



**Synergies of forest management with other  
sectors (hydropower, biomass, agriculture,  
tourism) in Mati river basin, Albania**

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# Synergy definition

- The combined power of a groups of things when they are working together that is greater than the total power achieved by each working separately ([Cambridge Dictionary](#)).
- The synergy is an interaction or cooperation giving rise to a whole that is greater than the simple sum of its parts ([Wikipedia](#)).

# Introduction

Forests are an important element of terrestrial ecosystem that helps in maintaining ecological balance, biodiversity conservation, protection of watersheds, and control of soil erosion and provide essential life-sustaining ecosystem services such as carbon storage, health, livelihoods, water, food, nutrient cycling and climate security.

These services are essential for the well-being of people, however they remain undervalued and therefore cannot compete with benefits from other sectors.

Contribution of forest and related services to national gross domestic product vary between countries but still is not accurately evaluated.

# Cross-Sectoral Synergies

- **Forest and water**

The availability and quality of water are threatened by overuse, misuse and pollution, and it is recognized that are strongly influenced by forests.

Forests can help in alleviating excess surface run off through its leaf litter, acting as sponge that helps in infiltration of the water to underground water aquifers.

The forest cover reduces the maintenance costs of water treatment by providing quality drinking water to millions of people.

Forested catchments supply a high proportion of the water for domestic, agricultural, industrial and ecological needs in both upstream and downstream areas.

**Challenge for forest managers?** To maximize the wide range of multi-sectoral forest benefits without detriment to water resources and ecosystem function.

# Cross-Sectoral Synergies

- **Forest and energy**

Wood is considered very important source of renewable energy in Albania.

For many households, the reasons for relying on fuel wood for fulfilling most of the household energy needs are related to poverty and high costs of alternative sources of energy.

Based on the Household Budget Survey conducted by the Albanian Institute of Statistics in 2014 (INSTAT, 2014), the average share of monthly expenditures on fire wood in Albania is 26% to total expenditures on energy.

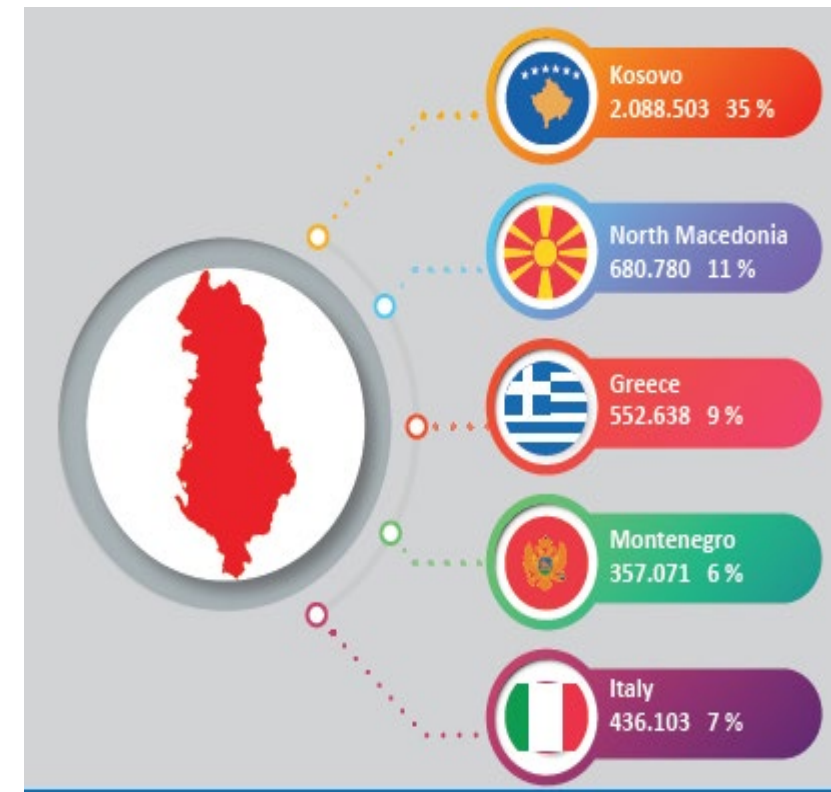
To make biomass use sustainable, a comprehensive supply and demand side approach is needed.

# Cross-Sectoral Synergies

## ■ Forest and tourism

The recreation and tourism functions of forests and woodlands are becoming more important in Albania, in particular, for their benefits on economic development, health and well-being and quality of life.

**Tourism** is undoubtedly a driving force for **Albanian** Economy. The fast pace growing industry which provides 19.3 per cent of the total employment and **contributes** more than 20 per cent on **Albanian GDP** is considered strategic for the future development of the country.



Tab4. Arrivals of foreign citizens according to the main purpose of the visit, in thousand

Description	2014	2015	2016	2017	2018
1+2 ARRIVALS OF FOREIGN CITIZENS	3.673	4.131	4.737	5.118	5.927
1 PERSONAL	3.624	4.089	4.678	5.049	5.840
1.1 -HOLIDAY	1.315	1.579	1.920	2.371	2.784
1.2 -OTHER PERSONAL PURPOSES	2.309	2.510	2.758	2.678	3.056
2 BUSINESS AND PROFESSIONAL	48	42	59	69	87

Source: Instat(2019)

Tourism is one of the fastest growing industries in the country and can be a sustainable alternative to economic activities that would be damaging to forest and biodiversity.

Tourism may have a variety of negative impacts on biodiversity, particularly when there is no adequate management and number of tourists exceeds carrying capacity .

