The Anthropization of the Tirana-Durra Region Case Study: Former Durrës Swamp

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Abstract

Anthroposizing is the transformation or adaptation of the environment to meet the needs of humans. This phenomenon in its most advanced stage in the territory recognizes the process of urbanization. The process of anthropization, which leads to urbanization, is mainly related to the alienation of land use. In the area of the former Swamp of Durrës, the change in land use has come gradually, leading to intensive urbanization. Some of the anthropizing processes that lead to urbanization are: covering the land with inert materials, fragmentation of habitats for different purposes, land occupation for future investment purposes. We are already in a transitional phase. The need to preserve this area is threatened by the effect of population growth, uncontrolled population movement and their activities. This prolonged anthropization process developed over 30 years has created strong environmental impacts in the area, translating once again the alienation of the land, the creasing of the land and different uses. All these alienations have caused the swamp to take on its characteristics such as: oversaturation with water and the creation of bogs. Anthropogenic activity is always increasing, causing "urban surprises"

Keywords: *Anthropization, Urbanization, Urban Pressure, Densification, Land Use, Geospatial Analysis*

1. Introduction

Anthropization: Anthropization is often defined as the transformation or adaptation of the environment to meet the needs of people, this change (transformation) comes as a result of human activity. The area chosen for the study is a part of the former marsh in Durrës. A narrow strip of land, more or less in the north-south direction, from Porto Romano to Ura e Dajlani and lying between the hills of Durrës and the hills of Shënavlash, centuries ago turned into a sea marsh.

Fig.1.1 *Ish Këneta Durrës- 1930*

Sea water flooded this strip of land, which sank, as a result of the movement of different tectonic plates that form the coast of Durrës. The city of Durrës was located on an island and was connected to the rest of the country by a bridge, known as the Dajlan Bridge (the place where sea water enters the land). Durrës lived for centuries with the marsh near it, learned to coexist with it, and even benefited from it. Projects were drawn up for deepening and turning it into a canal, making it navigable.

In 1942, the architect Leone Carmignani completely completed the General Regulatory Plan of Durrës. The plan envisaged its development in the future, where the idea of deepening the swamp and turning it into a navigable channel was discussed, giving Durrës the shape of a city-island.

In 1944, the drafting of the plan for draining the marsh began. In 1962, the marsh was no more: a powerful embankment was built at the Dajlani Bridge, preventing the sea from entering. The road was built on the embankment, which exists to this day. People still know that place as Dajlan Bridge, for now there is no bridge there. A similar embankment was also built in Porto Romano, blocking the entrance of the sea from the north. The water was removed and a wide area of land was obtained. The intention was to use it for wheat, but the soil turned out to be so salty that the only product that could be grown there was beans.

1.1 How the "Ish- Keneta" field was benefited

Until the mid-1990s, what used to be called the swamp, remained a large area of agricultural land, useless for anything. One of the reasons why it remained unusable was the sea level. This area was not considered suitable for construction as it is below sea level and holds water. The main facilities that were built on the basis of the project idea are: the Porto Romano reservoir that has 7 motor pumps with a capacity of about 24 m3/sec. Without the functioning of the hydrovor, this land surface can be flooded by rainwater that naturally flows from the hills on the side; the high water canal Spitalle, which collects the waters of the hills and pours them freely into Porto Romano; with a length of 7200 ml; the Shënavlash high water channel that collects rainwater from the hills and pours it freely near the Army Rest House on Durres Beach with a length of 7800 m; protection of the marsh from the sea with embankments 9200 m long; protection of the marsh from the Erzen River with embankments (left wing) with a length of 4700 ml; the main drainage collector of the marsh that brings the drainage waters to the Porto Romano reservoir with a length of 7883.60 ml; 26 secondary drainage channels with a total length of 39 164 ml. With the completion of all the above facilities for the drainage of this field, 3050 ha of land were benefited. The need to conserve limited natural resources is threatened by the effect of populaton growth and ongoing anthropogenic activities.

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Fig1.2 Swamp reclamation - 1940

1.2 Transition from "swamp"- "city"

Urbanization is the process of urban population growth, physical and spatial expansion of cities and the urban way of life. Urbanization is seen as a way to improve civilization, bringing it more progress and development.

