticides, herbicides, etc.) and other substances directly related to quality of the food that would be grown on those soils.

Also, due to inadequate **waste management** and its disposal on agricultural land, there is a risk of possible contamination of soils and surface and ground waters with pollutants that will directly affect the quality of agricultural products used as food.

It is necessary to use the renewable energy sources in a way that does not disrupt the natural balance of the ecosystems in The Former Yugoslav Republic of Macedonia. When utilizing the hydro potential for energy production, ecosystems in water resources and their environment may be endangered. Also, water pollution is possible due to inadequate maintenance of water infrastructure.

The Law on Environment is a main law in the field of environment and environmental protection and it integrates at high level water and ecosystems in term of protection and sustainable management. Integration of energy policy within the Law on environment is low. Both the Law on energy and the Law on water describe the correlation between the utilization of water resources for obtaining electricity and the impact of the production of electricity from non-renewable energy on the environment. Ecosystems are not mentioned in the Law of Energy.

As well as the others laws, the Law on food safety integrates food only on the high level; it has low integration of issues related to other sectors. The Law on Agricultural land only considers the agricultural land; energy or ecosystems policy are not covered. The Law integrates water and food policy if they are directly connected to the agricultural land.

2.1.4. Policies and strategic documents

This chapter presents the most important strategic documents in the fields/sectors of focus and provides information on their objective(s), key policies, measures envisaged and targets set, with reference to their timeline.

2.1.4.1. Water

Water Strategy of The Former Yugoslav Republic of Macedonia (2012-2042)

The main objective of the Strategy is the preparation of an integrated approach for sustainable water management.

With an integrated water management in The Former Yugoslav Republic of Macedonia, it is necessary to ensure sufficient quality of drinking water for public water supply; to provide the necessary quantities of water of adequate quality for various commercial purposes; and the protection of people and material goods from floods and other harmful effects of the water. The objectives focus on training, flood protection, erosion protection, irrigation and drainage. It is also necessary to achieve and preserve good water status in surface and underground water bodies, water protection and water ecosystems dependent on water, and to harmonize water management measures with other sectors. Emphasis is placed on the sustainable use of water resources, which includes ensuring sufficient water and the development needs of all users, taking into account the natural opportunities of ecosystems.

The Strategy specifically provides actions and measures for the protection against floods and other harmful effects from water, water use, water protection, protected and other areas of importance related to water, professional and operational framework of water management, international cooperation and process the accession to the EU, the framework and instruments and economic instruments. Activities and measures include administrative instruments, structural measures, measures to improve different types of water use, legal instruments and standards, control and monitoring of instruments, data collection and management and economic instruments.

Emphasis is also placed on the principle of prevention, such as the actions necessary for the restoration of the damage, which are clearly higher than the necessary funds for a continuous, organized and planned protection of surface and groundwater.

OBJECTIVES IN THE FIELD OF DRINKING WATER SUPPLY

- Increase the level of drinking water supply of the population. The current level of population connected to public water supply systems must increase. The increase should be achieved by upgrading existing and building new water supply systems.
- Introduce the economic price of water. Introduction of water pricing with consideration of fundamental “polluter pays” principle should progressively be

implemented with integration of technological systems and establishment of distribution areas with a unique price of water.

- Reduce water losses from public water supply systems. Reduction of losses from public water supply systems to acceptable values (15 - 20%), taking into the account the model of developed European countries, should be permanent task of the municipal economy.
- Satisfy the need for water. In the future it is expected that water needs could increase or decrease.
- Increase safety procedures for public water supply. Water from groundwater resources should continue to be the main source of water, which is used for public water supply.
- Increase the current level of connection rate to sewage system and wastewater treatment plants.

OBJECTIVES IN THE FIELD OF INDUSTRY WATER USE

- Ensure required quantity of cooling water in the industry. Economic growth and development will further develop required quantities of cooling water.
- Encourage the introduction of water recirculation in technological processes wherever possible.
- Determine plans for exploitation and protection of water resources used for production of water for market sale.

OBJECTIVES IN THE FIELD OF AGRICULTURAL WATER USE

- Efficient water use for irrigation purposes and securing the necessary quantity of water for irrigation purposes. The strategy does not provide the trends for future irrigation consumption increase.
- Fragmentation of the agricultural land.
- Stopping the reduction of existing irrigation systems and bringing them into working order and alignment with the new conditions and needs, where there is an interest in it.

In general, most of the irrigation systems have functional difficulties. The most common problem is outdated equipment and infrastructure, inadequate maintenance due to lack of funds and transition processes in the water economy and the agricultural sector. Priority in the irrigation sector is the rehabilitation of existing hydro-melioration networks, their modernization and installation of new equipment, applied water saving techniques and flow control in the main channels.

OBJECTIVES IN THE FIELD OF WATER USE FOR ENERGY PRODUCTION

- Construction of new HPPs, as one of the strategic objectives of The Former Yugoslav Republic of Macedonia, which is defined with a strategy for energy development in order to fulfil the obligations from the Directive on Electricity Production from Renewable Energy Sources Directive (2001/77/EC). The Strategy provides legal obligations for preservation of ecosystems; sustainable development of water resources through meeting the needs of all users; rational and economic water use; insurance of good water quality and sufficient quantity; water protection and improved measures to prevent pollution, protection and improvement of aquatic ecosystems; and protection against harmful effects of waters.

One of the strategic goals of the Economy, which is defined in the Strategy for Energy Development, is the construction of new hydro power plants. In this way, part of the electricity needs will be provided for the future. For the period 2010-2021, it is planned to build large accumulation HPPs.

OBJECTIVES IN THE FIELD OF NAVIGATION WATER USE

- Integrate inland waterways in the European navigation system arrangement.

OBJECTIVES IN THE FIELD OF FISH-FARMING WATER USE AND FISHING

- Development of fish ponds, especially warm ones, because of their multi-purpose use (maintenance of good water status, sport fishing, tourism, habitat for birds, ensuring biodiversity, etc.).

OBJECTIVES IN THE FIELD OF RECREATION WATER USE

- Ensure water supply and wastewater treatment in the tourist season.

OBJECTIVES IN THE FIELD OF GEOTHERMAL AND MINERAL WATER USE

- Ensure multi-purpose use of geothermal water.

2.1.4.2. Energy

Strategy for energy development in The Former Yugoslav Republic of Macedonia until 2030

The Energy Development Strategy of The Former Yugoslav Republic of Macedonia defines the most favourable long-term development of the Energy Sector in the Economy in order to ensure reliable and good quality energy supply to the consumers while caring about the environmental impact. The Strategy addresses the economic, organizational, institutional, legislative and educational dimensions of the energy sector development in the areas of energy production, transmission and utilization. The Strategy foresees the necessary funds for the realization of the envisaged activities: for the revitalization of the existing HPPs or around 67 million Euro; for the construction of new HPPs 1041 million Euro; development of the transmission network 109.3 million Euro; gasification 310 million Euro; and renewable

energy sources (hydro power plants, geothermal energy, windmills, photovoltaic, solar systems for hot water) 618 million Euro.

Intensified efforts for the improvement of the energy efficiency in production, transmission and consumption of energy, particularly electricity are required. The maximization of the utilization of the renewable energy sources belongs among the priority activities in the energy field. All preconditions for greater utilization of natural gas should be provided for. The transition to market prices for electricity will improve the investment climate, strengthen the interest to introduce renewable energy sources and improve the energy efficiency.

Considering that certain natural monopolies, such as the transmission and distribution of electricity and natural gas and the distribution of heat, still continue to exist, the measures for elimination of the misuse of the monopoly position of any entity should be strengthened.

Environmental protection in the energy sector means acting primarily through energy efficiency, renewable energy sources, selection of fuels and modern technologies that are environmentally friendly, good quality legislation and monitoring, education and public awareness, as well as promotion of positive examples.

According Strategy for Energy Development until 2030, projected consumption of electricity for 2020 (kWh/inhabitant) in the baseline scenario is 4961 kWh/inhabitant and for EEf – Scenario with improved energy efficiency the projected consumption of electricity for 2020 is 4637 kWh/inhabitant.

The following priorities have been identified in the strategy:

- Maintenance, revitalization and modernization of the existing and construction of new, modern infrastructures for the purposes of energy production and utilization, by complying with the EU standards for environmental protection;
- Improvement of the energy efficiency in the production, transmission, and utilization of energy, in parallel with specific programs for reduction of the final energy consumption in all sectors;
- Utilization of domestic resources (reserves of lignite, hydropower potential, wind and solar energy) for electricity production;
- Increase use of natural gas;
- Increase use of renewable energy sources;
- Preparation and realization of programs for supporting consumers and gradual increasing of the electricity price to market values by 2015; and

- Finalization of the reforms in the energy sector of The Former Yugoslav Republic of Macedonia and its integration in the regional and European electricity and natural gas market.

The ecological components on which the thermal power facilities operate are grouped into three parts, air, water and soil and indirectly through them the impacts on wildlife, flora, fauna and especially on the health and quality of life of people. In The Former Yugoslav Republic of Macedonia, the environmentally most affected component by thermal energy facilities is air. Thermal energy facilities pollute the air as particles and gases (SO_2, NO_x, CO) with a direct negative impact on living environment and materials in their environment and with gases (CO_2, CH_4, N_2O) with a global negative impact through the greenhouse effect.

Thermal power facilities are major polluters of water. Although there are clearly defined obligations for purification of wastewater, this problem has not yet been adequately addressed.

According to the baseline scenario, the use of geothermal energy at the level of 32.8 ktoe (382 GWh) is envisaged by 2020. Electric energy and petroleum products will grow at an average rate of around 1.6% and 1.4%, respectively. The total energy consumption in this sector in the analysed period will grow at an average rate of 5% per year. In 2020 it will reach a value of 59 ktoe (690 GWh, 2483 TJ).

Strategy for use of renewable energy sources in the The Former Yugoslav Republic of Macedonia until 2020 (2010)

The objective of the Strategy for use of renewable energy sources in The Former Yugoslav Republic of Macedonia until 2020 (hereinafter the Strategy) is to gather data for the potential of use of renewable sources of energy in the Economy to protect the environment, reduce greenhouse emissions and reduce dependency on imported energy.

The use of biofuels by 2020 is forecasted to have a share of 10% and by 2030 to have a share of 20% from the total fuel consumption in the transport sector. The strategy also researches options to stimulate the use of biofuels in the transport sector. The consequences of such impacts have not been assessed or quantified.

	2005	2020 S2	2020 S3	REF	Emissions REF S2	Emissions OIE S2	Emissions REF S3	Emissions OIE S3	Reduction S2	Reduction S3
	GWh	GWh	GWh		$ktCO_2$-ekv	$ktCO_2$-ekv	$ktCO_2$-ekv	$ktCO_2$-ekv	$ktCO_2$-ekv	$ktCO_2$-ekv
EE from RES	**1144**	**3039**	**2679**							
Hydropower plant	**1144**	**2710**	**2350**							
Large hydropower plant	1090	2350	2000							
Small hydropower plant	54	360	350	EE from coal	367	0	355	0	367	355
Wind power plants	0	270	270	EE from coal	324	0	324	0	324	324
Photovoltaic systems	0	14	14	EE from coal	17	0	17	0	17	17
Biomass	0	25	25	EE from coal	30	28	30	28	2	2
Biofuel	0	20	20	EE from coal	24	8	24	8	16	16
Heat from renewable energy sources	**1872**	**3200**	**3240**							
Biomass	1767	2740	2740	EE from coal	1168	480	1168	480	688	688
Solar energy	0	60	60	EE from coal	72	0	72	0	72	72
Geothermal energy	105	400	440	Fuel oil	82	0	94	0	82	94
Bio fuels	**0**	**655**	**560**	gasoline	164	39	140	33	125	107
Total RES	**3016**	**6894**	**6479**					**Total reduction with RES until 2020**	**1693**	**1674**
PFE	**21783**	**32873**	**30825**					**Emissions – coal scenario (black scenario) until 2020**	**21500**	**21500**
Participation of RES (%)	**13,8**	**21,0**	**21,0**					**Relative reduction with RES until 2020**	**7,88%**	**7,79%**

Table 7 Reduction of greenhouse gas emissions by applying renewable energy sources[37]

As shown in the table above, the total annual greenhouse gas emission reductions that can be achieved by RES in 2020 are around 1693 and 1674 kt CO2-eq, according to the scenario S2 and S3 respectively. Regarding the coal scenario (S1), the reduction of total emissions to RES is 7.88% (S2) and 7.79% (S3). The scenario S3, in addition to the increased use of RES, also envisions enhanced energy efficiency measures (lower energy consumption) that would result in additional (even greater) emission reductions.

2.1.4.3. Sector Food/Land/Agriculture

Second Action Plan for food and nutrition of The Former Yugoslav Republic of Macedonia (2009)

The Second Action Plan aims to highlight the major challenges to public health in the area of nutrition, food safety and food security, nutritional disorders, especially obesity, micronutrient deficiencies and food-related diseases.

In order to achieve these health goals, the recommendations for the correct nutrition should be in line with the recommendations of WHO and FAO.

Strategy for agriculture and rural development for the period 2014-2020

The primary strategic goal is "increasing the competitiveness of The Former Yugoslav Republic of Macedonia agricultural production and the food industry, rural development and sustainable management of natural resources". In order to achieve the strategic goal in the next period, the agricultural sector in The Former Yugoslav Republic of Macedonia should be fully oriented to the needs of consumers and market signals, to increase its efficiency in operations, economies of scale and by adaptable to change.

The Strategy provides for minimum conditions for good agricultural practice. The rules for good agricultural practice regulate the following practices: periods when avoiding dispersal of soil fertilizers, applying fertilizers on steep terrain, farming on soils saturated with water, soils near watercourses, construction and capacities of containers for the storage of livestock manure and fertilizer use in general (including doses). Starting from 2013, direct payments (subsidies) are linked to the fulfilment of the requirements prescribed in the list of minimum requirements for good agricultural practice and environmental protection.

The activities of agricultural companies should implement the concept of "green" agriculture. The application of the minimum requirements relating to the responsible management and protection of soil and water, the proper use of chemical preparations and the promotion of the efficiency of the use of natural energy resources defined as cross-compliance requirements will be widely applied by more than 71 farmers.

About one third of arable agricultural land (173 thousand ha) is irrigated and about 80 thousand ha are under drainage systems. The irrigation network comprises 17 large dams and over 100 small dams and about 1,400 km of main channels, or about 7,000 km detailed channel network of pipelines and channels.

The Strategy calls for investments in equipment for solar energy utilization for drying vegetables, fruit, and vineyards, medical and aromatic plants. In addition, investments in photovoltaic systems will be supported at locations where there is no access to the electrical distribution network. To support the use of biomass as a renewable energy source, investments for the production of briquettes and pellets from forest and agricultural plant waste, investment in the production of biogas from plant and animal waste (green biomass and manure) and biodiesel production are supported.

In order to use the wind energy, investments in mini windmills for pumping water or for the production of electricity in agricultural holdings and in rural areas will be supported.