Irresponsible and unsustainable tourism can damage nature through habitat destruction, overexploitation of local resources, waste and pollution, invasive alien species, infrastructure development, and greenhouse gas emissions.

# Cross-Sectoral Synergies

- **Forests and agriculture**

The agriculture sector sustains the livelihoods of 46% of people living in rural areas in Albania and is at the centre of national policies to alleviate rural poverty.

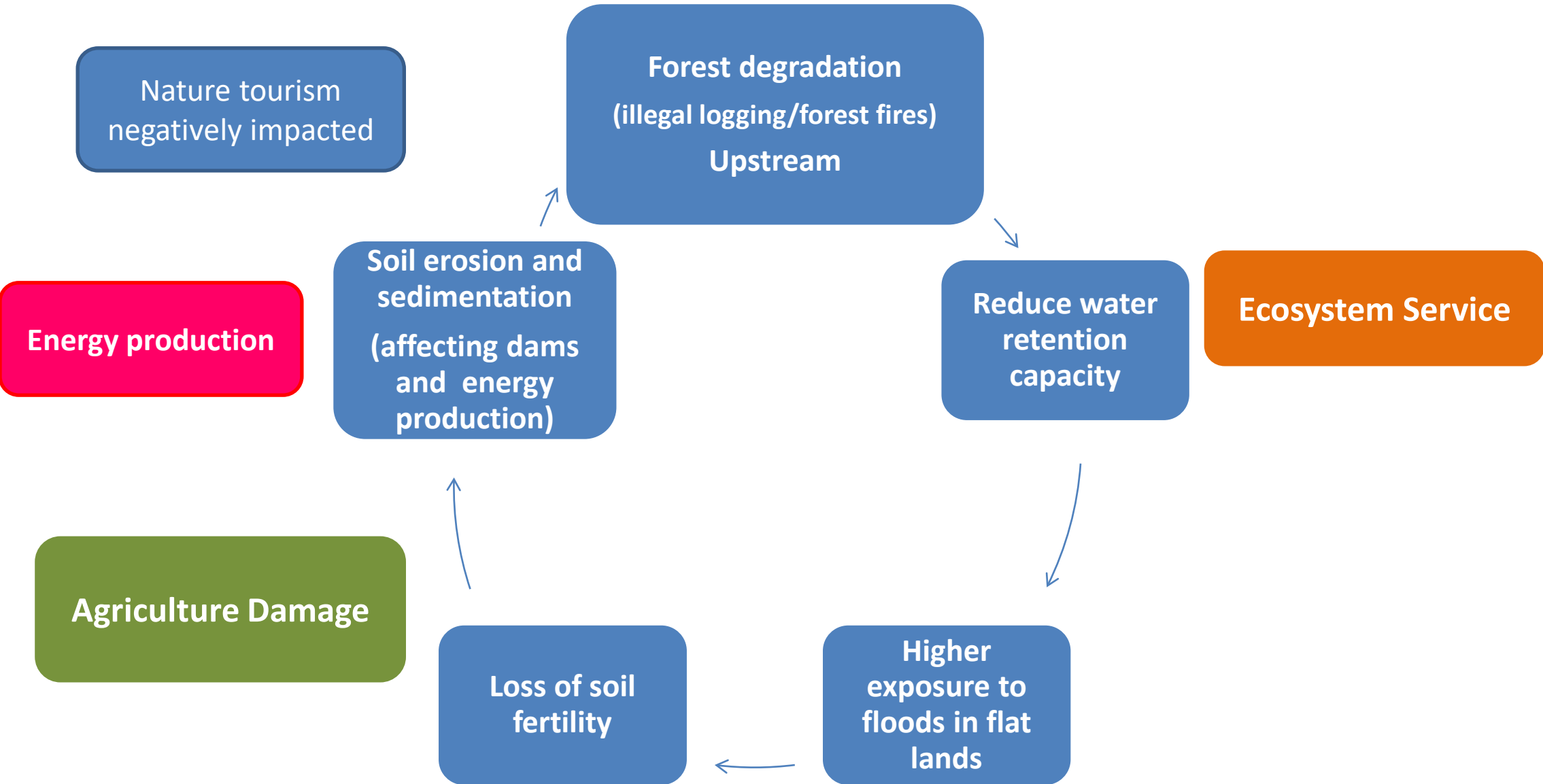
However, the need of people for additional land for agriculture is also the main driver of deforestation and land degradation since the Communism time in Albania.

One option to reconcile agriculture development with forestry is to increase crop production per unit area through technology development avoiding the encroachment to forest lands.

The present situation calls for sustainable land management policy and insights into the relationship may help decision makers to identify and introduce appropriate interventions that can balance objectives in the forestry and agriculture sectors.



