REPORT

Agroecological Territories for Climate Action Project

Kosovo/Albania/Macedonia Part

Climate Awareness Association

January 2025

Climate Awareness Association

Dukat Workshop

Participants :

16 participants (Annex 2) took part in the workshop organized in Dukat :

- Institute of Agronomy in Vlore
- One citizen from Dukat who well known the area
- Institute of Agronomy in Vlore
- Honey Keeper
- Farmer
- Veterinarian
- Farmers
- Farmers
- Agronom
- Water District
- Institute of Agriculture Vlore
- Agriculture Extension in Vlore
- Mayor of Dukat
- Environmentalist

For this workshop, we took a very different approach compared to the first one in Podujevo. The participants had varying levels of understanding, which led us to adjust and adapt the format to better suit their needs.

The workshop revolved around the Climate Fresk methodology. Using the visual cards as a central tool made it much easier to pause, reflect, and engage in discussions about everything happening in the territory. This approach fostered more interaction and deeper understanding, allowing participants to connect the dots in a clear and impactful way.

Keys findings from the workshop in Dukat

Socio-Economic Context :

Dukat (i Ri and i Vjetër) is a large village with a population of approximately 5,000 residents as of 2016. However, the region is experiencing significant demographic shifts, marked by an **aging population** and a declining interest in agriculture among younger generations. Many young people are leaving the area in search of better opportunities, creating a shortage of new farmers and ranchers willing to sustain existing agricultural practices. This aging workforce threatens the continuity of traditional rural and agricultural activities.

While the area has no heavy industry, the local economy is supported by **marine fish farming**, spanning around 600 hectares, as well as agriculture, livestock, beekeeping, and seasonal tourism. In recent years, tourism has grown significantly, particularly around the nearby Gulf of Vlora, leading to a surge in construction activities. Although this development has provided economic benefits, it has also exacerbated environmental pressures and climate impacts.

Unregulated construction and tourism-related activities have caused deforestation, land degradation, and accelerated soil erosion. Agricultural lands are increasingly being **converted into construction zones** without proper urban planning, placing further strain on the landscape. Additionally, untreated white water discharge from hotels has contributed to heavy metal contamination in local waters, with mercury levels recorded at up to seven times above safe limits. Rising sea acidity poses another significant challenge, compounded by polluted waters from the Vjosa River, which carries untreated sewage and agricultural runoff from upstream villages.

Waste management remains a persistent issue. While municipal authorities oversee waste collection, the Orikum Administrative Unit faces significant challenges due to a **landfill l**ocated near residential areas. Plans are underway to operationalize the Sherishta landfill to address these concerns. During the tourist season, coastal cleaning efforts are bolstered by an additional cleaning company, monitored by the National Coastline Agency and the Regional Coastline Agency of Vlorë.

Despite the growing environmental challenges, smog is not a significant issue due to the lack of industrial activity and low urbanization levels. However, **transportation infrastructure** remains **underdeveloped**, functioning primarily during peak tourism seasons. This limits accessibility and constrains the region's economic potential outside of these periods.

The environmental strain has also raised public health concerns. Residents report health issues linked to poor environmental conditions and the lingering threat of naval mine explosions in the area. Healthcare services are limited, with **a single healthcare center** in Orikum and the nearest hospital located in Vlorë, which is primarily accessible through private transportation such as minibuses and buses.

The cumulative impact of these factors—rising sea pollution, deforestation, land degradation, and unplanned urban development—poses a serious challenge to the sustainability of the region and the health and well-being of its residents. Addressing these

issues requires urgent, coordinated efforts to balance economic growth with environmental preservation and improved infrastructure development.

Geographic context :

The Dukat Plain spans approximately 1,000–1,500 hectares, nestled between the Ceraunian Mountains and opening northward toward the Bay of Vlore along the Adriatic Sea. The Orikum Lagoon spans 630 hectares.