2.1.4.4. Ecosystems

Strategy for Nature Conservation (2017-2027)

The main objectives of the Strategy for Nature Conservation are to analyse the situation and the identification of threats and to propose appropriate measures and activities for the protection and sustainable management of nature.

In the Strategy seven objectives are identified:

- Objective 1: To protect, preserve and monitor components of geo diversity, geo heritage, biological and landscape diversity.
- Objective 2: Geo diversity, geo heritage and other nature components (biological and landscape diversity) should be properly identified, explored, monitored and inventoried.
- Objective 3: To incorporate the nature conservation policy into strategies, plans and programs in other sectors till 2022.
- Objective 4: To establish sustainable use of geo diversity, heritage and other nature components (biological and landscape diversity) through the use of traditional knowledge, innovations, best practices for conservation and sustainable use of nature.
- Objective 5: To approximate the legislative framework with EU legislation and relevant ratified conventions for nature protection and to provide an appropriate institutional framework through strengthening of administrative capacities.
- Objective 6: To raise the level of information, education and promotion of the values and significance of geo diversity and heritage and other components of nature (biological and landscape diversity)

- Objective 7: To ensure continuous and increased funding for nature protection from budgetary funds at central and local level, from investments and other sources of funding, through the establishment of appropriate sustainable and efficient models for financing the protection and sustainable use of nature.

The vision and objectives of the Strategy are thoroughly presented and described in Action plan. The action plan contains numerous actions that need to be implemented in order to fulfil and achieve the vision and objectives of the Strategy. The actions in the Action plan refer to:

- protection, conservation and monitoring;
- identification, research and inventory;
- sustainable use of geo diversity, heritage and other components of nature (biological and landscape diversity);
- rejecting the policy of nature protection in strategies, plans and programs in other sectors;
- improving the legislative framework and strengthening the institutional capacity of the applicants;
- raising the level of awareness, education and promotion of the values and significance of geo diversity, heritage, biological and landscape diversity; and
- Providing continuous and increased funding for the protection of nature.

Biodiversity is adversely affected by the energy sector due several aspects: pollution of air, water and land during electricity production (REK Bitola and REK Oslomej); disruption and alteration of the total landscape, as well as biodiversity in the construction of transmission lines; change of pH and increase in concentrations of heavy metals in groundwater (slag depots); reduction and fragmentation of habitats and areas of plant communities, as well as relict, endemic and rare species.

Current threats to biological diversity related to agriculture result from the abandonment of traditional uses of meadows and pastures, in a change of the landscape through succession, and changes in the composition of biological diversity.

The intensive development of the transport sector in the economy often leads to fragmentation of habitats, which appears as one of the most important threats to biodiversity.

Strategy for Biological Diversity with Action Plan

Within the Strategy, 19 biodiversity targets have been identified, grouped in the following 4 strategic objectives:

(1) overcoming the main causes of biodiversity loss through its integration across the whole society;

(2) reducing direct and indirect pressures on biodiversity;

(3) improving the status of biodiversity by preserving ecosystems, species and genetic diversity in order to increase the benefits of biodiversity and ecosystem services; and (4) improving the knowledge and availability of all relevant information on biodiversity.

In order to achieve the set biodiversity targets, specific actions related to the conservation and sustainable use of biodiversity are defined in the Strategy.

From total 7 objectives given in Strategy for Nature Protection, the objective 4 refers to establish sustainable use of geo diversity, heritage and other nature components (biological and landscape diversity) through the use of traditional knowledge, innovations, best practices for conservation and sustainable use of nature.

The Action Plan will serve as a framework and direction for realization of the activities that The Former Yugoslav Republic of Macedonia should undertake to conserve the biological diversity by 2020, thereby contributing to the achievement of global biodiversity targets (Aichi Aims).

Based on the threat analysis, the following key sectors that influence biodiversity have been identified: agriculture, forestry, hunting, transport, energy, fisheries and aquaculture, tourism, water management, industry, pollution and use of natural resources.

Fifth Report to the convention on biological diversity of The Former Yugoslav Republic of Macedonia (2014)

Article 26 of the Convention on Biological Diversity (ratified with Law on ratification “Official Gazette of The Former Yugoslav Republic of Macedonia” No. 54/97, entered into force in 1998) states that the objective of reporting is to provide information on measures taken for the implementation of the Convention and the effectiveness of these measures. In accordance with Article 6, measures to be addressed, in light of specific circumstances, are reflected in the biodiversity strategy and action plan. Biodiversity Strategies and Action Plans (NBSAPs) are the principal instruments for implementing the Convention at the level.

The Fifth Report was prepared in the framework of the project "Support to The Former Yugoslav Republic of Macedonia for revision of the Biodiversity Strategy and Action Plan and preparation of the fifth report to the Convention on Biological Diversity", which was implemented in the period 2013-2014, by the Ministry of Environment and Physical Planning and the United Nations Environment Programme (UNEP) Office in Vienna, in cooperation with organizations and experts, and with financial support from the Global Environment Facility (GEF). Recommendations of the Convention given in Decision X/10 and developed guidelines for the content and process of preparation of the report prepared by the Secretariat of the Convention on Biological Diversity were used for its drafting.

For the preparation of the Fifth Report numerous publications, research papers, reports of completed projects in the field of nature protection, and information obtained from the Ministry of Environment and Physical Planning, parks management authorities and other institutions and organizations were used.

THIRD Communication on Climate Change

The main objective of the Third plan on climate change (hereinafter the Plan) is the implementation of the responsibilities arising from the United Nations Framework Convention on Climate Change (hereinafter the Convention) and the Kyoto protocol linked to the Convention, through strengthening of the information database, analytical and institutional capacity of the key institutions, as well as integrating climate change priorities in strategies for development and relevant sectoral programs, with provision of financial and technical support.

The specific targets of the Plan are the following:

- Renewal of the greenhouse emissions inventory for key sectors, as well as strengthening the capacities for modelling, analysis and planning of the greenhouse emissions.
- Identification of the climate change mitigation potential in all sectors, taking into account all relevant aspects: technical (how to reduce emissions), environmental (to what extent can the emissions be reduced), and economic (what are the costs for emissions reduction).
- Agricultural activities are expected to increase due to growing demand for food and with that the increase of GHG emissions from this sector is inevitable. Detailed analysis was carried out of the potential for the following mitigation options in agriculture as a part of the TNC: increase in organic agriculture, livestock management for less GHG – intensive enteric fermentation, improved crop residues management, improved sprinkler and drip irrigation, altering tillage techniques, improved management of fertilizers, production of biogas from farming.
- For energy sector the most cost - effective areas for mitigation were found to be the following: installing natural gas-fired power plants instead of coal plant, hydropower development, wind power development and some solar power development. In addition to power supply, mitigation measures related to reducing or altering energy demand will be important – particularly involving: energy efficiency improvements in the building sector, various measures in the transport sector for low carbon fuels, awareness raising for efficient driving, changed travel behaviour, improvement of the vehicle fleet, and advancement of vehicle equipment and improvements in industrial processes for improving energy efficiency.
- Adoption of appropriate criteria for climate change mitigation measures prioritisation.
- Assessment of change mitigation measures in accordance with the adopted criteria.

The objectives of the Plan concerning transport sector are more efficient energy use and increased use of bio-fuels. There are no quantified data.

Water resources in The Former Yugoslav Republic of Macedonia are sensitive to climate change with regard to both quality and quantity. At the state/regional level, priorities for adaptation include placing greater emphasis on integrated, cross – sectorial water resources management and using river basins as management units. The priority measures consist of the following: modernization of the hydro – meteorological network, establishment of data monitoring, processing and availability, rehabilitation and reconstruction of existing hydropower and water infrastructure and development and implementation of water management plans.

Environmental and Climate Change Strategy (2014 – 2020)

Four sectors - energy, transport, industry and agriculture - are important for environmental and climate change policies. The objectives of the Strategy are aimed at preserving and improving the quality of water, air and soil, maintaining biodiversity and preserving natural resources in The Former Yugoslav Republic of Macedonia.

Operational objectives of the Strategy in the field of environment and climate change are:

- complete transposition of EU environmental legislation;
- adopt planning documents within a certain timeframe, measures and activities necessary for the implementation of the legislation;
- establish and strengthen the administrative structure, ready to ensure the implementation of legislation and manage the process of accession to the EU;
- higher level of implementation of the legislation in the field of environment, in accordance with the requirements of the EU and the obligations from the international contracts;
- integrate environmental protection into sectors affecting environment;
- monitor and assess the state of the environment and reporting about the condition;
- raise awareness on environmental issues;
- reduce the negative effects of climate change and the establishment a system of measures to limit greenhouse gases;
- increase the adaptation capacity of the most vulnerable sectors climate change; and
- support for "clean" technologies and changes aimed at using renewable sources energy and reducing energy consumption.

Specific objectives in relation to the protection of nature and biodiversity:

- harmonize of the legislation with the EU acquis the field of nature protection, through amendments and supplements to the Law for the protection of nature and preparation of bylaws;
- identify Special Protected Areas and Special Areas for conservation as part of the Natura 2000 network;
- establish administrative structure for Natura 2000, through adopted plans for protected area management and an efficient system for financing and development of the Natura 2000 network; and
- establish monitoring of natural habitats and strictly protected and protected wild species in The Former Yugoslav Republic of Macedonia.

2.1.5. Identification of possible effects of these key policy and managerial measures to the fields/sectors of focus other than these for which they were prepared ("potential conflicts")

The following potential conflicts have been identified within the strategies:

Sector Water:

The Strategy give an overview of the activities and measures to be implemented to achieve the objectives of water protection and other areas of importance related to water. Especially measures in the protected area should not contradict measures in the Water Management Plans.

In the Water Strategy 2012-2042 gives an overview of the investments in the agriculture sector related to water for the period from 2009 to 2011 (132.5 million euro); it also mentions investments in energy sector (Reconstruction and revitalization of existing HPPs and building of new ones).

The investments envisage the following activities:

- Irrigation of Southern region of the River
- HMS Lisice - phase 2 - construction of irrigation systems
- Programme for irrigation of the Southern Valley of the River Vardar
- Construction of dam on Orizarska river
- Regulation of the water flows of the Vardar River

The strategy does not provide any further information about the implementation of the proposed activities, their effect on the water abstraction, potential pollution and effect on ecosystems.

The main investment projects are the reconstruction and modernization of the existing irrigation systems, finishing and equipping of new necessary irrigation systems and more intensive use of hydroelectric resources through the construction of a new HPP.

Sector Food/Land/Agriculture:

Strategy for agriculture and rural development for the period 2014-2020

Within the Strategy, during the selection and development of the policies and measures, climate change issues are taken into account, including how climate change impacts negatively affect agriculture production.

Environmental problems related to water and soil are (a) pollution with fertilizers and pesticides (especially in the production regions of intensive fruit and vegetable production), (b) loss of organic matter in the soil (due to intensive monocultures, little use of organic fertilizers, green manure), and (c) degradation of the humus layer due to drought or heavy rainfall.

Soil erosion is one of the most important environmental problems caused by agricultural activities in The Former Yugoslav Republic of Macedonia. The combination of natural disadvantages (sloping terrain, soil structures and the occurrence of intense rains), inadequate land use (destruction of the natural flora, conversion of pastures for intensive agricultural production, creation of large parcels through the destruction of protective belts) and agricultural practices (excessive grazing, using monocultures, limited use of organic matter, ploughing on steep slopes, lack of production techniques for soil protection, lack of land use for winter crops) contribute to the acceleration of the erosion process.

It is estimated that 38% of the economy faces medium to severe erosion, with a total annual loss of soil of about 17,100,000 cubic meters. Soil erosion results in large amounts of sedimentation, which leads to a reduction in storage or flow capacity of water and damage to critical hydraulic infrastructure.

Intensive livestock farming is considered a basic source of nitrates, whose uncontrolled management leads to imbalance of soil components and pollution of surrounding surface and groundwater.

2.1.6. Identification of key cross-references overlaps or potential conflicts among the identified strategic documents.

Strategy for agriculture and rural development for the period 2014-2020

Individual adaptation measures that will give the greatest economic benefit and will minimize the impact of climate change by sectors are included in the Third Climate Change Plan. In the

agricultural sector, mitigation measures for adverse effects of climate change are more specifically related to the areas of vegetation, livestock production and the water sector.

In order to successfully transpose the measures of the Third Climate Change in policies, their implementation and monitoring of the situation, activities have been included to strengthen the institutional capacities of the main institutions involved in climate changes adaptation.

2.1.6.1. Possible positive or negative effects among the fields/sectors of focus as an outcome of the provisions and cross-references or absence of cross-references in the related strategic documents

Strategy for agriculture and rural development for the period 2014-2020

An analysis of the impact of climate change on the agricultural sector indicates that all the necessary inputs for the agricultural production can negatively impact the environment. In addition, the environment can place restrictions on agriculture protection. The most important factors that impose restrictions on agricultural production are: water deficit and occurrence of periodic drought, as well as the increase of the microregions with a dry climate.

The vulnerable sub-sectors are agricultural crops, agricultural land and livestock breeding. The following production types have been identified as especially vulnerable to the negative impact of climate change:

- Vineyards / grapes as the most important agricultural product in the Povardarski region;
- Tomatoes as the most important agricultural product in the predominantly agricultural region in the south-eastern part of the Economy (Gevgelija, Strumica);
- Winter grain as the most important grain culture in Skopje - Kumanovo and Ovce Pole;
- Apples in the Prespa / Ohrid region, especially Resen;

If these products, which are highly susceptible to climate changes are cultivated without irrigation, a significant decline in yields in the affected geographical areas is expected by in 2025 as a result of climate change.

The negative impacts of climate changes on agriculture in The Former Yugoslav Republic of Macedonia is increasing. Climatic events in 2007/2008, 2011/2012 and 2013, which included long dry periods and heat waves, led to significant production loss. Lack of water in the summer period led to a significant shortage of moisture for summer crops and annual cultures. The irrigation in vulnerable regions that are affected by droughts is of enormous significance for the survival of agricultural production and agro-biodiversity.

The most significant impacts of climate change in the agriculture sector are associated with soil degradation, landslides and salinization. The response to these risks is the application of

sustainable agricultural practices and land use, good water management, biodiversity protection and protective measures for the prevention of soil erosion.

Measures to reduce the negative impacts of climate change include:

- change the time for sowing or irrigation can contribute to significantly improve yields;
- breeding cattle genetically resistant to heat;
- specially prepared feed and application of feeding techniques during periods of increased heat;
- improvement of the conditions for accommodation with adequate ventilation;
- cooling and air conditioning on farms and monitoring productivity against climate change, especially in dry periods and heat waves; and
- afforestation of agricultural land in erosion risk areas.

2.1.7. Nexus-related initiatives

This section includes the identification of international and/or donor-driven initiatives and projects to introduce and implement the Nexus approach at the Economy and/or trans boundary basin/aquifer levels.