Urbanization is one of the most important factors that threaten land cover. In order to study the effects of human factors on the plant cover, we will study the area of the Former Swamp in Durrës in different periods of time (1985-2000-2007-2015) where urbanization is being carried out spontaneously.

Durrës County is one of the counties that has experienced an increase in population from internal migration. The former swamp of Durres is one of the most informal neighborhoods of the city. This area began to be populated massively after 2010. While in 2015, that area had become one with the city of Durres.

The reasons why the residents have chosen the area of the former swamp to live are different as: 1. According to the residents, these lands were free and the owner of these lands was the state. 2. Abundance of natural wealth

According to the statistics of Aluizni, around 12,000 local flats and services of various types have been built, making the residents self-employed. The population in this area is thought to be around 40,000. Regarding the age structure, the most dominant age group is the young age.

Fig 1.3-1.4 Residents in the area of Ish-Këneta

Although this area is being urbanized every day more and more different problems prove that the swamp has not disappeared. It is the health and environmental factors that prove the "existence of the swamp". Garbage, open drains,

lack of containers, bad smell in the air and roads covered with gravel, potholes in places. It is this panorama that appears in many streets, squares and alleys. The canal passes through some parts of this neighborhood, in some of its streets, and it is the problem of the day for the residents. The inner streets of the neighborhoods are in complete darkness, there are no green and illuminated public spaces.

Fig 1.5- 1.6 Current state of the area

Another problem that comes after the main issues is the way of life. For more than 25 years, residents have been living among sewage. The area is crossed by an open canal which is a factor in the creation of various infectious diseases. Statistics show that numerous cases of residents affected by various infectious diseases have been registered and the most affected age group is that of children.

Fig 1.7- 1.8 Current state of the area

Objective: Identification of land cover change processes.

Problem: Looking the factors that have changed the land cover

2. Methodology

The study begins with the research framework which includes a theoretical research through which we will explore and understand what urban anthropization is and mainly in the city of Durrës. During this research we will identify the factors and processes of anthropization which have influenced the change of the land cover. . The research will then proceed with the conceptual framework which will develop the components in each step.

The third step is the methods that will be used to measure land cover changes. First, using geospatial data, we will see the land cover in different periods, which are 1994-2021. To see the changes in the land cover we made a classification (grouping) according to its use. These categories are: a) urban b) arable land c) complex cultivable land d)

Considerable area of land usable for agriculture. To see the change of land cover, we will create a matrix where each land change is presented as "T1- T2" (T1-time 1 & T2- time2), which means the change from the land cover T1(1994) to the cover of land T2 (2021).

Land cover stability is defined as a lack of land changes which will be represented as T1T1 meaning that a given plot of land in 1994 has the same land cover in 2021.

Table 1. Change of land cover in different periods

Plot	1994	2002	2007	2021
P1	T1	……..	……..	……..
P2	T2	……..	……..	……..
P3	T3	……..	……..	……..
P4	T4	……..	……..	……..

The indicators that evaluate the processes of land cover change are: 1. Urbanization

1.1- Urbanization and artificialization from crops, pastures and semi-natural areas

1.2- Urbanization and artificialization from natural areas

2. The creation of new mostly homogeneous agricultural areas

2.1- Creation of new heterogeneous or semi-natural areas

3. Homogenization of new areas

To measure what is the gross relative change of the earth's surface, we will calculate it through the formula:

S. actual year- S. year 1994/ S.toale- S. not built

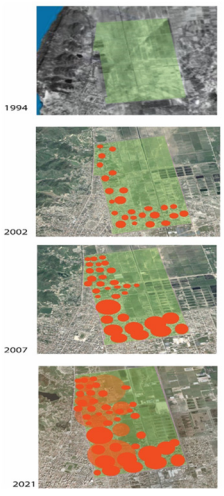
Relative Change = Sip. 2021- Sip. 1994/ Sip. Total- Sip. not built

3. Analysis

Anthropization: Anthropization is often defined as the transformation or adaptation of the environment to meet the needs of people, this change (transformation) comes as a result of human activity.

Following the methodology to evaluate the changes of the land cover but also to understand the process of anthropization, we chose the area of the Former Swamp of Durrës. The reason for selecting this area is because this is an area which has undergone various transformations within a period of about 30 years. We have a high impact of the intervention of human activity.

Land cover is still changing from 1994 to the present day.



Using geospatial techniques, we see that the magnitude of human development activities affects plant cover. The results of the analysis show a remarkable impact of anthropization.