The area is rich in protected natural sites:
- Karaburun-Sazan Marine Park (IUCN Category II) covers 12,570 hectares and holds the distinction of being Albania's first marine protected area.
- Rreza e Kanalit Karaburun Managed Natural Reserve (IUCN Category IV) was established in 1992 and spans 20,000 hectares.
- Llogara National Park (IUCN Category II) encompasses 1,010 hectares, preserving mountainous landscapes and a unique ecosystem.

These protected areas contribute to the conservation of biodiversity and natural heritage, supporting both ecological and sustainable tourism initiatives in the region.

Energy context :

Albania relies heavily on **hydropower** for electricity generation, which is highly seasonal. During dry periods, particularly in summer when coastal tourism in areas like Oricum peaks, the country often resorts to importing electricity to meet demand. Despite Oricum's significant solar energy potential, renewable resources remain underutilized, and outdated local infrastructure hampers energy efficiency and reliability.

Heating in Albania is primarily provided by firewood, electricity, and solar panels. In the Oricum region, which includes the villages of Dukat, Dukat i Ri, Tragjas, and Radhimë, firewood is the dominant heating source. The proximity of protected areas like Karaburun and Llogora has increased pressure on nearby municipal forests, although this impact remains relatively limited.

Agriculture

Agriculture remains a key activity, especially in the Dukat area, where 1,300 hectares are cultivated, with approximately **30% dedicated to olive groves**, forage crops, and livestock vegetation. Besides olives, the region supports grain farming, predominantly oats, and provides vegetation for livestock grazing. The main crops cultivated in the area include pomegranate, almond, fig, apple, pear, plum, and various citrus fruits. These crops benefit from the region's varied climate and soil conditions.

While crops such as walnuts, wheat, and corn have not been successfully cultivated, vegetable farming remains largely limited to personal use. There is a growing trend of converting arable land into olive groves. Also, viticulture is a well-established industry.

However, warmer winters have altered livestock practices, with herds remaining in alpine pastures year-round. While **the reduced number of grazing animals** keeps resources sufficient for now, decreased grass availability may become a concern. Additionally, water scarcity is expected to become a pressing issue for pastures. However, **no other significant changes in livestock development** have been observed so far.

Agricultural Adaptation: Local farmers are adapting to changing climate conditions in innovative ways. For instance, some farmers have started intercropping pomegranate trees between vine rows to shield them from increasingly strong winds. Warming temperatures allow **citrus trees** to be planted at altitudes **above 1,000 meters**, where they previously could not survive. Additionally, **bananas,** which had never ripened in the area before, are now maturing locally.

However, warmer late winters and early springs have disrupted traditional planting schedules, leading to challenges such as late spring frosts that damage early blooms. These unseasonal conditions also affect plant phenophases, as reduced cold days hinder proper plant dormancy, ultimately impacting yields. Additionally, heatwaves place significant stress on crops, while the emergence of new diseases and invasive pests, such as the **white butterfly** in this region, poses further threats to crop production.

Forestry

Forests in Dukat territory are critical natural resources, providing essential ecosystem services and biodiversity. However, these forests face ongoing threats, primarily from human activities and seasonal wildfires. A significant incident in 2001 saw **350 hectares** of black pine forests destroyed by **fires** attributed to human causes. The occurrence of fires in the area is significant. The 2001 fire caused major damage, but annual fires still occur, often stemming from various factors such as clearing pastures with fire, electrical sparks, accidental vehicle fires along the national road crossing Llogora National Park, and lightning strikes.

Furthermore, increased demand for wood for heating puts pressure on forested areas, raising concerns about long-term sustainability and the need for effective forest management to curb deforestation and forest degradation.

The combined effects of deforestation and wildfires have exacerbated **soil erosion** and **land degradation** throughout the region. Additionally, the **Sodë Forest**, located along the Orikum coastline, is increasingly affected by **sea-level rise**, resulting in the loss of approximately **10 meters of land** due to water encroachment.