GEF Drin Project "Enabling Trans boundary Cooperation and Integrated Water Resources Management in the Extended Drin River Basin"

Name and focus*:*

The Drin Memorandum of Understanding Coordinated action at the Drin Basin level has been absent until the development of the Shared Vision for the sustainable management of the Drin Basin and the signing of a related Memorandum of Understanding (Tirana, 25 November 2011) by the Ministers of the water and environment management competent ministries of the Drin Riparians i.e. Albania, The Former Yugoslav Republic of Macedonia, Greece, Kosovo* and Montenegro. This was the outcome of the Drin Dialogue supported by the Swedish Environmental Protection Agency and coordinated by UNECE and Global Water Partnership Mediterranean (GWP-Med).

The Global Environment Facility (GEF) supported Full Size Project "Enabling trans boundary cooperation and integrated water resources management in the extended Drin River Basin" is aligned in content, aims and objectives with the DAP and the activities under the Drin Coordinated Action. The GEF also supported Medium Size Project "Enabling trans boundary cooperation and integrated water resources management in the White Drin and the extended Drin Basin".

- Fields/sectors of focus considered:

The main goal of the project is to reach a point in the future where the scale of management lifts from single water bodies to the hydrological interconnected system of the Drin Basin,

eventually leading from the sharing of waters among Riparians and conflicting uses, to the sharing of benefits among stakeholders in an area that is physically, culturally and historically interconnected.

- Geographical area:

The Drin River starts at the confluence of its two headwaters, the transboundary Black Drin and White Drin Rivers at Kukës in Albania. The interconnected hydrological system of the Drin River basin comprises the transboundary sub-basins of the Black Drin, White Drin, and Buna/Bojana (outflow of Skadar/Shkoder Lake in the Adriatic Sea) Rivers, and the subbasins of Prespa, Ohrid and Skadar/Shkoder Lakes. Albania, Greece, The Former Yugoslav Republic of Macedonia, Kosovo* and Montenegro share the Drin Basin.

- Institutions involved (Implementer, supporter, donor):

The Project is implemented by UNDP and executed by the Global Water Partnership (GWP) through GWP-Mediterranean (GWP-Med) in cooperation with the United Nations Economic Commission for Europe (UNECE); GWP-Med is responsible for the realization of the Project. The Drin Core Group is the Steering Committee (SC) of the Project. It will be managed by a Project Coordination Unit (PCU), based in Tirana, Albania; staff will be stationed also in Podgorica, Montenegro; Ohrid, The Former Yugoslav Republic of Macedonia; Pristina, Kosovo*.

- Timeline (start/end):

The project is expected to promote joint management of the extended transboundary Drin River Basin on the basis of the Drin MoU (signed in Tirana on 25 November 2011). This project was endorsed by the GEF CEO on 17 October 2014 and started in 2015.

- Resources:

UNDP is the implementing agency and UNOPS, UNECE and GWP-Med the executing partners of the project.

- Brief description:

The Drin Basin needs to be managed as an entity to ensure effective and sustainable management of water and ecosystems. Although there is an established cooperation between the riparian countries in the sub-basins of Prespa, Ohrid and Skadar/Shkoder Lakes, there is no such cooperation at the “extended” Drin Basin level.

The objective of the project is to promote joint management of the shared water resources of the transboundary Drin River Basin, including coordination mechanisms among the various sub-basin joint commissions and committees. In order to achieve the goal mentioned above, the project activities will include following:

- Building consensus among countries on key transboundary concerns and drivers of change, including climate variability and change, reached through joint fact finding;
- Facilitating the agreement on a shared vision and on a program of priority actions deemed necessary to achieve the vision;
- Strengthening technical and institutional capacities.

- Focus (of conflict resolution) adopted:

Diverse and often conflicting uses and unsustainable management approaches applied in the Drin Basin under various circumstances, have led to the degradation of ecosystems and pollution of the Adriatic Sea, as well as to a bottle-neck for the sustainable economic growth of the region. Some of the key pressures (causes) and their corresponding impacts are following:

- Unsustainable management of:
  - solid waste
  - wastewater
  - water resources
  - minerals
  - agriculture and forests
  - fishing and hunting
  - land use
  - urban development
- Lack of robust institutions and mechanisms for cooperation
- Increasing climate variability

- The results of the project and lessons learned:
  - The operationalization of the institutional structure of the Drin CORDA, rendering it capable of undertaking a coordinating, executive role that aims towards a structured cooperation among the Drin Riparians.
  - The enhancement of scientific knowledge in the Basin for informed decision-making concerning transboundary management.
  - A set of commonly agreed measures towards the sustainable management and sustainable development of the Basin.
  - The systematic involvement of users, civil society and other stakeholders in the implementation of the aforementioned.

II Prespa Watershed Management Plan

- Name and focus:

The pilot project for watershed management planning in the Prespa Lake Watershed represents an initial stage in The Former Yugoslav Republic of Macedonia's efforts to further EU approximation by applying the principles of the Water Framework Directive in the water management sector. The reason for designating Prespa Lake Watershed as a pilot basin is that the basin includes a wide range of aquatic and terrestrial habitats that are subject to major sources of environmental pressure, such as intensive agricultural production and the presence of the urban centre of Resen. The wider region is also of high environmental importance, as has been recognized by the establishment of parks, a nature reserve and the designation of Prespa Lake itself as a Ramsar site.

- Fields/sectors of focus considered

The Prespa region is considered to be an ecosystem of global significance and has been identified as one of Europe's major trans-boundary 'ecological bricks'. The Prespa Region hosts unique habitats which are important from both a European and global conservation perspective. The health of the ecosystem of the Prespa Basin is under stress, however, from unsustainable practices in agriculture, fisheries, water and forest management. There is limited knowledge of environmental protection and conservation issues among the relevant decision-makers and the general population and a lack of streamlined information available for interested parties. The project is designed to strengthen capacity for restoring the health of the ecosystem and conserving biodiversity at local, state and trans-boundary levels in the three neighbouring states in the Prespa region by piloting ecosystem-oriented approaches to main productive sector practices within the basin, including land-use/spatial planning, water management, agriculture, forest and fishery management, conservation and protected area management.

- Geographical area

Prespa watershed is a high-altitude basin at approximately 850 meters above sea level. It includes two inter-linked lakes: Micro Prespa (47.4 km^2) and Macro Prespa (259.4 km^2). The watershed is shared between The Former Yugoslav Republic of Macedonia, Albania and Greece. The area which forms the subject of this study is the The Former Yugoslav Republic of Macedonia part of the watershed of Macro Prespa Lake.

- Institutions involved (Implementer, supporter, donor)

Executing Agency: MoEPP; Implementing Agency: UNDP; Donor: GEF

- Timeline (start/end)

Work on the Prespa Watershed Management Plan started in 2009 as part of the GEF/UNDP Prespa Park Project, following several years of preparation.

- Resources

The preparation of the Prespa Lake Watershed Management Plan was produced with the technical and financial support of the United Nations Development Programme (UNDP), in the framework of the Integrated Ecosystem Management in the Prespa Lakes Basin project. The Integrated Ecosystem Management in the Prespa Lakes Basin project is implemented by UNDP with financial support from the Global Environment Facility (GEF)

- Brief description

Prespa Watershed Management Plan represents an initial stage in The Former Yugoslav Republic of Macedonia's efforts to further EU approximation by applying the principles of the Water Framework Directive in the water management sector.

The aim of the on-going GEF/UNDP Prespa Transboundary Project is to mainstream ecosystem management objectives and priorities into productive sector practices and policies. The

project is designed to strengthen capacity for restoring the health of the ecosystem and conserving biodiversity at local, state and trans-boundary levels in the three neighbouring states in the Prespa region by piloting ecosystem-oriented approaches to main productive sector practices within the basin, including land-use/spatial planning, water management, agriculture, forest and fishery management, conservation and protected area management.

- Focus (of conflict resolution) adopted

The pressures on waterbodies from both natural and anthropogenic origins have been extensively identified and analysed. These pressures include the input of pollutants (e.g. nutrients and hazardous substances) and physical pressures on the waterbodies (e.g. agriculture in the river corridor, drainage, watercourse maintenance and abstraction). The input of pollutants takes place via both water and air from diffuse sources (e.g. nutrient leaching from farmland) and point sources (e.g. wastewater discharges from households and industry, emissions from industry and agriculture and leaching from disused landfills). The harmful impacts of water (floods, erosion) and the morphological pressures on rivers and on the lake, as well as the state of protected areas have all been scrutinized.

- The results of the project and lessons learned:

- 16 watercourses have been identified as water bodies: 13 water bodies as rivers; 1 heavily modified water body; and 2 artificial water bodies.
- Prespa Lake is delineated as a single transboundary water body. Six groundwater bodies have been identified in the Prespa region.
- Initial 12-month comprehensive surveillance monitoring of the water quality and ecological status has been conducted for all the identified/delineated water bodies and reference conditions have been established. The pressures on waterbodies from both natural and anthropogenic origins have been extensively identified and analysed.
- The status (including biological, hydromorphological and physico-chemical quality elements) of all the waterbodies in Prespa region has been determined.
- Based on Problem Analysis and Gap Analysis, a comprehensive Programme of 45 Measures for achieving the set objectives has been developed, aimed primarily at resolving technical and environmental issues and problems in the region.
- An economic analysis has been made of the proposed Programme of Measures.

(Source:https://www.researchgate.net/profile/trajce_stafilov/publication/266850433_prespa_lake_watershed_management_plan/links/543d02e30cf24ef33b76582b/prespa-lake-watershed-management-plan.pdf)

III River Basin Management Plan for Bregalnica

- Name and focus

The focus in the Bregalnica River Basin Management (RBM) Plan is on the current and future situation of the water resources in the Bregalnica catchment because they are under high

pressures, caused by the human activities: usage of chemicals in agriculture and industry as well as the discharge of untreated wastewater over the last few decades.

- Fields/sectors of focus considered

The rivers, lakes and groundwater aquifers in the Bregalnica catchment provide the drinking and the irrigation water necessary to the fifteen municipalities present in the catchment. But these water resources are under high pressures, caused by the human activities. The main objective of the project is the sustainable management of the water resources in the Bregalnica river basin, by this promoting the economic development of the region, stimulating industry, agriculture and tourism. The enforcement of the The Former Yugoslav Republic of Macedonia water law through the project should bring about the improvement of the water and sanitation services in the Bregalnica River Basin

- Geographical area

Bregalnica River is one of the major tributaries to Vardar River. The Vardar watershed drains in the Aegean Sea – Mediterranean Sea. The Bregalnica watershed comprises a territory of 4307 km^2, which is approximately 21% of the Vardar watershed in The Former Yugoslav Republic of Macedonia and about 17% of the overall territory of the economy. The Bregalnica watershed borders with Bulgaria in the east, Strumica River catchment in the south, Pcunja River in the north, and Vardar River in the west. The average altitude of the Bre-galnica watershed is 722 m a.s.l.

- Institutions involved (Implementer, supporter, donor)

To bring forward the implementation of the new The Former Yugoslav Republic of Macedonia Water Law and the RBM approach, the Ministry of Environment and Physical Planning (MOEPP) and the Ministry of Agriculture, Forestry and Water Economy (MAFWE) started in 2012 a collaboration with the Swiss State Secretariat for Economic Affairs (SECO). MOEPP, MAFWE and SECO selected the Bregalnica river basin as pilot region to apply the RBM approach. The Project started in July 2012 and is co-financed by SECO, MOEPP, MAFWE, and the municipalities of the Bregalnica region.

- Timeline (start/end)

The Bregalnica River Basin Management Project is implemented between 2012 and 2016.

- Resources

The Project started in July 2012 and is co-financed by SECO, MOEPP, MAFWE and the municipalities of the Bregalnica region.

- Brief description

MOEPP, MAFWE and SECO selected the Bregalnica river basin as pilot region to apply the RBM approach. The Project started in July 2012 and is co-financed by SECO, MOEPP, MAFWE, and the municipalities of the Bregalnica region.

As surface water resources, the region features the Bregalnica River and its 12 tributaries, six reservoirs and two main irrigation canals. Further the basin includes five groundwater bodies, typically in the form of unconfined aquifers in unconsolidated sediments. The Bregalnica watershed borders with Bulgaria in the east, Strumica River catchment in the south, Pcinja River in the north, and Vardar River in the west. The average altitude of the Bregalnica watershed is 722 m a.s.l. Protected areas have not been legally proclaimed so far. 15 municipalities have a significant share in the basin, including all of the East Planning Region.
The main objective of the project is the sustainable management of the water resources in the Bregalnica river basin, by this promoting the economic development of the region, stimulating industry, agriculture and tourism. The enforcement of the The Former Yugoslav Republic of Macedonia water law through the project should bring about the improvement of the water and sanitation services in the Bregalnica River Basin.

- Results (so far) and lessons learned

The Report documents the results from the surveillance monitoring for both surface water and groundwater. Corresponding to the pressures, high phosphorous levels and high level of nitrites were found widely spread in the surface waters of the basin which cause eutrophicated reservoirs, resulting in a bad ecological status. Further, relatively low heavy metal concentrations were measured with exceptions of zinc, copper, lead and manganese in several surface water bodies. In addition, high concentrations of phthalates were found in surface waters of the entire Bregalnica river basin, including the heavily modified water bodies. In groundwater, high phosphorus concentrations were detected, in conjunction with low levels of dissolved oxygen and high levels of nitrates. Nitrogen pesticides and polycyclic aromatic hydrocarbons were also found to be widespread in the Bregalnica groundwater bodies.
The environmental objectives are firstly to avoid the further deterioration of the status of the water bodies in the Bregalnica catchment, and secondly to achieve a good status or a good environmental potential for all water bodies, while acknowledging that for some water bodies less stringent objectives or exemptions from the interdiction of further deterioration might have to be made. A good status and environmental potential shall be achieved gradually and in line with the goals set forth by The Former Yugoslav Republic of Macedonia Water Law.
***(Source:** http://www.moepp.gov.mk/wp-content/uploads/2015/01/RBMP_Bregalnica_Final.pdf)*

IV River Basin Management Plan for Vardar

The The Former Yugoslav Republic of Macedonia and Greece share the basin of the Vardar/Axios River. The transboundary Lake Dojran is located in this basin.

The river has its source in the Shara massif — a mountainous area between Albania and the The Former Yugoslav Republic of Macedonia — and empties into the Aegean Sea (Mediterranean Sea) at Thermaikos Gulf (Greece). The total length of the river is 389 km, with 87 km being in Greece. The river has a pronounced mountainous character, with an average

elevation of about 790 m a.s.l.

Water is abstracted for irrigation (63%), fishponds (11%) and drinking water (12%), as well as for municipal and industrial uses (15%). There is an overuse of water in many parts of the river basin, mainly for agricultural purposes. In the The Former Yugoslav Republic of Macedonia, extensive and severe increases in abstraction from the Gevgelija/Axios-Vardar aquifer (No. 137) have resulted in the decline of groundwater levels, reduction in borehole yields, severe reduction of baseflow and spring flow locally, and degradation of ecosystems. According to the The Former Yugoslav Republic of Macedonia the observed impacts are also due to pressures at transboundary level.