Uncontrolled demographic movements caused them to move from the South to the North in a land that was designed for agricultural land that used to be a marsh and nowadays "Durrësi Ri" is found. The area continues to be known as the "Durres Swamp" but there is no free land anymore, as we can see in the picture.

Urbanization has occurred with rapid steps in this area, changing the land use cover and its function

Fig 1.9 Process of anthropization

In order to see the process of what happened and how the anthropization process happened in the area of Ish Këneta, we made a categorization in four steps:

1) In the 1960s we have water baths, completely intact.

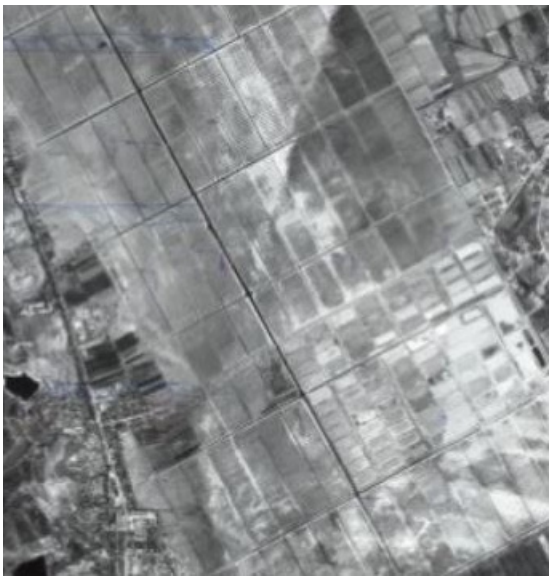


Fig. 1.10 Homogenization

1) Around the 1990s, the anthropization of these plots takes place by being compacted with "soil" and turning into agricultural land.

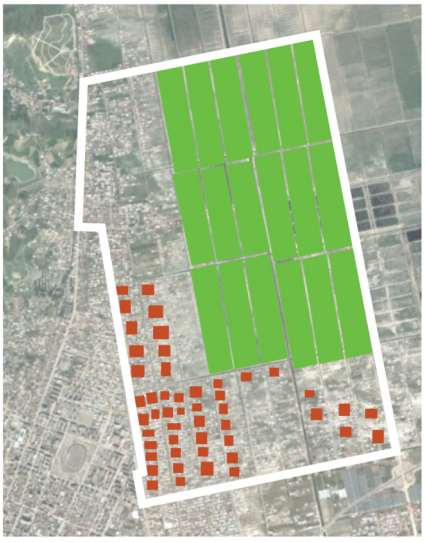


Fig. 1.11 Decomposition of functions

2) Occupying plots and returning them to already habitable land. The function of the parcels varies. From agricultural function to residential function.

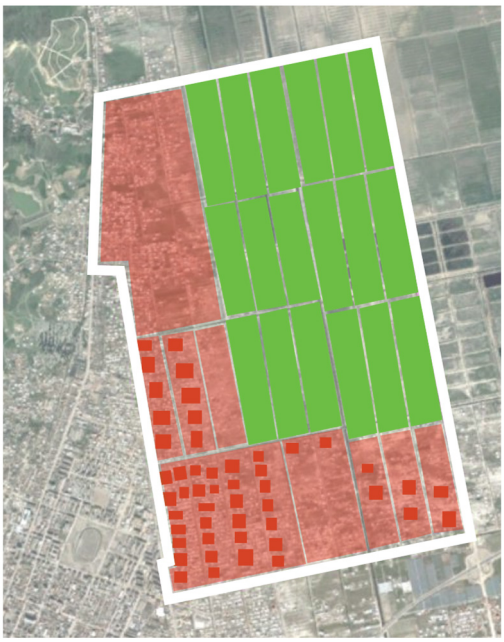


Fig. 1.12 Densifikimi dhe konsolidimi i zonës

1) In this phase, the process of densification and consolidation of buildings takes place.

In order to compare and see how high and with how fast urbanization has occurred, we have carried out some measurements as below:

-Total area of the study area = 5.75 km^2
-Surface of the unbuilt area = 2.32 km^2
-Surface of the area built in 1994= 0.0614 km^2
-Surface of the built area in 2021 = 3.35 km^2
Relative Change = Sip. 2021- Sip. 1994/ Sip. Total- Sip. not built
= 3.35 - 0.0614 / 5.75 – 2.32
= 0.958
So relative change is bigger than 0.5.