# Impact of non sustainable forest management to other sectors (agriculture, energy production, tourism etc)



# **Synergy between forestry and other sectors in Mati river basin**

# General overview on Mati River basin

**Mati** river is located in north-central Albania.

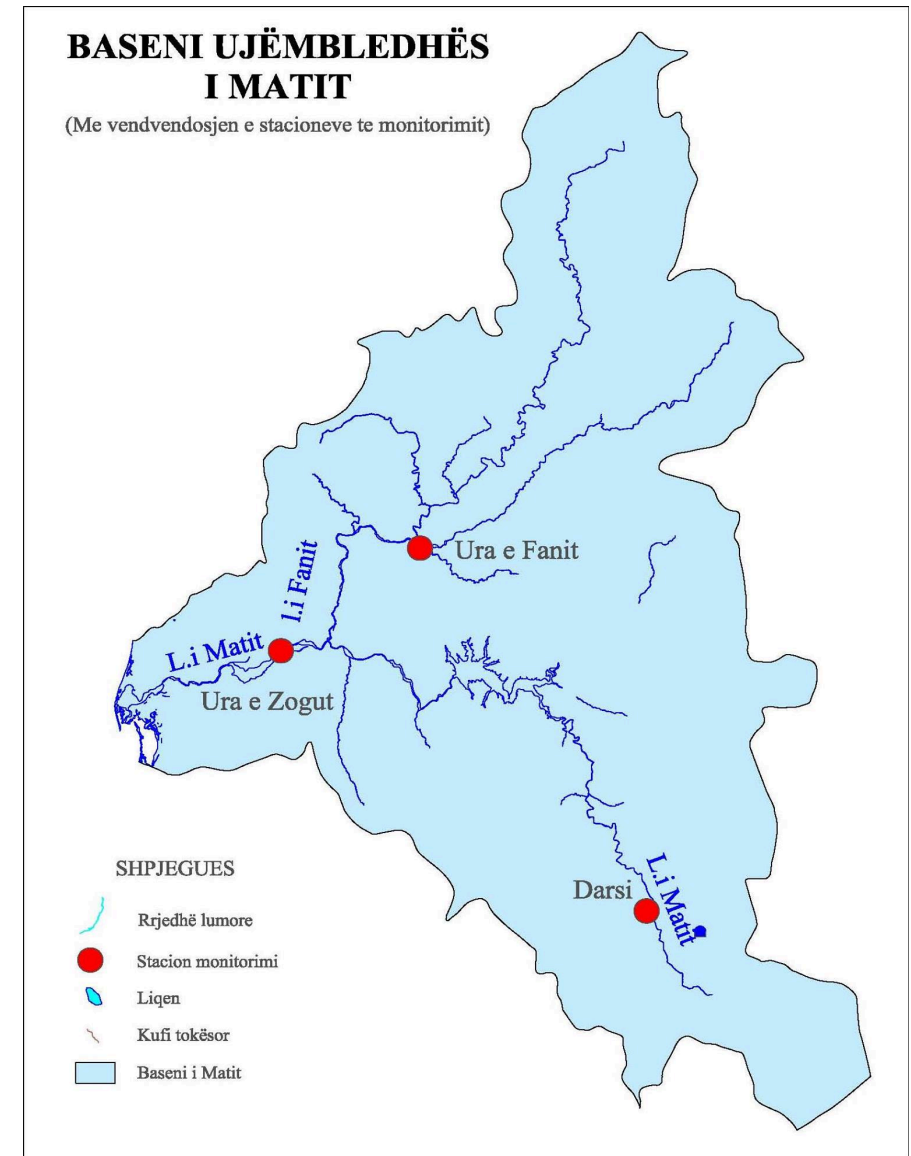
Its overall length is 144 km while its catchment surface is 2,441 km<sup>2</sup>.

The entire river basin district covers an area of 2993 km<sup>2</sup>.

The average discharge is 103 m<sup>3</sup>/s

The main tributaries are: (i) **Fan**, flowing from the northeast, and (ii) **Mat** which flows from the southwest down to the confluence with Fan and then towards the Adriatic Sea.

Population living within the Mati river basin district is 234346 residents.



# General overview on Mati River basin.....cont

The main spring of the Mati River is near Martanesh.

Two major artificial reservoirs, Ulëz (1958) and Shkopeti (1963) exist within the basin. They are built for energy production and can be classified as artificial modified water body.

Mean long-term discharge of the river to Adriatic sea is  $103 \text{ m}^3/\text{s}$  and the runoff coefficient is 0.8.

There are many streams which percolate the area and supply the Mati river.

The only management plan for Mati River Basin was drafted on 2010.





# Division of Mati river basin into sub-basins

Sub-basin	Area (km <sup>2</sup> )	Average Elevation (m.a.s.l)	Specific runoff (l/s/km <sup>2</sup> )
Mati Shoshaj	684	924	38.4
Urake	150	1229	29
Milot	160	784	44.3
Mati Shkopet	457	960	46.7
Fani Vogel	322	876	41.9
Fani Madh Bukmire	291	802	39.5
Fani Madh Breg	132	680	44.9
Fani Rubik	265	695	44.5

Based on the existing information on hydropower generation the storage capacity of the Ulza reservoir represents 15% of the available resources reaching the coastal plain downstream Milot. It is unlikely that hydropower generation will represent any pressure on the available resources any time of the year as the peak storage is generated during late winter and spring where the run-off is at a maximum.