The main pressure on water resources in terms of quality stems from agriculture. In the The Former Yugoslav Republic of Macedonia crop production and animal husbandry is practiced in river valleys, especially the Pelagonija, Polog and Kumanovo valleys, as well as in the whole Bregalnica catchment area.

The implementation of the WFD — in progress in both countries, but Greece, being an EU member State, is much ahead in this respect — is expected to improve the status of the system in the long term.

Implementation of good agricultural practices and public awareness are necessary measures in Greece, and abstraction controls and monitoring need to be improved. More efficient groundwater and lake water use, monitoring of lake and aquifer water quantity and quality, raising public awareness, defining protection zones, and carrying out vulnerability mapping, as well as wastewater treatment, need to be improved in the The Former Yugoslav Republic of Macedonia. Data exchange is deemed necessary by both countries.

V Struma/Strymonas River Basin

- Name and focus

The ecosystem of the Strumica River Basin plays an essential role in sustaining the livelihoods and wellbeing of some 124,500 people in the region. It provides a vital source of water for drinking and for agriculture, which is the chief source of income for the majority of the population.

- Fields/sectors of focus considered

The accumulated pressures (described in *Focus (of conflict resolution) adopted*) have made the ecosystem especially vulnerable to climate change, which is causing higher temperatures and extreme weather events. These bring the risk of an extreme scarcity of water that could jeopardize the livelihoods of the region’s farming families.

- Geographical area

The basin of the Struma/Strymonas River is typically considered to be shared by Bulgaria and Greece. The shares of Serbia and the The Former Yugoslav Republic of Macedonia in the total

basin area are small. The river has its source in western Bulgaria (Vitosha Mountain, south of Sofia) and ends in the Aegean Sea (Strymonikos Gulf – Greece). Covering almost seven per cent of the economy's territory (with a total area of 1,649 km^2), this valuable but fragile ecosystem also provides a vital habitat for a large variety of animal and plant species.

- Institutions involved (Implementer, supporter, donor)

Donor: Swiss Agency for Development and Cooperation (SDC)
Counterparts in the Economy: Ministry of Environment and Physical Planning, Ministry of Agriculture, Forestry and Water Economy, Basin's municipalities (Strumica, Radovis, Vasilevo, Bosilovo, Novo Selo and Konce), Center for Development of Southeast Region, Hydrometeorological Institute, water management entities (Water Management Organization, public utility enterprises), Public Forest Enterprise, Crisis Management Center and Directorate for Protection and Rescue, farmers associations and other NGOs.

- Timeline (start/end)

Project dates: 01 July 2015 – 30 June 2021

- Resources

Total Budget: 2,940,000 CHF

- Focus (of conflict resolution) adopted

The health of the Strumica River Basin ecosystem has been under threat in recent decades from pollution and rising demand for water from farming, industry and growing urban centers. Unsustainable farming practices, including excessive use of fertilizers and pesticides to grow vegetables and fruits and inefficient irrigation methods, have undermined water quality. Demand for water from industry and towns, together with the current operating regimes of reservoirs, have exacerbated fluctuations in water levels, increasing the risk of droughts and floods.

- Results (so far) and lessons learned

VI Open Regional Fund for South East Europe – Energy Efficiency

- Name and focus - Open Regional Fund for South East Europe – Energy Efficiency (source: https://www.giz.de/expertise/downloads/giz2016-en-orf-energieeffizienz-suedosteuropa.pdf)

- Fields/sectors of focus considered – Energy Efficiency and capacity building

- Geographical area - Albania, Bosnia and Herzegovina, Kosovo*, The Former Yugoslav Republic of Macedonia, Montenegro and Serbia and Croatia as a model economy

- Institutions involved (Implementer, supporter, donor) - Commissioned by German Federal Ministry for Economic Cooperation and Development (BMZ); Lead executing agency Regional Cooperation Council (RCC);

- Timeline (start/end) – 2015-2018

- Resources - 13,8 Mio Euro (incl. 1,98 Mio Euro from EU)

- Brief description - The goal of the ORF-EE is to establish regional networks of energy related institutions in South-East Europe as drivers of innovation. The regional networks, supported by the ORF-EE, independently share their experiences of implementing energy efficiency measures and address issues of common interest. In doing so, they contribute towards a more effective implementation of energy efficiency policies in their respective countries.

- Focus (of conflict resolution) adopted - Energy in the countries of South-East Europe (SEE) is being wasted on large scale. This is harming the region's economic competitiveness, social stability, and environment. SEE countries are increasingly recognizing the importance of energy efficiency for ensuring a viable sustainable future. Striving to join the European Union has encouraged them to make European energy and climate protection policy aims their own, and they are incorporating the corresponding elements of the acquis communautaire step by step into their own legislation.

- Results (so far) and lessons learned - With the support of the ORF-EE, the Network of Energy-Efficient Capital Cities in South-Eastern Europe has been established. It is comprised of the cities of Zagreb, Sarajevo, Podgorica, Skopje and Tirana. Support for this network is also being provided by the German model city of Freiburg. All of the partner cities have joined the European Covenant of Mayors initiative and undertaken to reduce their CO_2 emissions by at least 20% by 2020. They have established energy management structures and developed Sustainable Energy Action Plans.

VII Lepenec River protection via Introduction of Integrated Water Management

-Name and focus - Lepenec River protection via Introduction of Integrated Water Management

(source: http://documents.rec.org/offices/projects/204_project_info_lepenec.pdf)

-Fields/sectors of focus considered - Project compliments the overall objective of the ENVSEC Initiative for contribution to the reduction of environment and security risks and increased cooperation on the environment and security issues both between and within countries of the SEE Region. Specifically, it contributes directly to the objectives under the second component of ENVSEC Programme for SEE region for improvement of management of natural resources.

-Geographical area – The Former Yugoslav Republic of Macedonia and Kosovo*

-Institutions involved (Implementer, supporter, donor) - The project is implemented by Regional Environmental Centre (REC) –Office in The Former Yugoslav Republic of Macedonia and Office in Kosovo*. The beneficiaries of the project are the Ministry of environment and physical planning of The Former Yugoslav Republic of Macedonia and Ministry of environment and physical planning Kosovo*.

-Timeline (start/end) - 2014

-Resources – Project is funded under the ENVSEC Initiative by the Government of Finland (total amount: 54,616 EUR

-Brief description - The project aim is to strengthen the environmental governance of both countries - The Former Yugoslav Republic of Macedonia and Kosovo* that share the water resources of the Lepenec River. The countries also share the understanding that cooperation on issues of common interest, such as management of shared natural resources where they also share the responsibility for their wise, sensible and sustainable use is essential for their good bilateral cooperation.

-Focus (of conflict resolution) adopted:

Data gaps and uncertainties Water quality:

- Monitoring is not in line with the WFD Data on hydro morphology and hydro morphology changes is incomplete;
- Interaction between hydro morphology and eco-system is unclear WBs delineation is pending;
- Typology and WBs delineation not harmonized;
- Data for assessment of impacts over surface water requires significant update;
- Groundwater quality data missing; some quantity data exists in The Former Yugoslav Republic of Macedonia;
- Identification of GWBs is pending;
- Data on influence of different pressures to the GWBs requires significant update;
- Data on economic analyses of water use is not available.

- Results (so far) and lessons learned:

- Held 3 preparatory state meetings in riparian countries;
- Held 3 meetings of the Water Expert Group;
- Two pairs of engaged consultants developed LRB AR REC compiled the LRB ARs into a Joint LRB AR Skopje, 17.11.2014

VII Integrated Ecosystem Management in the Transboundary Prespa Park Region

- Name and focus - Integrated Ecosystem Management in the Transboundary Prespa Park Region
  (source:https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&ved=0ahUKEwj_qKuHjLaAhUE3qQKHX9wAG0QFgg5MAI&url=https%3A%2F%2Fiwlearn.net%2Fresolveuid%2Fcc55e73333a592c6f7ce040a7f6126df&usg=AOvVaw25EWH61iwFQKcnViP9QOl5)
- Fields/sectors of focus considered - Multiple Focal Area: International Waters & Biodiversity (also expected to produce Climate Change benefits)
- Geographical area – The Former Yugoslav Republic of Macedonia, Greece and Albania
- Institutions involved (Implementer, supporter, donor) –
  Funding Sourcing Trust Fund
  Implementing Agencies: United Nations Development Programme
  Executing Agencies: Ministries of Environment of The Former Yugoslav Republic of Macedonia, Albania and Greece
- Timeline (start/end) - Project Approved for Implementation - 30 Jan 2006;
  Project closed - 31 Mar 2012;
- Resources - 13,147,000.00 USD
- Brief description - The overall goal of this project is the conservation of globally significant biological diversity and transboundary water resources of the Prespa lakes Basin. The project's objective is to catalyse the adoption of integrated ecosystem management (IEM) in the transboundary Prespa Lakes Basin of The Former Yugoslav Republic of Macedonia, Albania, and Greece to conserve globally significant biodiversity, mitigate pollution of the transboundary lakes, and provide a sustainable basis for the Basin's further social and economic development.
- Focus (of conflict resolution) adopted:

The ecological integrity of the Prespa Park region is currently threatened by inappropriate land and natural resource use, which can be broken down into a number of factors including:

- Non-existent or inappropriate water management;
- large-scale forest destruction and erosion;
- overgrazing;
- over-exploitation of medicinal plants, fisheries and other natural resources;
- ecologically unsound irrigation practices;
- water and soil contamination from uncontrolled use of pesticides, raw sewage disposal and lake siltation;
- uncontrolled urban and other forms of development;
- pressure from increasing and uncontrolled tourism development

The threats to the Prespa ecosystem identified above have been caused as a result of

the following underlying or root causes, which are affecting all or parts of region:

- lack of integrated planning and weak inter-sectoral co-ordination;
- limited management and enforcement capacity;
- lack of financial and technical resources for ecosystem management and
- conservation;
- regulatory frameworks and policies not harmonized or co-ordinated among sectors and between the three countries;
- lack of co-ordination among the three countries to address transboundary issues and management needs of the region as an integrated ecosystem unit;
- limited income generation opportunities leading to unsustainable use of natural resources and pressure on the ecosystem;
- limited incentives or disincentives to prevent or control environmentally unsustainable practices;
- lack of awareness among key stakeholders and general public about the ecological values of the region, their potential, and the corresponding need for their preservation.

- Results (so far) and lessons learned

  Expected Outputs and Activities of Full Project:

  - Outcome 1: Ecosystem values protected through effective land-use planning, PA management and integrated water resources management;
  - Outcome 2: Enhanced awareness and understanding of the ecological values of the region among public at the local and state levels and to promote sustainable local development;
  - Outcome 3: An enabling environment developed for sustainable development in the Prespa Park region through appropriate policies, incentives, financing mechanisms and strengthened inter-sectoral co-ordination;
  - Outcome 4: Mechanisms for transboundary co-operation strengthened through the capacity building of the PPCC and its Secretariat and exploring options for establishment of a more permanent regional commission.

IX Conservation and sustainable use of biodiversity at Lakes Prespa, Ohrid and Shkodra/Skadar (CSBL)

- Name and focus – “Conservation and sustainable use of biodiversity at Lakes Prespa, Ohrid and Shkodra/Skadar (CSBL)” (source: https://www.giz.de/en/downloads/giz2016-en-initial-characterization-prespa-ohrid-shkodra-skadar.pdf)
- Fields/sectors of focus considered - The lakes’ natural resources are managed on a transboundary basis and in compliance with EU environmental and biodiversity protection targets.

- Geographical area - South-East Europe (The Former Yugoslav Republic of Macedonia, Greece and Albania)
- Institutions involved (Implementer, supporter, donor) - German Federal Ministry for Economic Cooperation and Development (BMZ); **Lead executing agency:** The ministries responsible for environmental protection and nature conservation in Albania, The Former Yugoslav Republic of Macedonia and Montenegro
- Timeline (start/end) - 2012 to 2017
- Resources - German Federal Ministry for Economic Cooperation and Development (BMZ)
- Brief description - The three large lakes of the western Balkans, Ohrid, Prespa and Shkodra, are part of the greater Drin River Basin and are shared by Albania, Greece, The Former Yugoslav Republic of Macedonia and Montenegro. The lakes have an abundance of rare flora and fauna, making them an important part of Europe's natural heritage. Although they are largely protected under nature conservation laws, the loss of biodiversity continues. Water quality, on the one hand, is deteriorating owing to municipal waste water and fertilisers from farming. On the other hand, more and more buildings are being constructed in the areas along the lakeshores and surfaces paved over. Some areas are suffering from the effects of intensive tourism and overfishing. The project aims to develop expertise and strengthen inter-ministerial cooperation, thereby supporting the ministries and downstream authorities responsible for the environment, water management and fisheries in their efforts to implement the WFD and EU nature conservation legislation. Support for the fishing sector is being provided by the Institute of Inland Fisheries in Potsdam-Sacrow.
- Focus (of conflict resolution) adopted – Pressures such as pollution, water abstraction or morphological alterations of water bodies are identified based on official data from state administrations. Point sources of pollution such as direct discharges from waste water treatment plants must be monitored. Data from compulsory self-monitoring and monitoring under state control provide a sound basis for the assessment of pollutant loads in lakes and rivers.

Results (so far) and lessons learned - GIZ has provided support to ministries, authorities, organisations, research institutes and resource users in setting up working groups for the WFD, nature conservation and fisheries. These working groups provide a forum for regional and transboundary cooperation spanning all lakes and act as platforms for knowledge and learning. They oversee implementation of inspection and monitoring programmes in compliance with the WFD and EU nature conservation legislation. They also propose measures for using natural resources sustainably, protecting biodiversity and improving the ecological status of the lakes. Over the long term, they will be incorporated into the structure of the Drin Core Group.

2.1.8. Climate change adaptation

The legal framework on climate change currently falls under the Law on Environment, including the details for the development of state GHG inventories. In the past decade, a number of other laws, regulations and strategies that incorporate mitigation considerations have been adopted.

The First Communication on Climate Change was adopted by the Government of the The Former Yugoslav Republic of Macedonia and submitted to the UNFCCC Secretariat in 2003 and the Second Communication on Climate Change in 2008. The Third Communication on Climate Change was prepared in 2014.

The recommendations of the climate change reports (Second Climate Change Communication adopted in December 2008 and Strategy for Clean Development Mechanism for the first period of obligations under the Kyoto Protocol, 2008–2012, adopted in February 2006) are being integrated into other strategic and planning documents at state level, e.g. the Strategy for Sustainable Development, the Waste Strategy, Environmental health plan and Environmental Approximation Strategy.