Biodiversity:

Albania's rich biodiversity includes about 3,600 plant species, with roughly 1,600 species present in the Oricum region alone.

The area boasts rich biodiversity, containing approximately **35% of Albania's national flora.** Many species listed in the Albanian Red List are present, and the Karaburun–Llogora mountain range serves as a habitat for nine endemic species, including *Arenaria cikae*, *Edraianthus caespitosus*, *Hypericum haplophyloides*, *Limonium himarensis*, *Nocceae cikae*, *Reichardia albanica*, *Sesleria albanica*, *Dianthus silvestris*, and *Viola acrocherauniensis*. *(For more detailed data, see the Management Plan for the*

*Llogora–Rreza e Kanalit–Dukat–Orikum–Tragjas–Radhimë–Karaburun complex.)*A 1995 vegetation inventory revealed that conifers dominate this area (around 80%) while deciduous species make up the remaining 20%. In the Qorra Peak region, vegetation is present up to 1,800 meters, while from 1,800 to 2,000 meters there has traditionally been limited or no vegetation due to snow. Biodiversity at higher altitudes is shifting due to changes in snowfall and rainfall patterns, with vegetation now establishing itself at elevations where snow covers traditionally limited growth. This shift may alter the region's delicate ecosystem balance, possibly impacting native species and making room for invasive flora.

Management is conducted by local government (municipalities) for non-protected areas and by the central government for protected zones, overseen by **the National Agency of Protected Areas.**

Water Resources and Marine Life:

The Dukat plain is irrigated by the Dukat river and numerous torrents which descend from the mountains, most prominently that of Llogara. The Llogara Pass at over 1,000 meters of altitude on the Ceraunian Mountains connects the Dukat plain with the Albanian Riviera of the Ionian Sea

But water resources in the Dukat region are experiencing strain, with local aquifers requiring deeper wells as the volume of available groundwater decreases. This depletion is linked to both increased tourism demand and changing rainfall patterns. Additionally, a reduction in the number of water sources and the flow rates of existing ones has been reported.
The irrigation water in the region is managed by a local association, but the **irrigation and drainage systems** have **deteriorated** due to the gradual abandonment of farming professions. Overall water management in the region falls under the responsibility of the **Vjosa River Basin Management Agency**.

The **Gulf of Vlora**, a vital marine environment, suffers from pollution due to untreated sewage, agricultural runoff, and discharge from fish farming. These pollutants introduce **heavy metals**, such as mercury, with levels reaching seven times above safe limits. The water quality in the Gulf of Vlora has declined over the past five years, with water temperatures at 4 meters depth reaching 30.8°C.

Fish populations have changed: This environment leads the place to **invasive species**, such as the Lagocephalus sceleratus (silver-cheeked toadfish), lionfish, and blue crab, have entered local waters due to warming temperatures, disrupting native fish populations. Ocean acidity has also increased, alongside the proliferation of invasive aquatic plants, further destabilizing the marine ecosystem.

The local fish populations have been severely impacted by these changes. Overfishing, coupled with rising water temperatures, has caused a significant decline in both the size and frequency of native fish. For instance, the once-abundant rufio fish, which fishermen used to catch at sizes up to 20 kg, now rarely exceeds 1 kg according to them.

Aquaculture spans over 600 hectares in the region. According to participants, it remains relatively low in terms of pollution levels, but careful monitoring is essential to prevent additional environmental strain.

Climate Change

Temperature and Weather Patterns: Dukat is experiencing unseasonal temperature shifts, with mid-November temperatures unusually high and fewer frost days. This shift impacts crop dormancy cycles, with crops like walnuts, wheat, and corn struggling to adapt to these shorter, warmer winters. Heatwaves are more intense and frequent, exacerbating dust pollution and making agriculture more challenging. Additionally, for the past three years, warmer-than-average February temperatures have disrupted plant life cycles, leading to premature ripening and reduced crop viability. A decrease in the number of cold days prevents many plants from entering dormancy during the winter months. Late spring frosts add further uncertainty, damaging plants that bloom early. Prolonged droughts, fewer frost days, and no snow in 2024. In higher altitudes, new plant growth due to rising temperatures.