# Hydrologic network in Mati river basin



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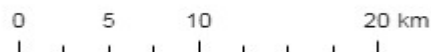
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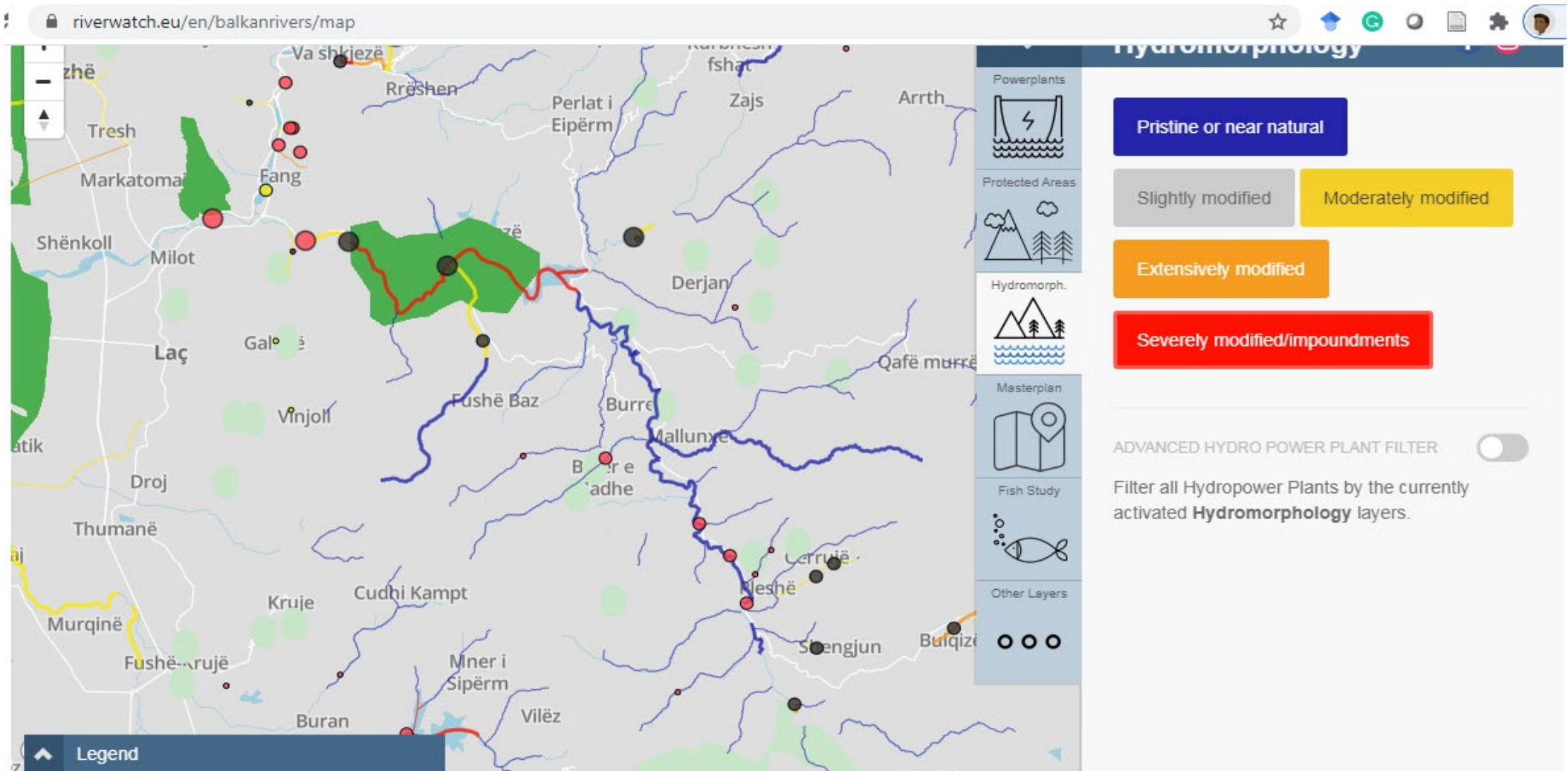
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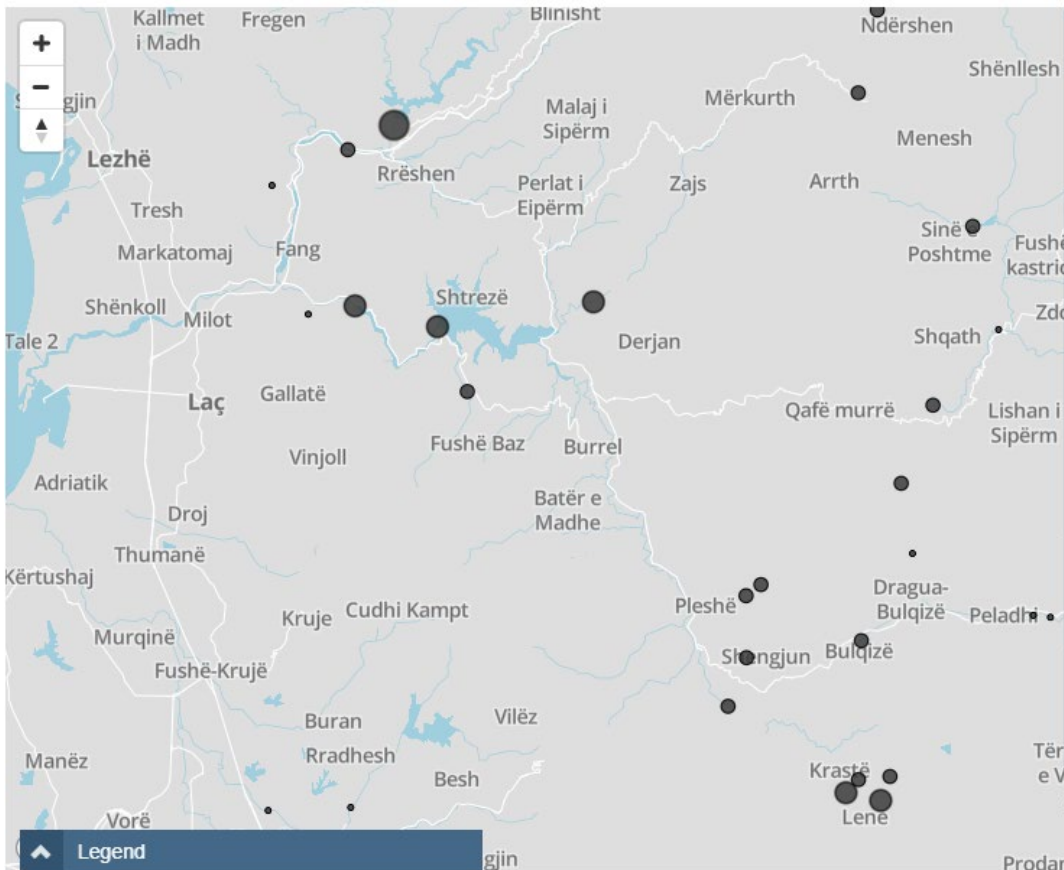
# Hydromorphology characteristics