Other strategic documents where climate change is being addressed include the Third Environmental Action Plan, the Strategy for Adapting to EU, the Strategy for Investment in the Environment, the draft Strategy for Complex Energy Development, Renewable Energy Sources Strategy of The Former Yugoslav Republic of Macedonia until 2020, the "Strategy for Energy Development in the The Former Yugoslav Republic of Macedonia for the Period 2008-2020 with a Vision to 2030" and Health Strategy for Climate Change Adaptation in Health Sector (NHSAHS).

Climate change indicators have been developed and climate change was analysed for the report on the state of the environment 2010.

The Ministry of Environment and Physical Planning (MOEPP) has been designated as the state Focal Point to the UNFCCC and the state Authority for the implementation of the Kyoto Protocol has been designated.

At the highest level, the Government has established the state Committee for the Climate Change (NCCP) as an advisory body for policy-making related to climate change issues. It is composed of thirteen representatives of key governmental agencies, non-governmental organizations, private entities and academia. The Committee is chaired by a representative of The Former Yugoslav Republic of Macedonia Academy of Science and Arts.

Other ministries that have responsibilities related to climate change aspects are:

- the Ministry of Agriculture, Forestry and Water Economy,
- the Ministry of Economy,

- the Ministry of Transport and Communication,
- the Ministry of Health and
- the Ministry of Finance.

The state Committee on Climate Change (NCCC) has been established by the Government and is a comprehensive political platform that provides a high level of support for the development and implementation of climate change activities. It consists of representatives nominated by key stakeholders, i.e. from institutions, academic institutions, the private sector and civil society and climate change coordinators appointed by ministries. The technical group in the Council for Sustainable Development, as well as other key stakeholders from the government and civil society, also participate in the process of creating policies related to climate change.

The Office of the Deputy Prime Minister for Economic Affairs is responsible for achieving the goals of sustainable development and is also a state designated entity for the Green Climate Fund (GCF).

The Ministry of Health is in charge of the adaptation of the health sector to the effects of climate change. The prevention or reduction of the possible consequences on human health is carried out in cooperation with other relevant institutions.

The Technical Group at the Sustainable Development Council also participates in this process as well as other key stakeholders in government and in civil society.

Figure 26 presents the different authorities and stakeholders involved in developing climate change policy.

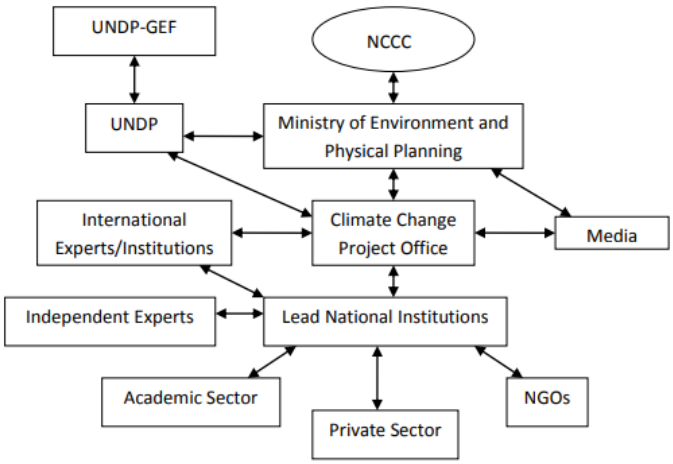


Figure 39 Relevant authorities and stakeholders included into climate change issues[38].

The international agreements for global environmental issues, such as climate change, include the principle of sustainable development and the precautionary principle. These are

incorporated in the environmental legislation and provide the foundation for political decisions for climate change issues.

In the Strategy for Sustainable Development, the issue of climate change is identified as one of the key issues which affect several sectors such as energy, agriculture, industry, health, etc.

In the Sustainable Development Strategy titled “Climate Change and Clean Energy”, it is required to integrate climate change mitigation into energy planning. In the Energy Strategy, the strong connection between energy sector and climate change has been recognized. Further coordination with the Ministry of Environment and Physical Planning, as the institution responsible for climate change, is required, as well as appropriate harmonization of the strategic and legislative solutions in the energy field with the strategic and legislative solutions for climate action. This Strategy has no conflicts with climate change.

Priority adaption measures in water sector focus on the development and improvement of water storage and supply infrastructure; coordination of water use; introduction of water saving measures; improvements in water supply and technology in the agriculture and industry sectors; pricing and management measures for the energy sector; and measures for disaster risk reduction.

In the agriculture sector, changes to irrigation and sowing could produce substantially improved yields of wheat and maize in the south-east region of the economy under future climate change. These high yield scenarios also place a great demand on water resources.

The Renewable Energy Sources Strategy of The Former Yugoslav Republic of Macedonia until 2020 envisages a total reduction of greenhouse gas emissions annually, which can be achieved by RES, amounting to about 1,700 kt CO2-eq. This Strategy has no conflicts with climate change.

The Climate change Health Adaptation Strategy and Action Plan (2011) establishes an integrated, efficient and effective approach for prevention, early warning, management and overcoming of the effects of climate change due to heat waves, increased UV radiation, floods and fires. Overcoming the climate change health consequences connected to air pollution and cold weather during winter by establishing control and preventive measures is the main objectives of the strategy. In addition, it addresses the control and prevention of allergic diseases caused by pollen in the context of climate change. The Climate change Health Adaptation Strategy has low conflict with climate change.

The Former Yugoslav Republic of Macedonia has developed a Strategy for protection and rescue for the period 2014-2018 to address flood events from natural watercourses and from dams and artificial reservoirs. The strategy specifies the responsible institutions and bodies during flood events.

Policy or strategic document	Level of conflicts with climate change adaptation strategies	Policies or measures
Sustainable Development Strategy	No	-Integration of climate change mitigation into the energy planning - harmonization of the strategic and legislative solutions in the energy field with the strategic and legislative solutions for climate action
Renewable Energy Sources Strategy of The Former Yugoslav Republic of Macedonia until 2020	No	Activities and measures targeting increased share of renewable energy sources, measures and activities to increase energy efficiency of final energy consumption
Climate change Health Adaptation Strategy and Action Plan	Low	- Establishment of control and preventive measures from health consequences connected with air pollution and cold weather during winter. - Establishment of an integrated, efficient and effective approach for prevention, early warning, management and overcoming of the effects of climate change connected to floods and fires, - Establishment of an integrated, efficient and effective approach for prevention, early warning, management and overcoming of the effects of climate change due to heat-waves, -Control and prevention of allergic diseases caused by pollen in the context of climate change

Table 8 Policy documents and their possible conflicts with the Climate Change Adaptation Strategy

The table has been prepared based on an analysis of documents related to climate change, which includes measures and activities that will lead to the reduction of climate change.

2.1.9. Nexus-related overview of Transboundary basins/ aquifers

Transboundary basins/aquifers relevant for The Former Yugoslav Republic of Macedonia (Figure 32) are the following:

- Prespa and Ohrid Lake aquifer (134),
- Sandansky-Petrich aquifer (139),
- Petrich valley aquifer (141),
- Pelagonia- Florina/Bitolsko aquifer (145)
- Korab/Bistra – Stogovo aquifer (158),
- Jablanica/Golobordo aquifer (159),
- Systima Doiranis (226),
- Systima Axiou (227),
- The Former Yugoslav Republic of Macedonia - SW Serbia (231),
- The Former Yugoslav Republic of Macedonia - Central Serbia (232), and
- Tetovo-Gostivar (233).

Figure 40 Transboundary aquifers in the region[39]

Trans boundary basins and aquifers identified in the SEE2020 region relevant for The Former Yugoslav Republic of Macedonia are presented in the Table 7.

Transboundary river basins	Aquifers	Countries/economies covered
Drin	Beli Drim/Drini Bardhe (Albania, Kosovo*), Prespa and Ohrid Lakes (Albania, Greece, The Former Yugoslav Republic of Macedonia), Skadar/Shkoder Lake, Dinaric east coast aquifer (Albania, Montenegro)	Albania, Greece, Kosovo*, The Former Yugoslav Republic of Macedonia, Montenegro
Vardar/Axios	Gevgelija/Axios-Vardar, Dojran Lake (Greece, The Former Yugoslav Republic of Macedonia)	Greece, The Former Yugoslav Republic of Macedonia
Struma/Stymonas	Sandansky-Petrich (Bulgaria, Greece, The Former Yugoslav Republic of Macedonia),	Bulgaria, Greece, The Former Yugoslav Republic of Macedonia, RS
	Pelagonia-Florina/Bitolsko	Greece, The Former Yugoslav Republic of Macedonia
	Korab/Bistra – Stogovo, Jablanica/Golobordo	Albania, The Former Yugoslav Republic of Macedonia

Table 9 Trans boundary basins and aquifers have been identified in the SEE2020 region relevant for the The Former Yugoslav Republic of Macedonia[40]

The Former Yugoslav Republic of Macedonia is a Party of the following international agreements relevant to trans boundary water management

- Convention on environmental impact assessment in a trans boundary context (Espoo, 1991)
- Convention on the trans boundary effects of industrial accidents (Helsinki, 1992)
- Convention on access to information, public participation in decision-making and access to Justice in environmental matters (Aarhus, 1998)
- Protocol on pollutant release and transfer registers (to the convention on public participation, Kyiv, 2003)
- convention on wetlands of international importance especially as waterfowl habitat (Ramsar, 1971)

The arrangements at the transboundary level for the management of the basins and aquifers signed between The Former Yugoslav Republic of Macedonia and other neighbouring countries include:

a. **Drin river Basin** - Albania, The Former Yugoslav Republic of Macedonia, Greece, and the European Commission signed an agreement on the protection and sustainable development of the Prespa Park Area in February 2010. The Petersberg Phase II/Athens Declaration Process (coordinated by Germany, Greece and the World Bank, supported technically and administratively by GWP Med), acting in cooperation with UNECE, GEF and UNDP, facilitates a regional multi-stakeholder dialogue process, aiming to explore possibilities of moving the level of cooperation from the sub-basin to the Drin Basin level.
b. **Ohrid Lake** - Cooperation between Albania and the The Former Yugoslav Republic of Macedonia on Lake Ohrid was formalized through the signing of the Agreement for the *Protection and Sustainable Development of Lake Ohrid* and its Watershed by the Prime Ministers of the two countries in 2004. The Lake Ohrid Watershed Committee was established in 2005.

1. GEF Drin Project "Enabling Trans boundary Cooperation and Integrated Water Resources Management in the Extended Drin River Basin"

GEF supported the Project "Enabling transboundary cooperation and integrated water resources management in the extended Drin River Basin".

The main objective of the project is to reach a point in the future where the scale of management shifts from single water bodies to the hydrological interconnected system of the Drin Basin, eventually leading from the sharing of waters among riparian countries and conflicting uses, to the sharing of benefits among stakeholders in an area that is physically, culturally and historically interconnected;

Albania, Greece, The Former Yugoslav Republic of Macedonia, Kosovo* and Montenegro share the Drin Basin.

The project is implemented by the UNDP and executed by the Global Water Partnership (GWP) through GWP-Mediterranean (GWP-Med) in cooperation with the United Nations Economic Commission for Europe (UNECE). GWP-Med is responsible for the realization of the project. The Drin Core Group is the Steering Committee (SC) of the project. It is managed by a Project Coordination Unit (PCU), based in Tirana, Albania.

The project was endorsed by the GEF CEO on 17 October 2014 and started in 2015. UNDP is the implementing agency and UNOPS, UNECE and GWP-Med the executing partners of the project.

2. Prespa Watershed Management Plan represents an initial stage in The Former Yugoslav Republic of Macedonia's efforts to further EU accession by applying the principles of the Water Framework Directive in the water management sector. The project focuses on the watershed of Macro Prespa Lake.

The objective of the on-going GEF/UNDP Prespa Transboundary Project is to mainstream ecosystem management objectives and priorities into sector practices and policies. The project is designed to strengthen capacity for restoring the health of the ecosystem and conserving biodiversity at local, state and trans-boundary levels in the three neighbouring states in the Prespa region by piloting ecosystem-oriented approaches to main productive sector practices within the basin, including land-use/spatial planning, water management, agriculture, forest and fishery management, conservation and protected area management.
The project "Prespa Watershed Management Plan" started in 2009 as part of the GEF/UNDP Prespa Park Project, following several years of preparation.

The results of the project:

- 16 watercourses have been identified as water bodies: 13 water bodies as rivers; 1 heavily modified water body; and 2 artificial water bodies.
- Prespa Lake is delineated as a single transboundary water body. Six groundwater bodies have been identified in the Prespa region.
- Aninitial 12-month comprehensive surveillance monitoring of the water quality and ecological status has been conducted for all the identified/delineated water bodies and reference conditions have been established. The pressures on water bodies from both natural and anthropogenic origins have been extensively identified and analysed.
- The status (including biological, hydro morphological and physico-chemical quality elements) of all the water bodies in Prespa region has been determined.

- Based on a problem and gap analysis, a comprehensive programme of 45 Measures for achieving the set objectives has been developed, aimed primarily at resolving technical and environmental issues and problems in the region.

An economic analysis has been made of the proposed Programme of Measures.

Partners involved in the projects are: MOEPP (Executing Agency), UNDP (Implementing Agency) and GEF (Donor).

3. River Basin Management Plan for Bregalnica

The main objective of the project is the sustainable management of the water resources in the Bregalnica river basin by promoting the economic development of the region, stimulating industry, agriculture and tourism. The enforcement of the The Former Yugoslav Republic of Macedonia water law through the project should bring about the improvement of the water and sanitation services in the Bregalnica River Basin.
Responsible Authorities:

1. Ministry of Environment and Physical Planning, Office for Environment and Water, Water Department
2. Ministry of Agriculture, Forestry and Water Economy, Water Economy Directorate

MOEPP, MAFWE and SECO selected the Bregalnica river basin as pilot region to apply the RBM approach. The Project started in July 2012 and is co-financed by SECO, MOEPP, MAFWE, and the municipalities of the Bregalnica region.

The environmental objectives for the Bregalnica catchment are to avoid the deterioration of the status of its water bodies and to achieve a good status or a good environmental potential for all its water bodies. In line with the EU WFD (Art. 4.4), a phased achievement of environmental objectives for different water bodies in the Bregalnica catchment is targeted, with the following deadlines: end of year 2015; end of year 2021; and end of year 2027. The phased approach is based on the technical feasibility of measures, their costs and the natural conditions regarding timely improvement of status in the different water bodies.

The agricultural sector is an important source of diffuse pollution in the Bregalnica catchment. Considering the present land use, it can be concluded that the areas with rice fields, greenhouses or permanent cultivations are the main sources for the diffuse pollution of the water. The top ten priorities for managing these pressures from households, industry, agriculture and other sectors to achieve the environmental objectives were identified.

Ecosystems (terrestrial and aquatic), are addressed in the Plan regarding their protection.

4. River Basin Management Plan for Vardar (on going)

The The Former Yugoslav Republic of Macedonia and Greece share the basin of the Vardar/Axios River. The transboundary Lake Dojran is located in this basin.

