

environmental alteration process of eastern costa del sol. tourism as an engine of change

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Abstract

Touristic development, urban growth and new production systems need various resources and infrastructure which may change natural order, altering ecosystems in the coast

We have studied the Vélez river valley and its territorial dynamics within the framework of the northern coast of the Alborán Sea.

It is located in the Axarquía region, composed by many small towns (except for rare cases) which have traditionally lived from agriculture and (more recently) from rural and “sun and beach” tourism.

In order to support this economy, it became necessary to develop other activities which would alter the environment more directly.

In this research project we will look for a solution for the mouth of river Vélez, trying to combine human presence and the preservation of the environment by means of a system which will change the current invasive tourism, to a sustainable and long-term tourism.

Keywords: Vélez, Alborán Sea, Coast, Axarquía.

Introduction

The rapid settlement of the territory during the last 50 years has dramatically altered the landscape, especially the coast. Tourism, urban growth and new production systems, together with their infrastructure need resources which change natural order, altering ecosystems. An analysis of the northern coast of the Alboran Sea shows that this phenomenon is particularly noticeable in the eastern part due to urban sprawl.

The Vélez river basin in the Axarquía region is an example of this transformation due to urban pressures and new farming techniques. These brought an increased demand for water, leading to the construction of the Viñuela dam in 1986.

Water regulation of the Vélez River basin represented a stop of sediment's contribution to the sea and the delta, which is causing its decline. The regulation of water flow, together with the uncontrolled extraction of groundwater wells has led to critical situations on many occasions, which affected the partial destruction of the river ecosystem and especially of wetlands in the mouth of the river.

Development of the problem

The northern coast of the Alborán Sea.

We have studied different layers of the territory from the Strait of Gibraltar to Adra (Almería). They have been grouped into three sections: those that deal with urban sprawl and its associated infrastructure, the physical environment of the Earth and the underwater environment.

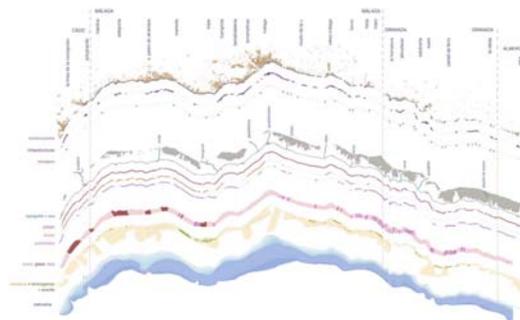


figure 1

Although the Costa del Sol has a larger urban area than the Axarquía and the Costa Tropical, the occupancy level of maritime infrastructure is greater in the second case. This is determined by the urban growth of the second area and its topography.

Whereas in the first case the hills are far from the coast and allow the emergence of infrastructure and continuous cities, the second model forces to break up buildings. This means a bigger investment in infrastructure per capita because it has a much steeper terrain. Small places have special importance for its rarity and proximity to the population.



figure 2

figure 3

figure 4

Vélez River's Basin.

In the case of the Vélez river valley, tropical crops exceed the limit of natural topography. This is giving way to urban growth in the more ecologically and economically valuable land. New crops have a higher water demand, and together with growth of city centers as a result of increased tourist interest in the area as a second home, this results in high water consumption. In 1986, the Viñuela dam was built for this reason. The basin's water regulation and years of lower rainfall have affected over 17 km of wildlife below the dam.



figure 5

Since 1986, the sediment to the sea by this river has slowed down. This is causing a decline in the delta, which had grown since the eighteenth century. The erosion of our coasts is not something that can be solved locally: it requires a global solution. Most of the biggest rivers in the Mediterranean Sea have dams and other elements which help slowing the sediment in the sea. They keep our coastal profiles.



figure 6 [1]

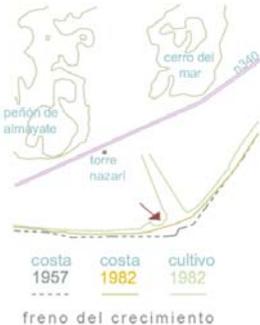


figure 7 [1]



figure 8 [1]

Finally, aggressive farming techniques and the overexploitation of wells are destroying the aquifer. The extracted water was more than the water which came in and the aquifer level dropped, allowing sea infiltration. This brackish water, together with nitrates from fertilizers used more recently damages severely the quality of water, especially in the coast.