Water Scarcity and Rainfall Changes: Rainfall in Podujeva is becoming less predictable. The April to October period is now drier, with up to 155 consecutive days without rain, and July and August temperatures often exceed 30°C. This extended dry season strains water availability, affecting both agricultural irrigation and potable water supplies. Increased tourism exacerbates water shortages, and potential conflicts over water resources could arise if tourism continues to expand without improved water management.

Sea-Level Rise and Coastal Impact: Rising sea levels pose a direct threat to the coastal forests in Orikum, with pine trees now located about 10 meters further inland than in previous years. Warmer sea temperatures and changing marine conditions are leading to shifts in marine biodiversity, with invasive species becoming more common. These changes further stress native species and disrupt the local fishing industry, which relies on traditional fish stocks.

Ecological and Environmental Impact: Dukat faces increased wildfire risk, stronger winds, and elevated dust pollution due to climate warming. Mosquito populations are proliferating at higher altitudes, which poses new health risks for local communities. Although no climate-related migration has been reported so far, local residents foresee potential resource conflicts, especially concerning water availability in peak tourist seasons. Changes in rainfall and snowfall patterns have also impacted forest and grassland ecosystems, enabling vegetation to establish itself at higher altitudes, where snow traditionally limited growth.

Participants wills

1. Introduce new crops suited to the changing climate.

2. Adopt innovative planting techniques.

3. Adjust planting schedules.

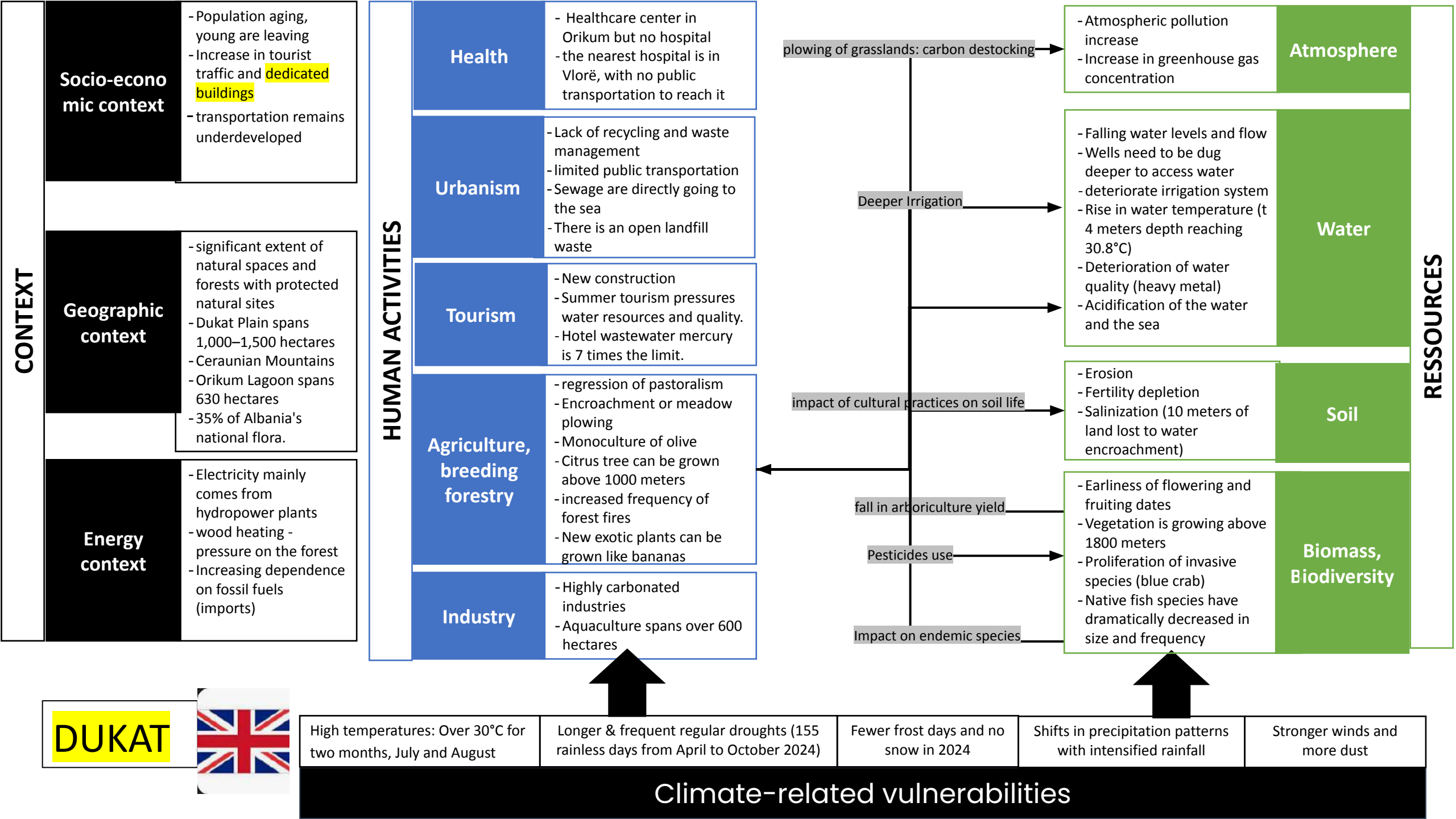
4. Attempt to reduce pesticide use.