Water is abstracted for irrigation (63%), fishponds (11%) and drinking water (12%), as well as for municipal and industrial uses (15%). There is an overuse of water in many parts of the river basin, mainly for agricultural purposes. In The Former Yugoslav Republic of Macedonia, extensive and severe increases in abstraction from the Gevgelija/Axios-Vardar aquifer (No. 137) have resulted in the decline of groundwater levels, reduction in borehole yields, severe reduction of baseflow and spring flow locally and degradation of ecosystems. The observed impacts are also due to pressures at transboundary level.

Implementation of good agricultural practices and public awareness are necessary measures in Greece, and abstraction controls and monitoring need to be improved. More efficient groundwater and lake water use, monitoring of lake and aquifer water quantity and quality, raising public awareness, defining protection zones, and carrying out vulnerability mapping, as well as wastewater treatment, need to be improved in The Former Yugoslav Republic of Macedonia. Data exchange is deemed necessary by both economies.

Development of the initial elements of the River Basin Management Plan of Vardar River is expected to be done in the frame of the EU/IPA project starting in May 2017; the project is still on-going.

5. Struma River Basin

Donor: Swiss Agency for Development and Cooperation (SDC)

Total Budget: 2,940,000 CHF

Project dates: 01 July 2015 – 30 June 2021

Counterparts within the Economy: Ministry of Environment and Physical Planning, Ministry of Agriculture, Forestry and Water Economy, Basin's municipalities (Strumica, Radovis, Vasilevo, Bosilovo, Novo Selo and Konce), Center for Development of Southeast Region, Hydrometeorological Institute, water management entities (Water Management Organization, public utility enterprises), Public Forest Enterprise, Crisis Management Center and Directorate for Protection and Rescue, farmers associations and other NGOs.

The styate and transboundary level "nexus-related" (any combination of the fields/sectors of focus) studies, assessments etc. are presented in Table 9:

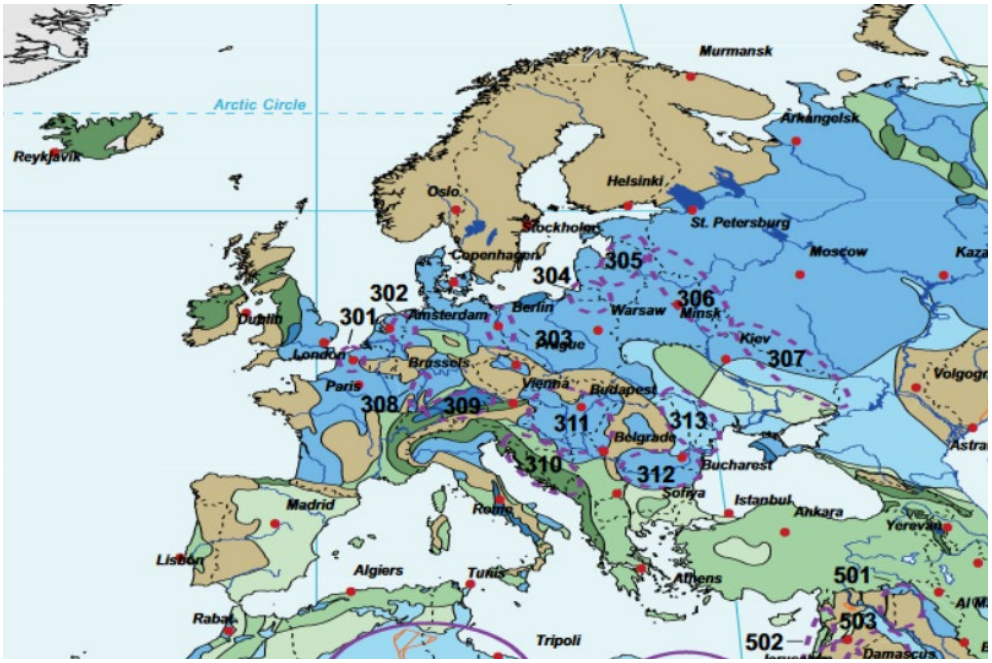
Document	Deneficiary institutions /involved parties in preparation	Geographic area	Date	source
Climate Change Action Plan	- Ministry of Environment and Physical Planning – MOEPP (MOEPP is also	The Former Yugoslav Republic of Macedonia	2013	Third communication on climate change http://unfccc.org.mk/conte

Document	Deneficiary institutions /involved parties in preparation	Geographic area	Date	source
	Designated state Authority – DNA for the Clean Development Mechanism - Climate Change Committee, - Climate Change Project Office, - UNDP, - GEF, - academic sector, - NGOs, - independent experts, - international experts/Institutions, - private sector, media			nt/Documents/TNC/TNC-Summary_ENG.pdf
Management Plan for Prespa Lake Basin as part of the Project ("Integrated ecosystem in the Lake Prespa in Albania, Mac he Lake Prespa in Albania, The Former Yugoslav Republic of Macedonia and Greece	- MOEPP; - Municipality of Resen; - Forest Enterprise - Ministry of Agriculture, the Forestry and Water Economy; - Farmers Association for Resen; - NGO representative; - Protected Area Manager(s); - Fishermen's Association for Prespa; - the Public Water Management Authority for Resen; - Ministry of Transport and Communications; and - Ministry of Foreign Affairs.	Albania, The Former Yugoslav Republic of Macedonia, Greece	2012	Prespa Lakes Basin Strategic Action Programme http://www.lakeprespa.mk/content/Publications/Prespa%20Lakes%20Basin(1).pdf
Regional Project "Protection and sustainable use of biodiversity in the Protection and sustainable use of biodiversity in the territory of Lakes: Ohrid, Prespa and Shkodra."	- Coordinator CSBL Ermira Kocu; - Experts groups, - part of the Technical Working Group	The Former Yugoslav Republic of Macedonia, Albania	2015	Initial Characterisation of Lakes Prespa, Ohrid and Shkodra/Skadar http://www.moepp.gov.mk/wp-content/uploads/2015/01/ICR-3-LAKES-Volume-of-Annexes.pdf
River Basin Management Plan for Bregalnica	- MOEPP and MAFWE, municipalities	The Former Yugoslav Republic of Macedonia, Greece	2016	Bregalnica River Basin Management Project http://www.moepp.gov.mk/wp-content/uploads/2015/01/

Document	Deneficiary institutions /involved parties in preparation	Geographic area	Date	source
				RBMP_Bregalnica_Final.pdf
River Basin Management Plan for Vardar (ongoing)		The Former Yugoslav Republic of Macedonia, Greece		
Enabling Transboundary Cooperation and Integrated Water Resources Management in the Extended Drin River Basin"	- UNOPS, - UNECE and - GWP-Med		2013-2014	http://www.twrm-med.net/southeastern-europe/supported-processes-and-projects/drin-river-basin/gef-project-201cenabling-transboundary-cooperation-and-integrated-water-resources-management-in-the-extended-drin-river-basin201d
River Basin Management Plan for Strumica (ongoing)	- Implemented by UNDP - MoEPP	The Former Yugoslav Republic of Macedonia, (Strumica region)		Restoration of the strumica river basin implementation of the strumica river basin management plan https://info.undp.org/docs/pdc/Documents/MKD/SDC_Progress%20Report_Strumica_January-June%202017.pdf

Table 10: Identified state and transboundary level "nexus-related" studies, assessments

Figure 33 shows the map of the transboundary basins/aquifers.



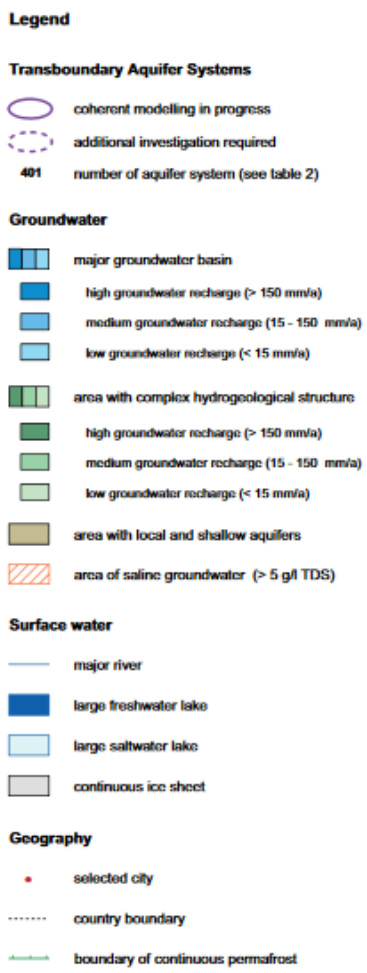


Figure 41 Trans boundary aquifer system[41].

2.1.10. Turning Nexus trade-offs to synergies

In order to avoid trade-offs and foster synergies between the different Nexus policies, regulation, strategies and plans shall promote an early and wide integration of the aspects and concerns of the related Nexus sectors in own developments.

Recent policy developments in the Water and Food/Agriculture sectors show a higher integration of objectives and targets of the other sectors, than Energy or Ecosystems, being the latter focused on ways to minimize the negative impacts of economic development on biodiversity.

	The Former Yugoslav Republic of Macedonia
Water integrates Energy	high
Water integrates Food/Agriculture	high
Water integrates Ecosystems	low
Energy integrates Water	medium
Energy integrates Food/Agriculture	low

	The Former Yugoslav Republic of Macedonia
Energy integrates Ecosystems	no
Food/Agriculture integrates Water	low
Food/Agriculture integrates Energy	no
Food/Agriculture integrates Ecosystems	no
Ecosystems integrates Water	low
Ecosystems integrates Energy	low
Ecosystems integrates Food/Agriculture	low

Figure 42 Integration of Nexus aspects in recent regulation, strategies or plans for the Nexus

Explanation: "high" indicates identification of synergies, "medium" indicates identification and assessment of conflicts, risks and constraints; "low" indicates inclusion of concerns, needs or supply aspects; and "no" none of the previous (only textual mentioning). Note that a more detailed analysis can lead to a higher scoring.

In The Former Yugoslav Republic of Macedonia, the following key references have been identified:

Several pieces of legislation have been reviewed in 2016, namely (i) the Law on Waters transposing the EU WFD which thereby considers other sectors; the (ii) Law on Energy which includes conditions for achieving energy efficiency and the promotion of the use of renewable energy sources; (iii) the Law on Spatial and Urban Planning 2016; (iv) the Law on Agricultural Land which addresses the rational use of agricultural land as a limited natural resource; (v) the Law on Agriculture and Rural Development which refers to the optimal utilization of natural resources with respect to the principles for the protection of nature and the environment; (vi) the Law for Forests which aims to ensure sustainable management, planning, forest management and preservation of forests and forest land in a manner and extent that permanently maintains and promotes their production ability, biodiversity, renewable and vitality in the interest of current and future development of the economic, ecological and social functions of the forest, without disruption of the ecosystem; (vii) the Law on Environment which promotes rational and sustainable utilization of natural resources; (viii) implementation and improvement of measures aimed at addressing regional and global environmental problems; and (ix) the Law on Nature Protection aiming to address spatial planning and organization.

Regarding strategies: The Water Strategy (2012-2042) aims to provide the necessary quantities of water of adequate quality for various purposes, including irrigation i.e. modernization and installation of new equipment, applied water saving techniques and flow control in the main channels and ecosystems. This includes the construction of new hydropower plants. However, the strategy does not provide any further information about the implementation of the proposed activities, their effect on the water abstraction, potential pollution and effects on ecosystems. The objective of the Strategy for the use of renewable energy sources until 2020 is to increase the use of biofuels by 2020 to 10% and by 2030 to 20% from the total fuel consumption in the transport sector; the consequences

of impacts have not been assessed, nor quantified. The Strategy for Agriculture and Rural Development for the period 2014-2020 addresses soil conservation, water efficiency and pollution, as well as conditions for nature protection.

2.1.11. Integration of climate resilience aspects in sector policy, regulation and management

Climate change resilience can be fostered by a varied set of measures addressing aspects like water scarcity, droughts or floods, temperature increase, heat waves, plagues and diseases, and ranging from efficiency increases to changes in production or management. Lists of options for action are usually included in the reporting to the UNFCCC.

Overall, climate change resilience has only partially been included in the sector-specific strategies/plans of the SEE2020 economies including The Former Yugoslav Republic of Macedonia. This can lead to situations where the sectors are not ready to deal appropriately with climate change.

	The Former Yugoslav Republic of Macedonia
Water	low
Energy	low
Food/Agriculture	yes
Ecosystems	no

Table 11 Overview on the integration of climate resilience in recent regulation, strategies or plans in The Former Yugoslav Republic of Macedonia

Explanation: “yes” indicated climate change being integrated; “high” indicates contributions to climate change resilience, “low“ indicates recognition of climate change constraints; and “no” none of the previous (only textual mentioning). For some of the documents, a screening assessment whether the considerations are of ‘high’ or ‘low’ relevance has been carried out.

In The Former Yugoslav Republic of Macedonia, the following integration has been identified:

Whilst the Energy Strategy (2010) contributes to climate change mitigation by fostering renewable energies and efficiency, the strong promotion of hydropower does not assure proper adaptation and increased resilience to the climate change effects e.g. on water availability, in particular bearing in mind the existing water abstraction levels and decreasing flows. The Water Strategy (2012-2042) sets flexible targets in order to adapt to climate change and other pressures built through the water sector. However no overall figures/scenarios are provided for water consumption in the future.

2.1.12. Integration of resource use efficiency aspects

Resource efficiency is an approach to produce more from less input, use resources in a sustainable way, and manage them more efficiently throughout their life cycle. Circular economy is an approach aiming to keep resources within the economy when products no

longer serve their function so that materials can be used again and therefore generate more value (Di Maio et al., 2017); and thereby supports resource use efficiency.

Resource use efficiency is included in the competencies of the sector administrations in place. However, resource efficiency seems to be so far only relevant for the energy sector, and some minor consideration is given to water use efficiency in irrigation, but not to water reuse, as a component of circular economy. Additionally, energy efficiency initiatives are often secondary when compared with the generation of new renewable energy.

	The Former Yugoslav Republic of Macedonia
Water efficiency	yes
Water reuse	no
Renewable energy sources	high
Energy efficiency	yes
Land/soil conservation	yes
Organic farming	yes
Food waste reduction	no

Table 12 Overview on the resource efficiency considerations in recent regulation, strategies or plans in The Former Yugoslav Republic of Macedonia[42]

Under the 'Sustainability Eventually' scenario, the SCENES project proposes significant water abstraction reductions for the electricity and domestic sectors as targets for 2030:

	The Former Yugoslav Republic of Macedonia
Electricity sector	Decrease >25%
Manufacturing sector	Increase >25%
Irrigation	No/slight change
Domestic	Decrease >50%

Table 13 Percentage change in water abstractions for The Former Yugoslav Republic of Macedonia as per the 'Sustainability Eventually' scenario under the SCENES project

The Water Strategy (2012-2042) and the Strategy for agriculture and rural development for the period 2014-2020 both address efficient water use for irrigation purposes. The Strategy for energy development until 2030 includes 'energy efficiency' as one of several topics to be addressed. However, the larger share of the investments is dedicated to promoting renewable energy production, including primarily hydropower. The Former Yugoslav Republic of Macedonia's Third Communication on Climate Change addresses energy efficiency improvements in the building sector, various measures in the transport sector for low carbon fuels, awareness raising for efficient driving, changed travel behaviour, improvement of the vehicle fleet, and advancement of vehicle equipment, as well as improvements in industrial processes for improving energy efficiency. It also refers to the promotion of organic farming as a more efficient agro-system. The 2016 Law on Agricultural Land and the Strategy for Agriculture and Rural Development for the period 2014-2020 address the rational use of agricultural land as a limited natural resource.