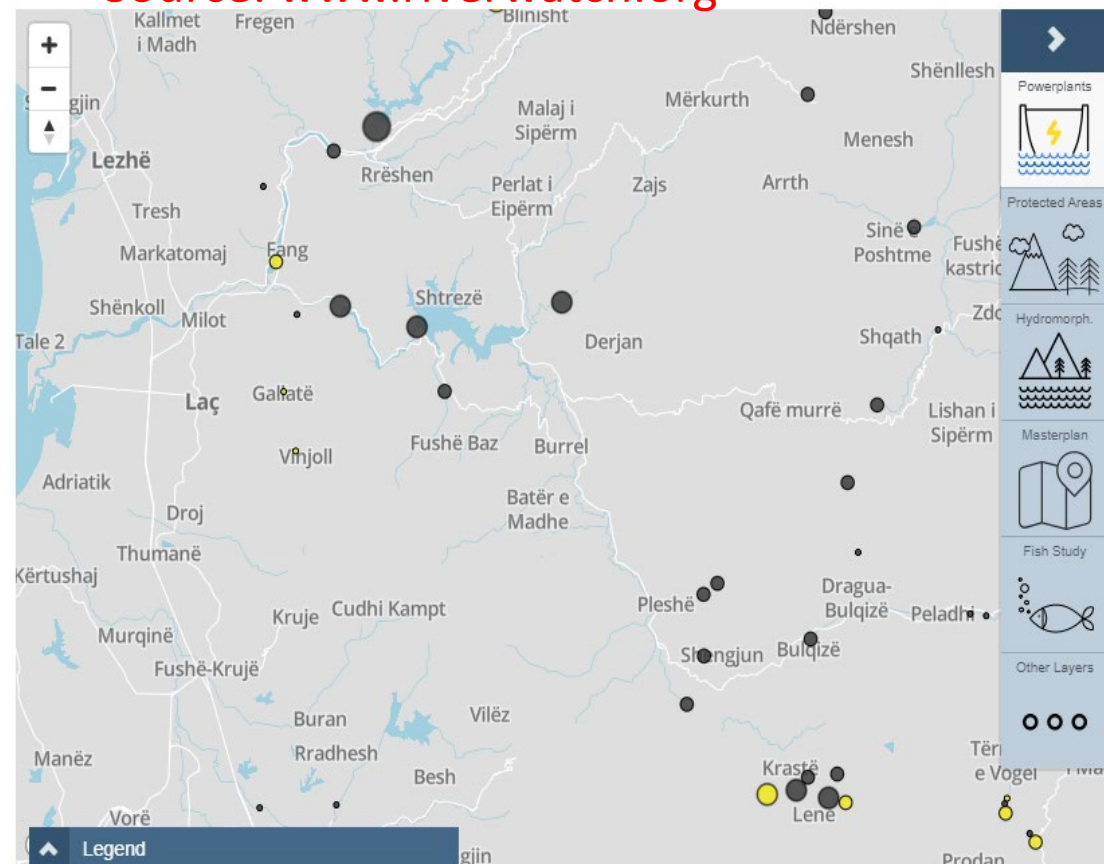
- blue- pristine or near natural
- yellow- moderately modified (intensive extraction of gravel and sand)
- red- severely modified/impoundments

# Hydropowers in Mati River Basin

Source: [www.riverwatch.org](http://www.riverwatch.org)