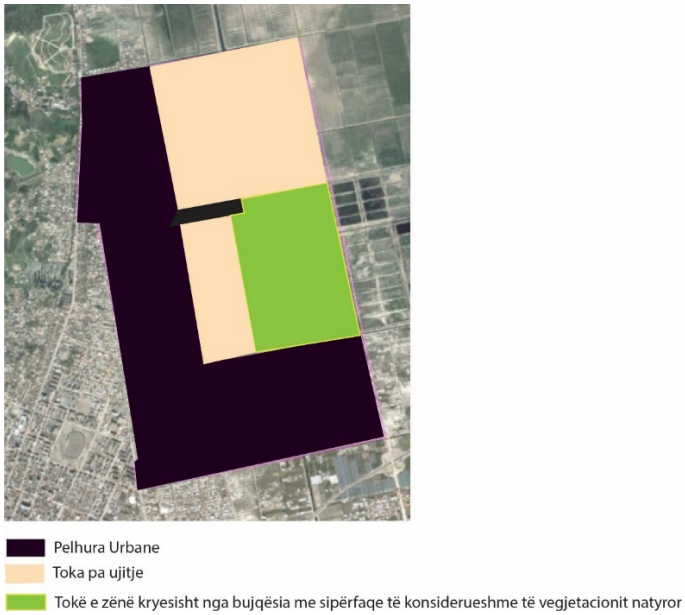


Fig 1.13 Land Cover

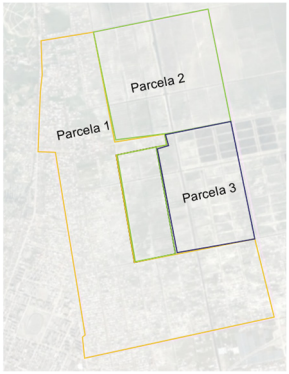


Fig.1.14 Categorization into 3 plots

Plots	1994	2021
P1	T1	T2
P2	T1	T2
P3	T1	T1

4. Results

The area of Ish Keneta is one of the most informal areas in the city of Durrës. The anthropization in this area is quite visible.

The intensity of the flood is high towards a territory in the process of urbanization or anthropization.

From the calculations of the relative absolute change in different periods 1990-2021, we see that the relative change is 0.958. This value expresses the state and progress of urbanization, since the absolute relative change was

greater than 0.5, this indicates that urbanization is high.

The continuity of living problems in this area, the numerous environmental and health problems show that the swamp continues and is still present.

The land cover in this part that we are studying has changed, only in 1 plot we have stability, which means that the land cover has not changed and its function also during the period we are studying.

Importance and usefulness of Policies

Channel sampling in the suburbs

As above, we have evidenced that the area under study had an industrial and agricultural character, where the rainwater or irrigation water that was collected from the land passed through a main channel that then flows into the Adriatic Sea. After the 90s, changes occurred with the population of the area. The phenomenon of urbanization of these areas did not go parallel to the development of public services. Due to the lack of a sewage system, sewage began to be discharged into the agricultural canal.

Regarding the description, the canal has a width of 6 meters, the canal has an extension from the Shkozet area, continues in the so-called "Former Swamp" part and then flows into the Adriatic Sea where this canal ends, and from this extension so large enough to pollute the coast of Porto Romano with sewage.

The Beach area, by means of 6 consecutive pumping stations, collects water from the area of Poplars and pours it into the open channel in the Former Swamp. The pumping station no. 7 at its exit also pours the waste water into this channel, where it is then poured directly into the sea.

Hierarchization of the Problem

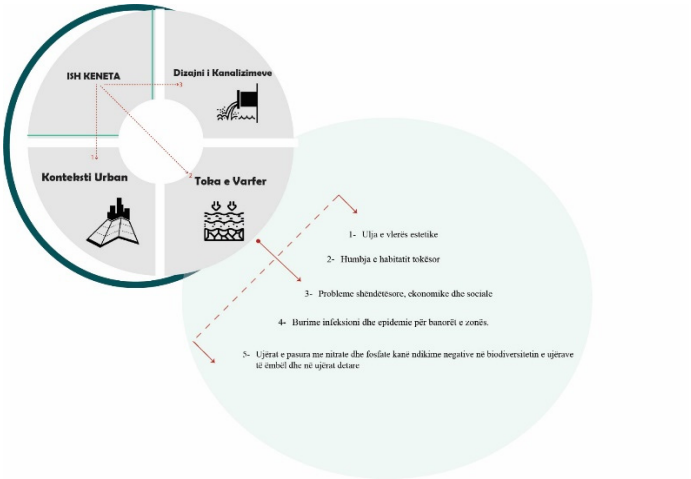


Fig.1.15 Hierarchization of the Problem

Problems caused as a result of channel pollution:

1- Waters rich in nitrates and phosphates have negative impacts on the biodiversity of freshwater and marine waters

2- Sources of infection and epidemic for the residents of the area.

3- Health, economic and social problems

4- Loss of terrestrial habitat

5- Decreasing the aesthetic value

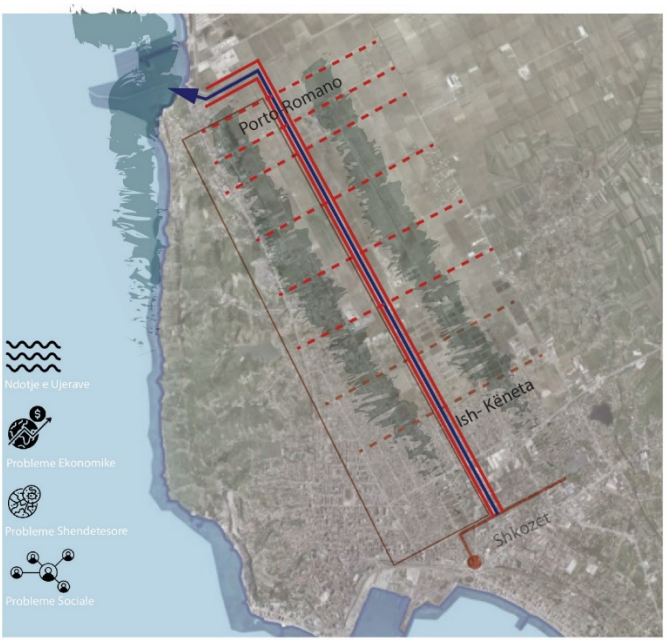


Fig.1.16 Problems caused by the channel, Source: Worked by the author

The policy undertaken

Rehabilitation of the Canal in the Ish Keneta area

Rehabilitation means maximizing the use of useful resource potentials.

In the concrete case, the rehabilitation includes all aspects of the canal including: restoration of the canal, flood management, sediment control. Channel rehabilitation entails a number of impacts on marine processes, coastal ecology and the terrestrial environment.

The rehabilitation of the channel in the area of Ish-Keneta will include activities that will change the parameters of the channel such as: width, length, depth, slope, discharge, sediment size.

-This project will ensure the preservation of the water level from floods, this can be done by removing obstacles from the canal, adjusting its direction and widening/deepening it.

Sediment control

Sediment transport in a channel is considered a natural phenomenon, sediment can be classified as a non-point pollutant and sediment can be present in excessive amounts that have harmful effects in environmental and physical aspects. Excessive sedimentation can result from erosion and runoff resulting from human-caused practices such as mining, agriculture, development, construction, and canal maintenance activities. Excess sediment can result from erosional degradation or channel bed failure. Sediment control activities include sediment removal (dredging), implementation of channel bank sustainability projects, better construction methods, sediment capture or storage, flow diversion structures, construction of sediment retention dams, and augmentation of the use of protective vegetation.

Infrastructure around the canal

Around the canal there are residential structures built by the residents themselves, bridges, etc. Canal rehabilitation projects can accelerate the erosion process and lead to damage or complete failure of an adjacent infrastructure. Excessive sediment transport and sedimentation can affect water supplies and diversion operations.

Habitat Improvement and Enhancement

Existing channels often experience a loss of lateral and terrestrial vegetation, bed substrate, and in-stream habitat diversity. Loss of vegetation on the channel side may result in an increase in water temperature due to a reduction in shade, in addition, loss of protective vegetation increases erosion. Habitat improvement activities include the re-introduction of vegetation along the shore. The necessary protection is provided and the placement of artificial structures

such as stones, gravel or rapids in the channel to ensure the necessary diversity of the channel bed.