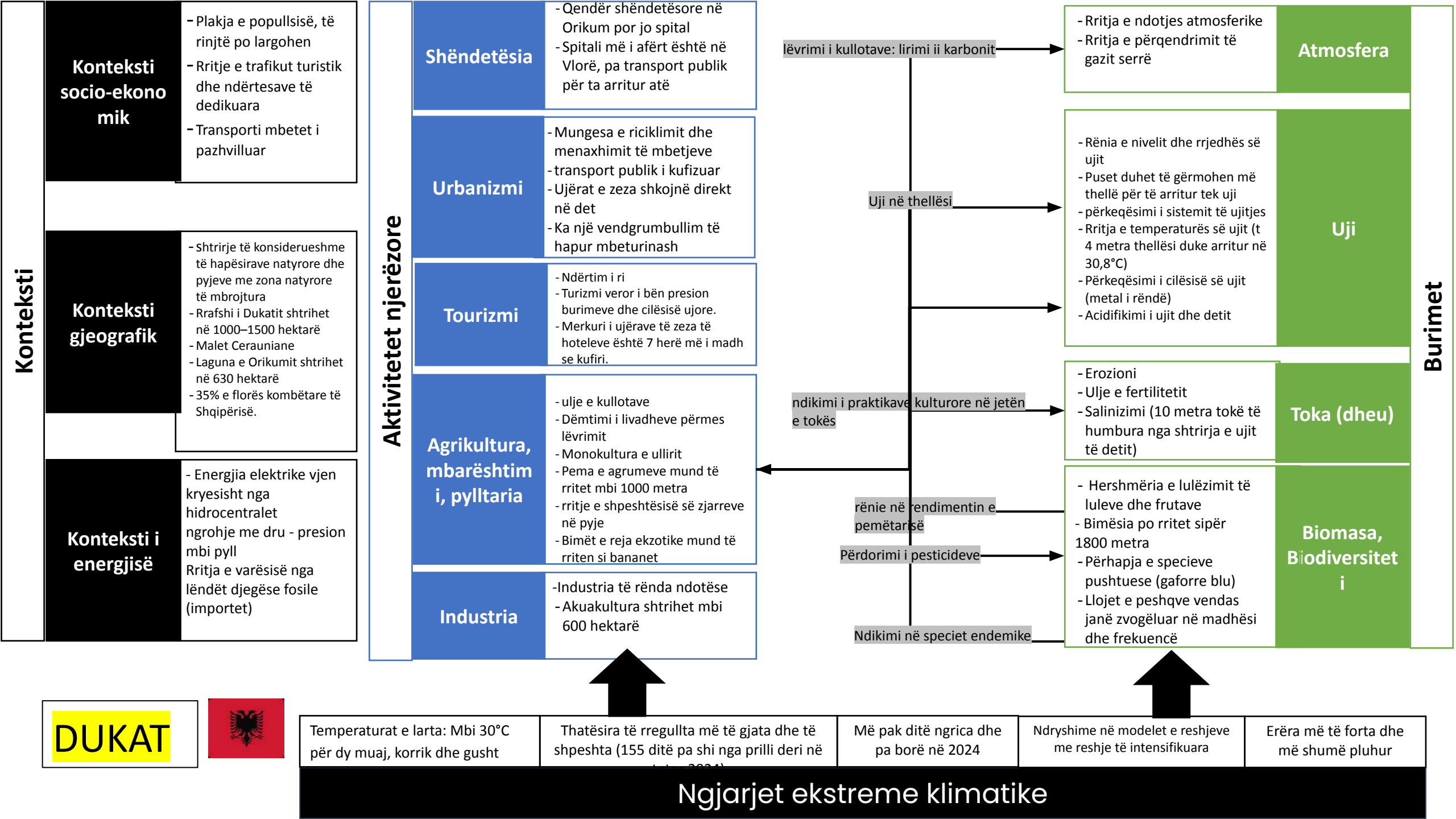
5. Cultivate complementary plants to support each other’s growth.