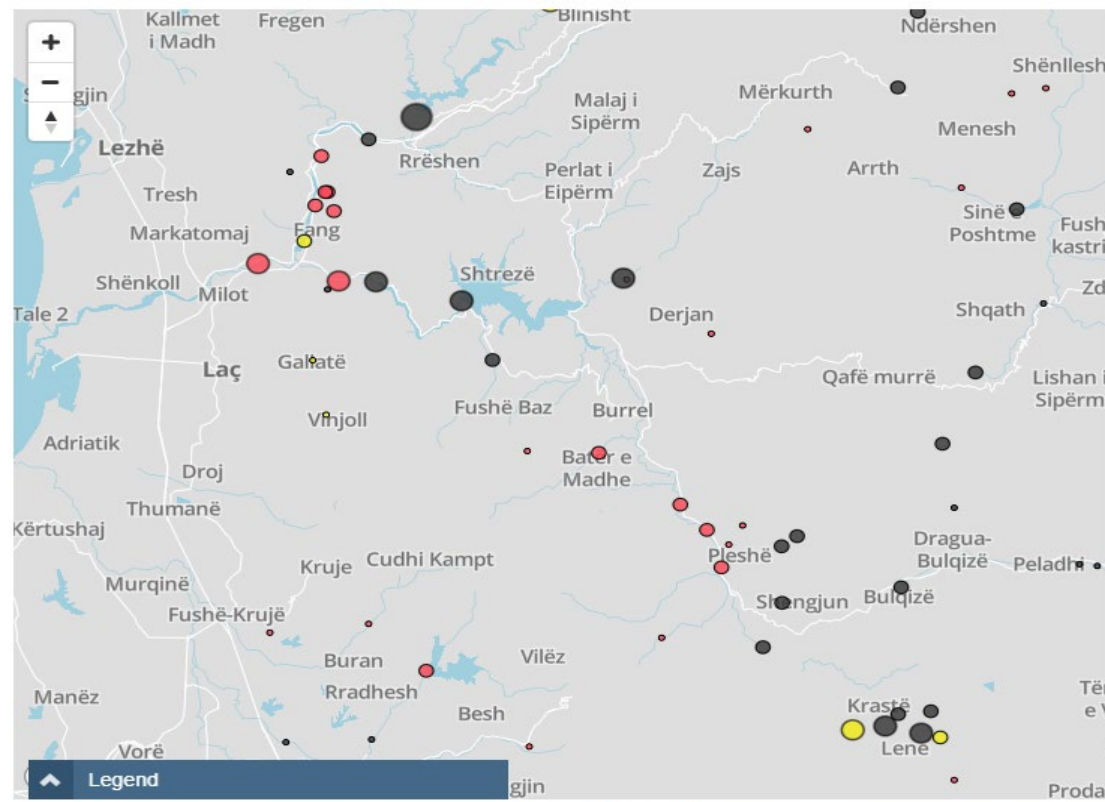
Existing hydropowers



In progress Hydropower plants

The capacity production of small hydropower plants vary from 1-10 MW.  
36 small hydropower are planned to be constructed within Mati river basin.





## Planned hydropowers

In the Mati river operate "Ulza" and "Shkopeti", hydropower plants, with a total installed capacity of 49 MW (Ulza HPP, 25 MW & Shkopeti HPP 24 MW).

Annual generation of energy power is 120 GWh (Ulza HPP) and 94 GWh (Shkopeti HPP).

Ulëz HPP has an area of 13.5 km<sup>2</sup> and a maximum depth of 61 m, while Shkopeti HPP has an area of 6 km<sup>2</sup>. The length of Lake Shkopet is 11 km, width 240 m, and maximum depth 75 m.

# Impacts of hydropower in the Mati River Basin

## 1- Source of conflicts with local communities. Three levels of conflicts:

- Water management – 1<sup>st</sup> level of conflicts
- Change of water flow-2<sup>nd</sup> level of conflict
- Environment impact- 3<sup>rd</sup> level of conflict

## 2-Long-term impacts

- Negative impact on environment(e.g. landscape damage, loss of biodiversity; change of water flow)
- Socio-economic impact (e.g. threatening of crop production; negative impact on ecotourism development).

# Flooding in Mati river basin

Flooding is a frequent problem in the Mati river district. The areas subject to flooding are located down part of the Mati river close to the Adriatic Sea.

During the last 150 years 8 severe flooding occurred: 1854, 1860, 1905, 1937, 1962, 1970 and 1992, 2002. The returning period of flooding seems to be 50 years.

Reason for flooding: heavy precipitation, storm surges, high tides from the sea.

# Impact of climate change on surface water of Mati river basin

The climate change scenarios developed for the area indicate that annual precipitation will decrease with 2.6-5.4% and the average annual temperature will be raised with 0.9-1.1°C, during the period up to 2030. A likely reduction of river runoff from 3.6 to 7.6% is expected by 2030. The climate change is likely to have a significant impact on available water resources in the long perspective up to 2100. Hereby it will impact the power sector which today is more than 90% dependent on hydropower.

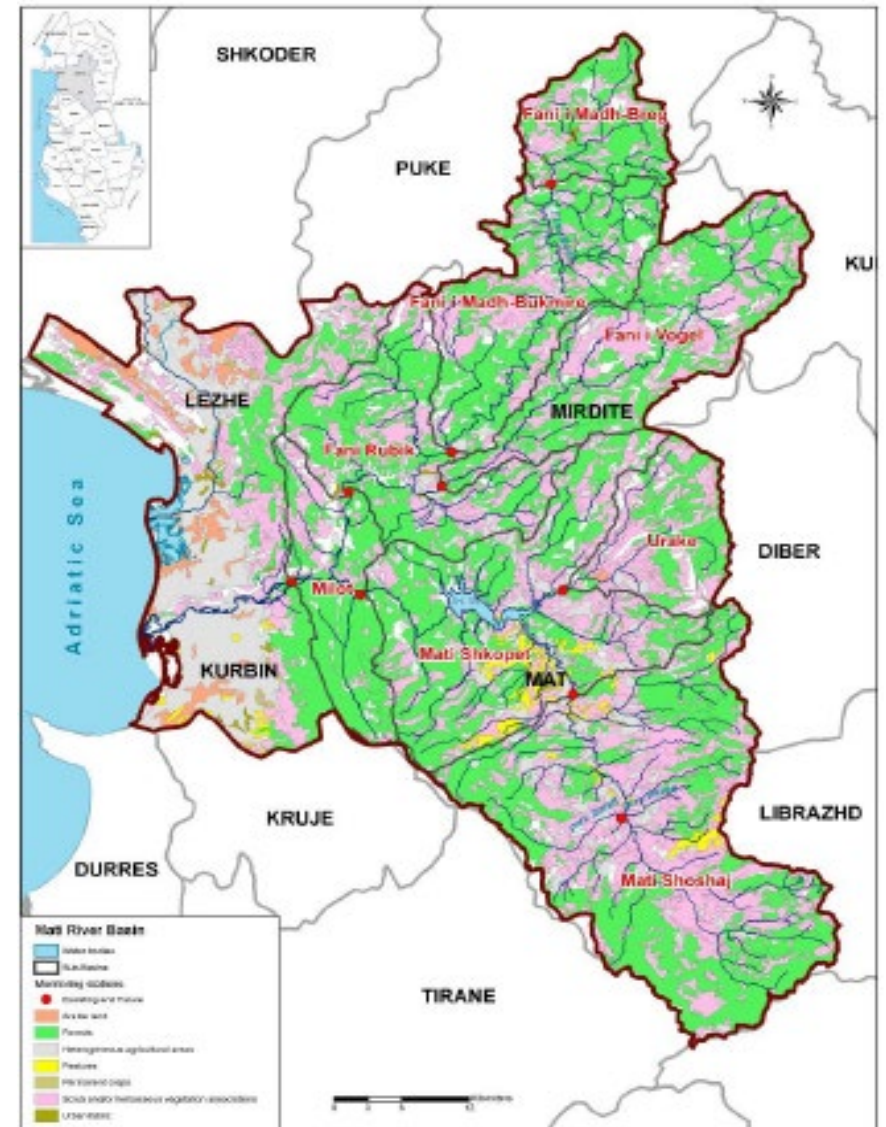
The possible impacts of climate change include:

- Increased energy demand for cooling
- Reduction of water supply
- Reduction of power generation
- Water quality problems (salinisation and water algae blooms)



# Land use categories in Mati River Basin

Land Use	Area (ha)	%
<b>Forest</b>	134427	<b>44.44%</b>
<b>Pastures</b>	4119	1.36%
<b>Open spaces with little or no vegetation</b>	18214	6.02%
<b>Heterogeneous agric lands</b>	44429	14.69%
<b>Scrub/hebaceous vegetation</b>	94340	<b>31.19%</b>
<b>Arable land</b>	5357	1.77%
<b>Permanenet Crops</b>	1041	0.34%
<b>Urban land</b>	590	0.20%



# Sustainable Forest Management in Mati river Basin



## Forest products and livelihood

Wood product

Non wood products (mushrooms, fruit, medicinal plants, berries.

Nature tourism

## Forest Ecosystem Services

Dioxide carbon capture, nutrient cycling, water and air purification, maintenance of wildlife habitat, biodiversity.

Only sustainable forest managed can provide :

- all these ecosystem services and
- Social, economic and environmental benefits

# Forest management practices applied in Mati River Basin

- Silviculture thinning in young oak forest stands
- Soil stabilisation interventions including; dams construction and reforestation of steep slopes.
- Reforestation of degraded and burnt forest lands
- Fighting pest and diseases

## **Measures proposed for improvement of forest resources in Mati river basin**

- Sustainable management of forest and pasture resources
- Engagement of local actors in the sustainable management of forest resources.
- Promotion of the payment for ecosystem services
- Law enforcement in the sustainable management of forest resources
- Reduction of the illegal logging
- Restoration of degraded and burnt forest lands through reforestation
- Prevention of the soil loss reduced by 25% until 2020.



# Forest biomass production in Mati River Basin

Biomass is mainly used for: heating/cooking and as fodder for livestock.

Firewood is the main fuel in the Mati river basin but is not efficient and cause pollution within the buildings.

Average wood consumption per family is between 5 and 6 m<sup>3</sup>/households, with 5% higher consumption in rural households and 8,9 % lower consumption in urban areas (FAO, 2017).



## Potential to increase the share of biomass in energy production in Mati River Basin

- Use of biomass from agriculture (fodder, grain, clover, reed-mace, corn) and forestry residues
- Sustainable forest management in order to guarantee long-term resource planning and wood fuel supply
- Improve burning technology efficiency in order to decrease indoor pollution and wood fuel consumption.
- Wood energy produced with efficient technology is already competitive with fossil energy in many countries and can offer some of the highest levels of energy and carbon efficiency among bioenergy feedstocks.

# Agriculture sector in Mati River basin

- Arable land cover an area of 5357 ha.
- 63.8 % of populations are employed in agriculture, forestry and aquaculture (Local Development Plan,2018)
- Main crops growing in the area are: maize, wheat, fruit trees, grape.
- Farmers breed cows, sheep, goats, pigs, and poultry.
- Mostly farmers produce only for their needs.
- Arable land is fragmented influencing the land productivity.
- Supporting schemes and investments in agriculture are minimal
- In the light of climate change the agriculture sector must select species which are resilient to drought and high temperatures.
- Irrigation system must be extended across the Mati river basin. The total water volume used for irrigation is 60 Million m<sup>3</sup>/year.

# Problems faced from agriculture sector in Mati river basin

- Erosion (most of the arable lands are situated in non flat areas prone to erosion)
- Wrong management practices (e.g. cultivation of steep lands; cultivation along the slope; burning of agriculture residues which destruct the soil fertility and burn the cover vegetation which protect the soil from erosion)
- Terrace establishing in hilly and mountainous areas
- River erosion (high rate of arable land loss in areas along the river bank)
- Urbanisation
- Arable land pollution from industrial wastes.



# Objectives for development of agriculture sector in Mati river basin

There are 3 objectives:

1-Land consolidation and modernization of the technology for land ploughing and other activities related to agriculture sector.