Channel modification activities and social influences

This section will address specific activities that are implemented to achieve project goals or address project environmental concerns. Activities that change the channel geometry can create stability problems. Each of the activities is implemented to achieve a level of benefit to the surrounding community or region.

Adjustment and cleaning

Catchment and cleaning activities are implemented to increase the discharge capacity of canals for flood and drainage control purposes and to prevent hazards to navigation or bridges. Increased flow resistance due to the presence of vegetation and debris can increase the frequency and duration of flows. The goal of the practice is to remove sufficient vegetation, debris, logs, sediment blockages, large rocks, and other obstructions from the channel and adjacent banks to reduce flow resistance. These obstructions slow the flow by reducing the effective cross-sectional area of the channel, increasing channel roughness and trapping additional debris, especially during high flows (shields).

Project Proposal

BOOM-BURB

Boom-booming

Burb- Suburbane

One of the main problems in the area was flooding. By making an estimate of the direction of the winds, the channel flow is in the opposite direction to the wind, which causes flooding. Floods also occur as a result of canal blockages/turbine closures. Another factor is the water that flows, so it is important to separate sewage from rainwater. Attached is a map showing the direction of the wind in the area.

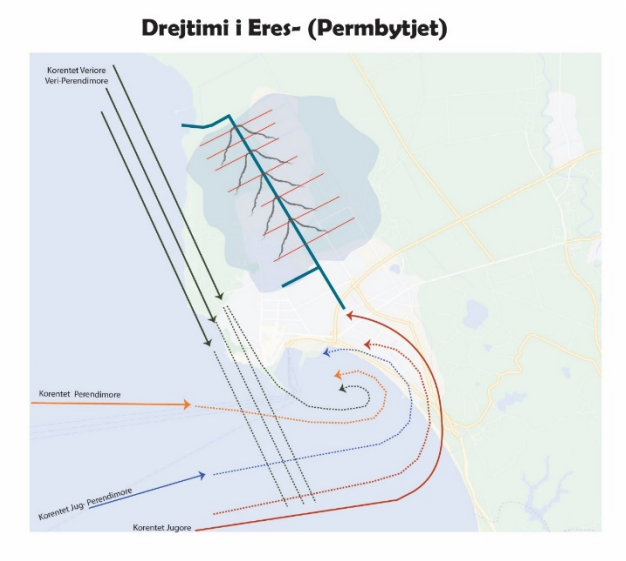


Fig.1.17 Wind direction, Source: Worked by the author

The solution to the problem consists in the proposal of several scenarios related to the rehabilitation of the channel, the naturalization of the areas and the diversion of the drainage point.

First scenario: Rehabilitation of the existing canal.

The reservoir is in a very bad condition, where it suffered the greatest damage after the earthquake that occurred in 2019. The main existing collector is about 37,700 ml and 40 drains. The area where these waters drain is about 3100 ha. Another intervention is the separation of rainwater and sewage.

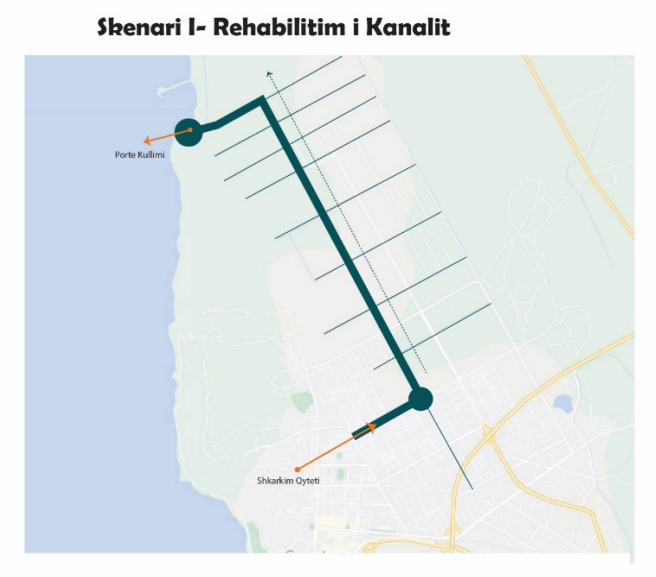


Fig.1.18 Scenario 1-Canal Rehabilitation, Source: Worked by the author

Second scenario: Water treatment plant and naturalization of the area.