6. Conduct comprehensive scientific research to identify specific issues in this region.

7. Offer training to raise awareness.

8. Increase afforestation efforts.


CONTEXT
Socio-economic context
- Population aging, young are leaving
- Increase in tourist traffic and dedicated buildings
- transportation remains underdeveloped
Geographic context
- significant extent of natural spaces and forests with protected natural sites
- Dukat Plain spans 1,000–1,500 hectares
- Ceraunian Mountains
- Orikum Lagoon spans 630 hectares
- 35% of Albania's national flora.
Energy context
- Electricity mainly comes from hydropower plants
- wood heating - pressure on the forest
- Increasing dependence on fossil fuels (imports)
HUMAN ACTIVITIES
Health
- Healthcare center in Orikum but no hospital
- the nearest hospital is in Vlorë, with no public transportation to reach it
Urbanism
- Lack of recycling and waste management
- limited public transportation
- Sewage are directly going to the sea
- There is an open landfill waste
Tourism
- New construction
- Summer tourism pressures water resources and quality.
- Hotel wastewater mercury is 7 times the limit.
Agriculture, breeding forestry
- regression of pastoralism
- Encroachment or meadow plowing
- Monoculture of olive
- Citrus tree can be grown above 1000 meters
- increased frequency of forest fires
- New exotic plants can be grown like bananas
Industry
- Highly carbonated industries
- Aquaculture spans over 600 hectares
plowing of grasslands: carbon destocking
Deeper Irrigation
impact of cultural practices on soil life
fall in arboriculture yield
Pesticides use
Impact on endemic species
- Atmospheric pollution increase
- Increase in greenhouse gas concentration
Atmosphere
- Falling water levels and flow
- Wells need to be dug deeper to access water
- deteriorate irrigation system
- Rise in water temperature (t 4 meters depth reaching 30.8°C)
- Deterioration of water quality (heavy metal)
- Acidification of the water and the sea
Water
- Erosion
- Fertility depletion
- Salinization (10 meters of land lost to water encroachment)
Soil
- Earliness of flowering and fruiting dates
- Vegetation is growing above 1800 meters
- Proliferation of invasive species (blue crab)
- Native fish species have dramatically decreased in size and frequency
Biomass, Biodiversity
RESSOURCES
DUKAT
High temperatures: Over 30°C for two months, July and August
Longer & frequent regular droughts (155 rainless days from April to October 2024)
Fewer frost days and no snow in 2024
Shifts in precipitation patterns with intensified rainfall
Stronger winds and more dust
Climate-related vulnerabilities