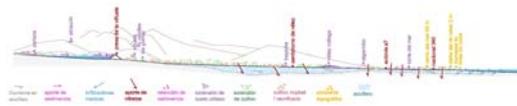


figure 9

Proposed water management.

Based on all the issues raised we have studied water management in the basin over the years, according to four parameters: aquifer recharge, water quality, supply and ecosystem regeneration. We have also assessed some new management possibilities and chosen a solution.

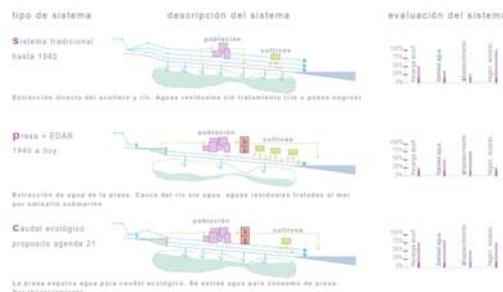


figure 10



figure 11

If we used a traditional system of collecting water without storage and plant treatment, our supply capacity would be minimal and the quality of groundwater would be deteriorated. With a dam, the ecosystem is severely affected. Agenda 21's proposal of an ecological flow of would help the regeneration of ecosystems, but the supply capacity would still be insufficient.

We propose a wastewater recycling system with tertiary treatment for a higher efficiency. Some of this water would be used to recharge aquifers. This takes place through channels and recharges wetlands that flow through a protected environment and proposed mouth park.



figure 12

The charge is implemented through permeable soil substrate until reaching the saturated zone, where clean charge water is mixed with the already existing water in the aquifer by increasing the level and quality, thus eliminating marine intrusion. Around channels and wetlands, local ecosystems, habitats wildfire, and interesting places to promote sustainable tourism would be created by themselves.



figure 13

Definition of the protection area. The park environment.

We suggest establishing a protected area in the mouth of the river increasing the protection margin provided by the current planning.

Recharge wetlands created from the extraction of gravel from the ground would be located within this space. This protected area would have other functions in addition to recharging the aquifer. It would be a public park in which actions such as the regeneration of the coastal dunes (now occupied by crops), the establishment of an area devoted to organic farming and the creation of a poplar grove (with white poplar) would be carried out. We also suggest giving this place different sports and recreational uses, and finally the construction of a management center for the park, visitors and water regulation.

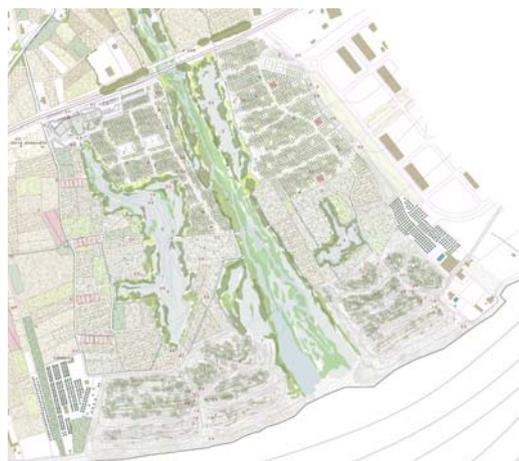


figure 13

Conclusion

The coast has suffered a very quick process of change in the productive systems in the recent years due to an increase in the population as a result of tourism. This has forced to adopt new solutions in the territory, often hasty or unplanned. Managing multi-scale data has revealed that a single event can affect the overall system.

Axarquía's urban model is very disjointed, and this is the main attraction for tourists seeking refuge in the countryside. This requires deploying a very large amount of infrastructure, so that the transformation undergone by the medium is very large and very few natural spaces remaining value free.

Our proposal targets the establishment of an area which may be attractive to the kind of tourists who visit the area, being respectful to the environment and integrating the urban network.



figure 14

References

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