2-Development of Agro-Processing Industry

3-Development of organic agriculture

# Implications from Agriculture in Mati River basin

The major threats from agriculture activities are associated with organic and inorganic pollution from mainly nitrogen and phosphorus which cause; (i) de-oxygenation and eutrophication of surface waters and contribute to declining fish populations, (ii) loss of biodiversity and (iii) pollution of ground waters.

Nitrogen generated from agriculture activities in Mati river basin amounted to 10,000 tons and 4,000 tons phosphorus (Management Plan of Mati River Basin, 2010).

# Fishery and aquaculture in Mati river basin

Fishing at commercial scale take place at Ulza and Shkopeti lakes where 25 active fishermen operate.

Fish quantity caught in one year is amounted to 15 tons.

Fish is used in the restaurants around Ulza area and traded outside the Mati river basin.

Carp species are dominant in both lakes (silver carp, big head carp, grass carp).

Trout farming take place in the area of Fshat and Bulqize.

There is no information on fishery as an economic activity.

# Ecotourism a sustainable livelihood alternative in Mati river Basin

Ecotourism is travel to fragile, pristine, and usually protected areas that strives to be low impact and (usually) small scale. It helps educate the traveler; provides funds for conservation; directly benefits the economic development and political empowerment of local communities; and fosters respect for different cultures and for human rights (Honey,1999).

Mati river basin offers the possibility of **Nature** and **Adventure** tourism.

**“Nature tourism”** involves travel to unspoiled places to experience and enjoy nature. It usually involves moderate and safe forms of exercise such as hiking, biking, sailing, and camping.

**“Adventure tourism”** is nature tourism with a kick: it requires physical skill and endurance (rope-climbing, deep-sea diving, bicycling, or kayaking) and involves a degree of risk-taking, often in little-chartered terrain.

Potential for development of water sports like: regata,rafting,fishing etc.







# Ecotourism a sustainable livelihood alternative in Mati river Basin

- Natural tourism is the main activity
- Protected areas within the Mati river basin are:
  - i. National Park of Qafe-Shtame 2000 ha (categ II-IUCN)
  - ii. National Park of Zall Gjocaj 140 ha (categ II-IUCN)
  - iii. Natural Regional Park of Ulez 4206 ha (categ IV-IUCN)
  - iv. Protected area with sustainable use of natural resources In Oroshi, Mirdite 4745 ha (categ VI-IUCN)
  - v. 28 Nature Monuments and 9 Geo-Monuments.
  - vi. 73 endangered species are present in the area

These areas of great interest have a great potential for development of natural tourism.



# Threats that protected areas face in Mati River Basin

- Forest fires are a present risk in protected areas. The risk is very high during the summer season(August).
- Illegal hunting (although there is a moratorium still illegal hunting is taking place in protected areas)
- Solid wastes left in the site from visitors
- Construction of small HPP has caused damages in the habitats of protected areas
- Grazing
- Soil erosion is evident especially in the steep slopes in protected areas.

# Tradition and culture

- Good tradition in fish cooking
- One museum with traditional clothes and tools, guns, bronze swords, lances, knives etc, used by community in different historical periods since 5<sup>th</sup> century.
- Traditional ornaments (bracelets, ear-rings, chaplets etc) produced by local hand-crafters (named pirusts) well-known for amalgamation of metals.
- Since 1952 were found three illyrian tombs so called barrow.
- During period from 1971-1984 were found other tombs belonging to the iron period. In total are found 53 illyrian tombs.
- In Shkopeti area there is also one castle.









Traditional houses in the area.

# Standards that characterize Ecotourism in Mati River Basin

1. Tourism activity is developing in relatively undisturbed natural areas (protected areas)
2. Minimal negative impacts on the environment mainly on waste deposit.
3. Conservation of natural and cultural heritage is taking place, but still there is need for further steps.
4. Active involvement with and benefit to local community (some restaurants, local fishermen, hand crafting association)
5. Tourism-generated profits contribute to sustainable development
6. Educational experience for visitors that incorporates both natural and cultural heritage

## Main threats of habitats in Mati river basin

Threat	Source of threat	Impact	Measures to mitigate
Urban development	Residents/businesses	Landscape damage/environment pollution	1-Implementation of the urbanistic plan
			2-Evaluation of the Environment Impacts for every activity
Urban wastes	Residents/businesses	Environment and water pollution	Rising awareness of local communities
			Improvement of infrastructure
			Law enforcement
Medicinal plants collection	Residents	Habitat damage of flora and their extinction	Rising awareness of local communities
			Collection according to rules
			Collaboration with businesses
Illegal cuttings	Residents	Decrease of forest resources	Rising awareness of local communities
		Landscape damage	Law enforcement
		Soil erosion acceleration	Territory control
Poaching/Illegal hunting	Hunters/residents	Decrease of fauna populations	Rising awareness of local communities and hunters
		biodiversity reduction	Territory control
		Loss of ecosystem functionality	Law enforcement
		Local disappearance of many species	
Forest fires	Residents/shepherds	Destruction of flora and fauna habitats	Law enforcement
		Landscape damage	Rising awareness of local communities and hunters
		Soil erosion	Fire early warning system
		Increase CO2 in atmosphere	Restoration of burnt habitats
Climate change	Human activity/industry	Damage on flora and fauna habitats	Rising awareness of local communities and hunters
		Soil erosion acceleration	Mitigation measures
		Increase frequency of forest disturbances	Adaptation measures
		Poverty advancing	Resilient crops in agriculture
			Improve water utilisation



**Thank you for your attention !**