Konteksti
Konteksti socio-ekonomik
- Plakja e popullsisë, të rinjtë po largohen
- Rritje e trafikut turistik dhe ndërtesave të dedikuara
- Transporti mbetet i pazhvilluar
Konteksti gjeografik
- Shtrirje të konsiderueshme të hapësirave natyrore dhe pyjeve me zona natyrore të mbrojtura
- Rrafshi i Dukatit shtrihet në 1000–1500 hektarë
- Malet Cerauniane
- Laguna e Orikumit shtrihet në 630 hektarë
- 35% e florës kombëtare të Shqipërisë.
Konteksti i energjisë
- Energjia elektrike vjen kryesisht nga hidrocentralet ngrohje me dru - presion mbi pyll
Rritja e varësisë nga lëndët djegëse fosile (importet)
Aktivitetet njerëzore
Shëndetësia
- Qendër shëndetësore në Orikum por jo spital
- Spitali më i afërt është në Vlorë, pa transport publik për ta arritur atë
Urbanizmi
- Mungesa e riciklimit dhe menaxhimit të mbetjeve
- transport publik i kufizuar
- Ujërat e zeza shkojnë direkt në det
- Ka një vendgrumbullim të hapur mbeturinash
Tourizmi
- Ndërtim i ri
- Turizmi veror i bën presion burimeve dhe cilësisë ujore.
- Merkuri i ujërave të zeza të hoteleve është 7 herë më i madh se kufiri.
Agrikultura, mbarështimi, pylltaria
- ulje e kullotave
- Dëmtimi i livadheve përmes lëvrimit
- Monokultura e ullirit
- Pema e agrumeve mund të rritet mbi 1000 metra
- rritje e shpeshtësisë së zjarreve në pyje
- Bimët e reja ekzotike mund të rriten si bananet
Industria
-Industria të rënda ndotëse
- Akuakultura shtrihet mbi 600 hektarë
lëvrimi i kullotave: lirimi ii karbonit
Uji në thellësi
ndikimi i praktikave kulturore në jetën e tokës
rënie në rendimentin e pemëtarisë
Përdorimi i pesticideve
Ndikimi në speciet endemike
- Rritja e ndotjes atmosferike
- Rritja e përqendrimit të gazit serrë
Atmosfera
- Rënia e nivelit dhe rrjedhës së ujit
- Puset duhet të gërmohen më thellë për të arritur tek uji
- përkeqësimi i sistemit të ujitjes
- Rritja e temperaturës së ujit (t 4 metra thellësi duke arritur në 30,8°C)
- Përkeqësimi i cilësisë së ujit (metal i rëndë)
- Acidifikimi i ujit dhe detit
Uji
- Erozioni
- Ulje e fertilitetit
- Salinizimi (10 metra tokë të humbura nga shtrirja e ujit të detit)
Toka (dheu)
- Hershmëria e lulëzimit të luleve dhe frutave
- Bimësia po rritet sipër 1800 metra
- Përhapja e specieve pushtuese (gaforre blu)
- Llojet e peshqve vendas janë zvogëluar në madhësi dhe frekuencë
Biomasa, Biodiversiteti
Burimet
DUKAT
Temperaturat e larta: Mbi 30°C për dy muaj, korrik dhe gusht
Thatësira të rregullta më të gjata dhe të shpeshta (155 ditë pa shi nga prilli deri në
Më pak ditë ngrica dhe pa borë në 2024
Ndryshime në modelet e reshjeve me reshje të intensifikuara
Erëra më të forta dhe më shumë pluhur
Ngjarjet ekstreme klimatike