This scenario proposes the placement of a sewage treatment plant near the point where the city's water is discharged, which then continues to the drainage point in Porto Romano. Other interventions that are proposed are the rehabilitation of drainage canals, increase of the green surface, in this way urban pollution is also eliminated.

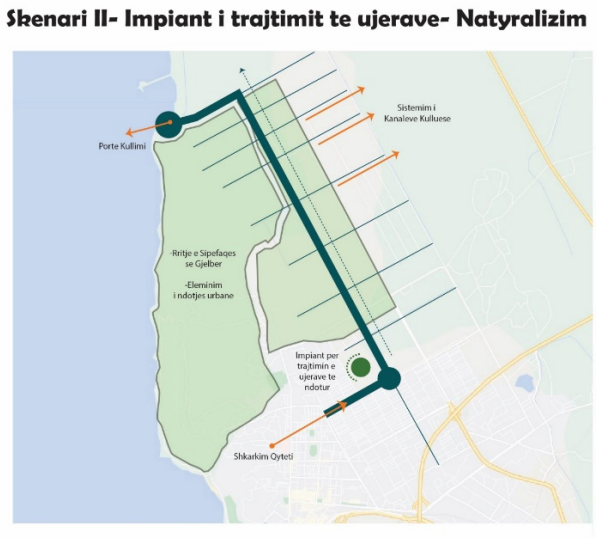


Fig.1.19 Scenario II- Water treatment plant, Source: Prepared by the author

Third scenario: Diverting the drain point

In the third scenario, the diversion of the drainage point, the installation of the water treatment plant, naturalization of the area is proposed. The water starts and collects from the area of Porto Romano, continuing in the direction of the road in the same direction as the direction of the wind, then it collects the water of the city and continues to be poured into the drainage point. This is the scenario that proposes the best solution for the canal and the surrounding area.

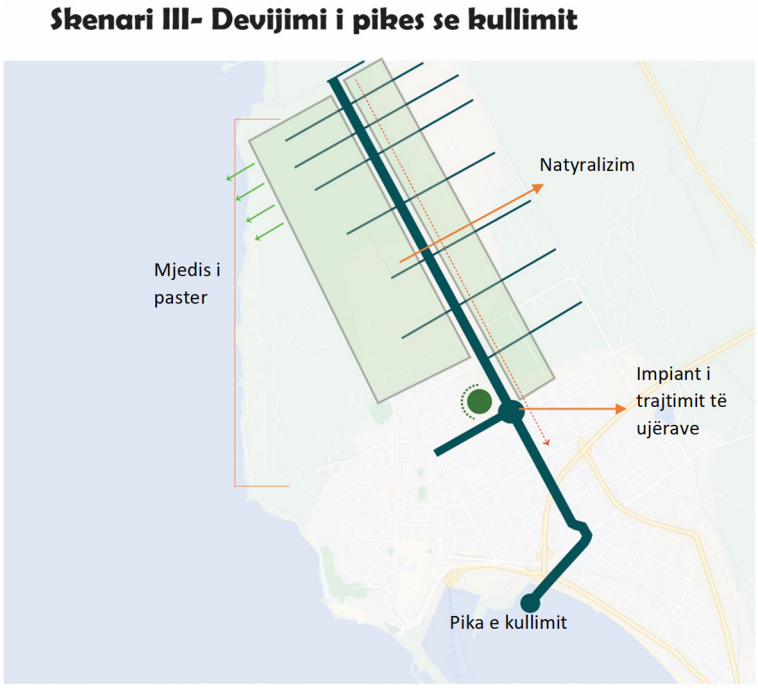


Fig.1.20 Scenario III- Drainage Point Deviation, Source: Worked by the author

The whole process goes through several stages, which are:

Phase 0- Macro intervention in the public

Phase 1- Innovation on vegetation and water pollution (Social Factor)

Phase 2- Infrastructure work (Investor)

Cost

-Consultancy contracts are needed for open channel study, fauna study, speech study, wind current study, road network study, water network study, habitat study. 10-20 year study on managed recycled quantities.

Urbanization rate for 20 years.

Cost over the value of the land - Conversion of hectares for the purpose of infrastructural work.

- Transfer of ownership.
- Designing the new landscape.
- Installation of water treatment plants.
- Installation of management systems

Constant itching

-Cleaning element on vegetation treatment

-Awareness of fauna and flora in educational institutions.

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