2.1.13. Consideration of nature-based solutions

Nature-based solutions are not reflected as a priority within the assessed strategies/plans, and are usually not even reflected.

	The Former Yugoslav Republic of Macedonia
Water	no
Energy	no
Food/Agriculture	no
Ecosystems	no

Table 14 Overview on the consideration of nature-based-solutions in recent regulation, strategies or plans in The Former Yugoslav Republic of Macedonia

The following relevant details for The Former Yugoslav Republic of Macedonia are highlighted:

The Strategy for Agriculture and Rural Development for the period 2014-2020 proposes activities for "green" agriculture, the efficiency of the use of natural energy resources, using water from irrigation systems and protecting irrigation and drainage facilities and application of fertilizers of organic origin and mineral fertilizers.

2.2. The role of international action

International agreements, decisions or actions can influence the way that SEE2020 economies including The Former Yugoslav Republic of Macedonia address the Nexus. There are three main pathways:

- By ratification of international agreements or conventions and the implementation of corresponding action plans;
- Via the process of EU accession, and the subsequent changes in institutions, regulation, planning, financing and management; and
- By means of projects or initiatives developed with the support or involvement of international bodies.

Regarding the first of the three elements, the economy has ratified a large number of Nexus-relevant agreements and conventions. In the frame of this study, the implementation details have not been assessed.

The Former Yugoslav Republic of Macedonia	
Convention on Environmental Impact Assessment in a Transboundary Context	1999
Protocol on Strategic Environmental Assessment	2013
Multilateral Agreement among the Economies of South-Eastern Europe for implementation of the Convention on Environmental Impact Assessment in a Transboundary Context	2011
Rio Convention on Biological Diversity	1997

The Former Yugoslav Republic of Macedonia	
Convention on International Trade in Endangered Species of Wild Fauna and Flora	1999
Convention on Conservation of Migratory Species of Wild Animals	1999
Convention on the Conservation of European Wildlife and Natural Habitats	1997
Helsinki Convention on Watercourses and International Lakes	2015
Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat	1997
Aarhus Convention on access to information, public participation in decision-making and access to Justice in environmental matters	1999
Protocol on pollutant release and transfer registers (to the convention on public participation	2010
United Nations Framework Convention on Climate Change	1997
Kyoto Protocol	2005
Energy Community Agreement	2006
WHO Framework Convention on Tobacco Control	2006

Table 15 International multi- or bilateral agreements/conventions undersigned by The Former Yugoslav Republic of Macedonia in the different Nexus fields (indicating the year of ratification/adoption)

The following table provides an overview on 29 initiatives identified and shows that these initiatives address usually several of the Nexus sectors, and with a strong aspect of capacity building/institutional set-up. In several of the initiatives, resource efficiency, nature-based solutions and climate change adaptation have been addressed. However, this Report does not aim for a full review of the previous studies, thus uncertainties are marked in Table 16.

Institution	Start/End	Nexus-related initiative	Economy	Nexus sectors				Policies			
			The Former Yugoslav Republic of Macedonia	Water	Energy	Food	Ecosystems	Institutional capacity building	Resource efficiency	Nature-based solutions	Climate resilience
GIZ	2008-15	Open regional fund – Energy Efficiency	x	?	x			x	x		?
World Bank	2012-15	Danube Region Water Supply and Wastewater Sector Capacity Building Program	x	x	?			x		?	?
		MoU Environment (No. 591/12)	x	x		x	x	x		?	X
ENVSEC	2014	Lepenc River protection via Introduction of Integrated Water Management	x	x		?	?				
UNDP-GEF/GIZ	2006-12	Integrated ecosystem in Management in the trans boundary Prespa Park Region	x	x			x	x		x	?
GIZ	2012-17	Protection and sustainable use of biodiversity in the territory of Lakes Ohrid, Prespa and Shkodra	x	x			x	x		?	?
SECO	2012-16	River Basin Management Plan for Bregalnica	x	x	?	?	?	?	?	x	?
IPA	2009-	River Basin Management Plan for Vardar	x	x	?	?	?	x	?	?	?
UNDP/GEF	2015-19	Enabling Transboundary Cooperation and Integrated Water Resources Management in the Extended Drin River Basin"	x	x				x[43]			
SDC	2015-21	River Basin Management Plan for Strumica	x	x				?			?
World Bank	?	Green Growth Strategy	x	x	x	x	?	x	?	?	?
EU?	2014-20	IPARD	x	?	?	x	?	?	?	?	?
WWF	2009-?	Activities on establishing Natura 2000		?	?	?	x	x	?	?	?

Institution	Start/End	Nexus-related initiative	Economy	Nexus sectors				Policies			
UNDP/GEF	2010-14	DIKTAS: Protection and Sustainable Use of the Dinaric Karst Aquifer System	x	x	x		x	x	x		X
GEF/UNDP	2009	Prespa Watershed Management Plan	x	x						x	
EU IPA	2017-	River Basin Management Plan for Vardar	x	x						x	
BMZ/RCC	2015-2018	Open Regional Fund for South East Europe – Energy Efficiency	x		x				x		

Table 16 Overview on the current Nexus-related initiatives

Indicating the economy involved and which Nexus elements are being addressed. The table includes also information on which Nexus-relevant key policies the initiative has been active.

2.2.1. Nexus approach in the transboundary water management

The following transboundary basins and aquifers have been identified in the economy and region:

Transboundary river basins	Aquifers	Economies covered
Drin	Beli Drim/Drini Bardhe (Albania, Kosovo*), Prespa and Ohrid Lakes (Albania, Greece, The Former Yugoslav Republic of Macedonia), Skadar/Shkoder Lake, Dinaric east coast aquifer (Albania, Montenegro)	Albania, Greece, Kosovo*, The Former Yugoslav Republic of Macedonia, Montenegro
Vardar/Axios	Gevgelija/Axios-Vardar, Dojran Lake (Greece, The Former Yugoslav Republic of Macedonia)	Greece, The Former Yugoslav Republic of Macedonia
Struma/ Stymonas	Sandansky-Petrich (Bulgaria, Greece, The Former Yugoslav Republic of Macedonia),	Bulgaria, Greece, The Former Yugoslav Republic of Macedonia, Serbia
	Pelagonia-Florina/Bitolsko	Greece, The Former Yugoslav Republic of Macedonia
	Korab/Bistra – Stogovo, Jablanica/Golobordo	Albania, The Former Yugoslav Republic of Macedonia
Velika Morava	Stara Planina/Salasha Montana (Bulgaria, Serbia)	Bulgaria, The Former Yugoslav Republic of Macedonia, Montenegro, Serbia

Table 17 Transboundary river basins and aquifers in the economy

Out of the above list of transboundary river basins or aquifers, those that are transboundary within the SEE2020 economies have been further assessed regarding their Nexus-related conflicts, trade-offs and actions to overcome them, taken at the transboundary water management level:

Transboundary river basins or aquifer	Nexus-related challenges	Transboundary actions taken or planned	Nexus addressed
Drin	The significance of the Drin River and its main tributaries in terms of hydropower production is major, and further developments are planned. The alteration of the hydrological characteristics of the Drin, has had an impact in the distribution of sediments, and on ecosystems supported. Biological corridors that facilitate migration have been interrupted. Abstraction of groundwater in Kosovo* and waste disposal, sanitation and sewer leakage in Albania are the main pressure factors on Beli Drim/Drini Bardhe aquifer. Nitrogen, pesticides and pathogens (only locally in Albania) have been recorded. In the Black Drin sub-basin (The Former Yugoslav Republic of Macedonia), there is extensive cattle production. The expected increase in water demand in the Black Drin sub-basin catchment area for drinking water, irrigation and fisheries will result in increased pressure on the system. Whereas agriculture is the main source of nitrogen and phosphorus in the river system as a whole, the source distribution varies geographically. Agricultural as well as industrial pollution of Lake Skadar,	Pogradec (Albania) newly built sewage collection and treatment facilities, which allow treatment of the wastewaters of some 25,000 inhabitants, with further stages planned, are expected to improve the situation. Reduction of pollution from municipal wastewaters has been achieved in The Former Yugoslav Republic of Macedonia's side of the lake, where a sewerage system was constructed. There are plans for the construction of additional systems in the area. The Former Yugoslav Republic of Macedonia and Albania have harmonized procedures for water quality monitoring in the Lake Ohrid and its tributaries[44]. The 2004 Agreement for Lake Ohrid and its Watershed is operational. Regarding Lake Skadar/Shkodar, wastewater collection and treatment facilities have been constructed in Albania and are planned for the reconstruction of existing facilities in Montenegro (Podgorica). The Skadar/Shkoder Lake Commission has developed work since 2009.	Water and Energy addressed in studies and plans, considering nature-based solutions and climate resilience
Korab/Bistra – Stogovo, Jablanica/Golobordo	In The Former Yugoslav Republic of Macedonia, groundwater abstraction for agriculture can affect the discharge of springs (reduced locally), with transboundary impacts related to groundwater quantity. In Albania, local and moderate degradation of ecosystems is an issue related to the quantity of groundwater.	Improvements are needed in The Former Yugoslav Republic of Macedonia for the monitoring of the aquifer and the protection zone system in place. Measures needed in Albania: detailed hydrogeological and vulnerability mapping, delineation of protection zones, wastewater treatment and public awareness campaigns. Enhanced cooperation, setting up of transboundary institutions and creation of a joint programme for quantity and quality monitoring of the sulfur thermo-mineral springs are needed. Data are exchanged.	No

Table 18 Nexus-relevant challenges and corresponding transboundary actions in river basins and aquifers

2.2.2. Conclusions

The Former Yugoslav Republic of Macedonia has a steady growing economy, with a strong tertiary sector and a slowly declining relevance of the primary sector. Employment is growing, with a growing equality of wealth distribution amongst the population.

Water is a resource of growing scarcity in The Former Yugoslav Republic of Macedonia, which is in the economies with the highest levels of exploitation. Further increased water use is foreseen in the Strategy – in particular for energy and agricultural production – without providing quantitative projections or scenarios, and likely with decreasing water availability due to climate change.

The Former Yugoslav Republic of Macedonia is strongly energy import dependent. It imports its entire demand for oil and petroleum products and natural gas and, starting from 2000, electricity. The energy imports have grown during the past period, and during the latest few years the imports of electricity have grown rapidly.

About half of the total land area is classified as agricultural (1.26 million ha), out of which 40% is cultivated land and 49% permanent pastures. Upland or mountainous forests cover 37% of the economy. Food production in 2016 is based on fruits and vegetables by 51%, followed by grains and cereals by 29% and dairy products with 19%; the economy is a food net importer.

The biodiversity is rich with important endemism (e.g. 150 endemic algae, 120 vascular plants, over 700 invertebrate species and 27 endemic fish species) and the network of protected areas comprises 86 areas, covering 8.9% of the territory. The main causes for biodiversity loss are land abandonment and river regulation, in particular by small hydropower plants.

In the past years, The Former Yugoslav Republic of Macedonia has updated its legislation in all Nexus sectors (Water, Energy, Food and Ecosystems) and included links to the other sectors, thus enabling coordination. The review has been significantly driven by the transposition of EU legislation and the adoption of international agreements and conventions.

The institutional setting of the Nexus sectors in The Former Yugoslav Republic of Macedonia has been established at national and local level; with cooperation established in the regulation. As coordination bodies, a multi-sector Water Council and a Consultative Council for Agriculture and Rural Development are in place; however, they do not fully cover all Nexus sectors. The Ministry of Environment and Physical Planning shares responsibilities with other Ministries (MAFWE, ME, MF, and MH) for the water sector. The recently established Energy Regulatory Commission (ERC) determines tariffs for water and energy services

The Former Yugoslav Republic of Macedonia has developed strategies for all Nexus sectors, which in some cases contain targets and measures for other sectors. The Water strategy supports the objectives of the agricultural and energy sectors in terms of production and refers (less integrative) to biodiversity. The Strategy for energy development points out water

pollution and impacts on wildlife, flora and fauna from the thermal power facilities, but does not establish synergies on hydropower development with ecosystems/biodiversity concerns. The integration of other strategies (e.g. Strategy for agriculture and rural development) is rather focused on overcoming constraints and risks of the sector than contributing to the objectives and targets of other sectors.

Agricultural and energy legislation and strategies/plans address climate change adaptation well, and water efficiency, energy efficiency, renewable energy sources, land/soil conservation and efficient organic farming are included in different strategies, although with different relevance. It is, however, unlikely that the current strategies will lead to a sustainable use of water resources but rather increase conflicts and trade-offs. Nature-based solutions are not considered in the strategies.

The following region-specific Recommendations for Nexus synergies have been made since 2013 by different projects, initiatives or institutions, covering either Nexus-overall aspects, or specific conflicts between different sectors, and addressing different aspects such as knowledge generation, institutional development or management actions at different levels. The below table also includes information on which of these recommendations have been implemented in the meantime in the economy:

Main specific Nexus conflicts	Recommendations for Nexus synergies	Implementation
Water (over)allocation to the different uses, in particular during drought events	1. To draft and implement (transboundary) River Basin Management Plans (Drin, Albania, The Former Yugoslav Republic of Macedonia, Montenegro, Kosovo*) 2. To draft and implement (transboundary) Drought Management Plans or (as preliminary step) to use hands-on operational (IT) tools for decision-making, coordination and communication before and during drought events 3. To increase water management flexibility by multipurpose operations of dams	Declaration on the management of the extended Drin River Basin, 18th April 2011 Memorandum of Understanding for the Management of the Extended Transboundary Drin Basin (Drin MoU), between Montenegro, Greece, Albania, The Former Yugoslav Republic of Macedonia and Kosovo* (24th November 2011) Pursuant to the Agreement, the Commission has been established, with the aim of jointly understanding and resolving all problems related to the management of international river basins To support their cooperation, projects funded by the Global Environmental Facility are being implemented by the Global Water Partnership and Global Water Partnership - Mediterranean in partnership with UNECE. In total the funding for 2016-2019 is US$ 5.5 million. The projects aim to improve the joint analysis and understanding of transboundary issues and have set up pilot projects to demonstrate sustainable development

Main specific Nexus conflicts	Recommendations for Nexus synergies	Implementation
		along the river and lakes and contribute to the development and implementation of a Strategic Action Plan decided on by the Riparians.
Dam operations causing hydro-peaking and subsequent ecosystem deterioration	4. To setup flagship projects (such as reintroduction of sturgeons in the river basin or return of the eel and marble trout to the upper White and Black Drin catchments)	
Pollution of surface and groundwater by pesticides and nutrients, and their treatment (costs)	5. To harmonise transboundary criteria for the establishment and implementation of drinking water protected areas and their safeguard zones 6. To promote organic farming and agricultural biodiversity and afforestation	Organic farming considered in Albania RDP and The Former Yugoslav Republic of Macedonia and Kosovo* Climate Change Strategies
Water pollution (caused by urban and industrial developments) and their treatment (costs)	7. To improve the information available on the use of hazardous substances and their emissions 8. To agree on and implement (transboundary) water monitoring programmes, and to improve the exchange of data 9. To agree, regulate and implement EU/transboundary standards for wastewater discharges 10. To construct and operate more/all wastewater treatment plants 11. To ban Phosphates' containing laundry detergents by 2012 and dishwasher detergents by 2015 (Phosphate Ban Scenario-Nutrients[45])	Construction of 6 new waste water treatment plants has begun in The Former Yugoslav Republic of Macedonia About 500 farmers are registered in The Former Yugoslav Republic of Macedonia for organic production, mostly for cereal and horticultural crops on a total area of about 3,000 ha
Increased energy consumption	12. Install energy-efficient wastewater treatment plants[46] and water supply systems	There are 31 projects in progress in The Former Yugoslav Republic of Macedonia on construction of water and sewage networks
Cross-sector governance, transparency and accountability	13. To improve available datasets and their accessibility 14. To systematically employ Strategic Environmental Assessment (SEA) and Environmental Impact Assessments (EIA) to preliminarily assess effects of infrastructure developments (incl. hydropower), including scenario development and SWOT assessments for awareness-raising and the informed involvement of stakeholders and the local communities 15. To examine the experience with SEA with the aim of expanding the use of nexus analysis within it.	

Main specific Nexus conflicts	Recommendations for Nexus synergies	Implementation
	16. To reconsider the mandates of ministries and intersectoral bodies 17. To analyze and coordinate/integrate the different timeframes and geographic scales for planning in different sectors. 18. To improve access to environmental justices (Aarhus convention) 19. To link spatial planning with river basin management and integrate adaptation to climate change 20. To implement more effectively (e.g. protection measures for ecosystems and biodiversity) 21. To aggregate the outcomes of public participation at specific decision-making levels in order to take these into account at more strategic levels 22. To develop broad, open, transparent and efficient platforms for reliable, high-quality data to serve as the foundation for high-quality decision-making	

Table 19 Main Nexus conflicts in The Former Yugoslav Republic of Macedonia and past recommendations to overcome them

In general, the follow-up implementation of recommended actions by internationally-supported projects is rather low, and many recommendations from the past decade are still to be implemented.

3. Annexes

3.1. Summary of Nexus Mapping in The Former Yugoslav Republic of Macedonia

The Former Yugoslav Republic of Macedonia has a steady growing economy, with a strong tertiary sector and a slowly declining relevance of the primary sector. Employment is growing, with a growing equality of wealth distribution amongst the population.

Water is a resource of growing scarcity in The Former Yugoslav Republic of Macedonia, which is the economy with the highest levels of exploitation. Further increased usage of water is foreseen in the Economy's Strategy – in particular for energy and agricultural production – without providing quantitative projections or scenarios, and likely with decreasing water availability due to climate change.

The Former Yugoslav Republic of Macedonia is strongly energy import dependent. It imports its entire demand for oil and petroleum products and natural gas, and starting from 2000 electricity. The energy imports have grown during the past period, and during the latest few years the imports of electricity have grown rapidly.

About half of the total land area is classified as agricultural (1.26 million ha), out of which 40% is cultivated land and 49% permanent pastures. Upland or mountainous forests cover 37% of the economy. Food production in 2016 is based on fruits and vegetables by 51%, followed by grains and cereals by 29% and dairy products with 19%; the economy is a food net importer.

The biodiversity is rich with important endemism (e.g. 150 endemic algae, 120 vascular plants, over 700 invertebrate species and 27 endemic fish species) and the network of protected areas comprises 86 areas, covering 8,9% of the territory. The main causes for biodiversity loss are land abandonment and river regulation, in particular by small hydropower plants.

In the past years, The Former Yugoslav Republic of Macedonia has updated its legislation in all Nexus sectors (Water, Energy, Food and Ecosystems) and included links to the other sectors, thus enabling coordination. The review has been significantly driven by the transposition of EU legislation, and the adoption of international agreements and conventions.

The institutional setting of the Nexus sectors in The Former Yugoslav Republic of Macedonia has been established at Economy and local level; with cooperation established in the regulation. As coordination bodies, a multi-sector Water Council and a Consultative Council for Agriculture and Rural Development are in place; however, they do not fully cover all Nexus sectors. The Ministry of Environment and Physical Planning shares since recent times responsibilities with other Ministries (MAFWE, Montenegro, MF, and MH) for the water sector. The recently established Energy Regulatory Commission (ERC) determines tariffs for water and energy services

The Former Yugoslav Republic of Macedonia has developed Strategies for all Nexus sectors, which in some cases contain targets and measures for other sectors. The Water strategy supports the objectives of the agricultural and energy sectors in terms of production and refers (less integrative) to biodiversity. The Strategy for Energy development points out the water pollution and impacts on wildlife, flora and fauna from the thermal power facilities, but does not establish synergies on hydropower development with ecosystems/biodiversity concerns. The integration of other strategies (e.g. Strategy for agriculture and rural development) is rather focused on overcoming constraints and risks of the proper sector than contributing to the objectives and targets of other sectors.

Agricultural and Energy legislation and strategies/plans address climate change adaptation well, and water efficiency, energy efficiency, renewable energy sources, land/soil conservation and efficient organic farming are included in different strategies, whilst with different relevance. It is however unlikely that the current strategies will lead to a sustainable use of water resources, but rather increase conflicts and trade-offs. The consideration of Nature-based solutions e.g. in Strategy for agriculture and rural development is unclear.

3.2. References

3.2.1. Acronyms

The following acronyms have been used in the development of this Study:

Acronym	
bbl	Barrel
BHD	Birds and Habitats Directives
CAP	Common Agricultural Policy
CCS	Carbon Capture and Storage
DG	Directorate General
EC	European Commission
EEA	European Environmental Agency
EU	European Union
EU ETS	European Emission Trading System
EUR	Euro (currency)
FAO	Food and Agriculture Organization
FD	Floods Directive
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Green House Gas
GWP-Med	Global water Partnership - Mediterranean
HPP	Hydro Power Plant
HR	Croatia
IWLEARN	International Waters: Learning Exchange and Resources Network
IWRM	Integrated Water Resource Management
kWh	Kilo watt hours
m3	Cubic meter
MS	Member State
NCCC	Committee on Climate Change
OECD	Organisation for Economic Co-operation and Development
RCC	Regional Cooperation Council
REC	Regional Environmental Center for Central and Eastern Europe
RES	Renewable Energy Sources
RIWMFA	Regional Integral Water Management Framework Agreement
SDG	Sustainable Development Goal
SEE	South East Europe
SEE2020	Regional growth strategy „SEE 2020 – Jobs and Prosperity in European Perspective“, endorsed in Sarajevo (November 2013)
SOER	State of the Environment

ToC	Table of Contents
ToR	Terms of Reference
TWRM	Transboundary water resources management
UN	United Nations
UNECE	United Nations Economic Commission for Europe
UNFCCC	United Nation Framework Convention on Climate Change
WEFE	Water-Energy-Food-Ecosystems (Nexus)
WGE	Working Group on Environment
yr	Year

Table 19: Acronyms

3.2.2. Glossary

The following terms have been widely used in the document and are explained to ensure a common understanding.

Term	Explanation
Nexus	The interaction between policies and management of the different Nexus elements
Nexus approach	The Nexus approach has been introduced in the natural resources management agenda to facilitate the enhancement of water, energy and food security, while preserving ecosystems and their functions, and increasing climate resilience, by reducing trade-offs, shifting towards more sustainable consumption patterns and improving demand management, building synergies and improving governance across sectors
Nexus fields/sectors of focus	Fields or sectors of the Nexus are in this case Water, Energy, Food and Ecosystems. Other institutions or projects work with different combinations of the Nexus fields or sectors
Conflict	the general pattern of groups dealing with disparate ideas
Trade-off	A trade-off is a situation that involves losing one quality, aspect or amount of a Nexus element (e.g. water) in return for gaining another quality, aspect or amount of another Nexus element (e.g. energy).[47]
Climate resilience	the capacity for a socio-ecological system to: (1) absorb stresses and maintain function in the face of external stresses imposed upon it by climate change and (2) adapt, reorganize, and evolve into more desirable configurations that improve the sustainability of the system, leaving it better prepared for future climate change impacts[48]
Sustainable consumption patterns	Sustainable consumption relies on certain premises such as (1) Wise use of resources, and minimisation of waste and pollution; (2) Use of renewable resources within their capacity for renewal; (3) Fuller product life-cycles; and (4) Intergenerational and intragenerational equity[49]
Demand management	In natural resources management, demand management refers to policies to control consumer demand for environmentally sensitive or harmful goods such as water and energy[50]
Synergies	The creation of a whole that is greater than the simple sum of its parts[51]
Governance	The processes of interaction and decision-making among the actors involved in a collective problem that lead to the creation, reinforcement, or reproduction of social norms and institutions[52]
Natural resource management	The management of natural resources such as land, water, soil, plants and animals, with a particular focus on how management affects the quality of life for both present and future generations (stewardship)[53]
Strategic document	These include policy papers, strategies, action or investment plans, communications, key projects or similar initiatives

Table 20: Glossary of key terms

3.2.3. Literature references

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The following literature has been used to develop the Report of The Former Yugoslav Republic of Macedonia:

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- Brief Nexus analysis of The Former Yugoslav Republic of Macedonia on NEXUS related institutions and policies
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3.2.4. Regional information sources

This Annex includes the used regional information sources.

Information source	Details
Transboundary diagnostic analysis - Thematic report on Biodiversity and Ecosystems for the Drin River Basin, 2017, GWP-Med/MIOECSDE/ ZaVita, svetovanje, d.o.o	The purpose of the project is to prepare a comprehensive overview of the state of Biodiversity and Ecosystems in the Drin River Basin. In addition, the objective is also to identify data deficiency in species and ecosystem status.
Brief Nexus analysis The Former Yugoslav Republic of Macedonia, Kosovo*, Bosnia and Hercegovina, Montenegro and Serbia prepared by REC	Brief Nexus analysis of The Former Yugoslav Republic of Macedonia, Kosovo*, Bosnia and Hercegovina, Montenegro and Serbia on NEXUS related institutions and policies
Thematic Report on Institutional and Legal setting, December 2017, Drin CORDA	The objective of this report is definition of institutional and legal setup in the economies within the Drin River Basin

Table 21: Regional information sources

3.2.5. Institutions contacted

The following institutions have been contacted in the development of the Economy Report for The Former Yugoslav Republic of Macedonia:

Institution contacted	Details
State Statistical Office of The Former Yugoslav Republic of Macedonia	Contact (Sectors - Energy, Transport, Agriculture, GDP)
Ministry of Environment and physical planning	Mrs.Teodora Grncarovska Obradovic (Climate Change)
Ministry of Environment and physical planning	Mrs.Ljupka Dimovska Zajkov (Water Sector)
Ministry of Environment and physical planning	Mr. Vlatko Trpevski (Nature Sector)
Ministry of Economy	Contact (Sectors Energy and Economic Development)

Table 22: Institutions contacted

Sources

[1] Source: http://www.freemapviewer.com/en/map/Map-World_1029.html
[2] Source: http://www.un.org/Depts/Cartographic/map/profile/macedonia.pdf
[3] Source: Nexus assessment Excel Sheet
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[6] Source: Water Strategy
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[8] Source: Nexus assessment Excel Sheet
[9] Source: FAO/Aquastat)
[10] Indicating the water consumption proportion of the available water resources. The WEI+ has been calculated as the quarterly average per river basin district. Source: EEA, http://www.eea.europa.eu/data-and-maps/explore-interactive-maps/water-exploitation-index-for-river-1.
[11] Source: State Statistical Office (Environmental Statistics 2017)
[12] Source: Nexus assessment Excel Sheet
[13] Source: SEE Nexus Regional Study
[14] Source: SEE Nexus Regional Study
[15] Source: Nexus assessment Excel Sheet
[16] Source: SEE Nexus Regional Study
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[18] Source: Nexus assessment Excel Sheet
[19] Source: Nexus assessment Excel Sheet
[20] Source: State statistical Office, Statistical indicators for agriculture in The Former Yugoslav Republic of Macedonia
[21] Source: State statistical Office, Statistical indicators for agriculture in The Former Yugoslav Republic of Macedonia
[22] Source: State statistical Office, Statistical indicators for agriculture in The Former Yugoslav Republic of Macedonia
[23] Source: State statistical Office, Statistical indicators for agriculture in The Former Yugoslav Republic of Macedonia
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[25] Source: State statistical Office, Statistical indicators for agriculture in The Former Yugoslav Republic of Macedonia
[26] Source: State statistical Office, Statistical indicators for agriculture in The Former Yugoslav Republic of Macedonia
[27] Source: 5th Economy report on Biodiversity, MOEPP 2014 Skopje
[28] Source: State statistical Office
[29] SEE Nexus Regional Study
[30] Source: Nexus assessment Excel Sheet
[31] http://www.moepp.gov.mk/?page_id=5380 link from “Environmental indicators” for chapter biodiversity, in form of statistical data about endangered and protected species
[32] Source: Nexus assessment Excel Sheet
[33] https://www.nordeatrade.com/en/explore-new-market/macedonia/economical-context
[34] Source: Nexus assessment Excel Sheet
[35] Source: SEE Nexus Regional Study
[36] Source: Water Strategy for The Former Yugoslav Republic of Macedonia 2012 - 2042
[37] Source: Strategy for use of renewable energy in The Former Yugoslav Republic of Macedonia, 2010

[38] Source: Second Biennial updates Report on Climate Change
[39] Source: UNECE Second Assessment of Transboundary Rivers, Lakes and Groundwaters - https://www.unece.org/?id=26343
[40] Source: Nexus Assessment
[41] Source: Atlas of trans boundary aquifers, UNESCO – IHP ISARM Program, 2009
[42] For some of the documents, a screening assessment whether the considerations are of 'high' or 'low' relevance has been carried out; for others a 'yes' or 'no' is stated
[43] Including multi-stakeholder dialogue
[44] in the framework of the GEF Lake Ohrid Conservation Project (ended in 2004).
[45] UNECE, 2011, p.173
[46] UNECE, 2017a, page 63
[47] Adapted from Wikipedia
[48] Wikipedia
[49] Wikipedia
[50] Wikipedia
[51] Wikipedia
[52] Wikipedia quoting Hufty, Marc (2011)
[53] Wikipedia