
ARTICLES

THE IMPACT OF INTENSIVE AGRICULTURE IN THE TOURIMS USE OF THE BEACHES OF «MARINA DE COPE» (MURCIA)

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Beaches, as we know them, are accumulations of sediments along the coastline (DGC, 2008). These sediments have three basic sources: marine organisms (shells, coral, etc.), eroded coastal rocks and, especially, sediments transported by rivers, both permanent and temporary. Due to the substantial churning of sediments along their beds («ramblas») and the large quantities of sediment they provide in full spate, these temporary streams are one of the most important factors determining the way in which the coast is regulated (López Bermúdez and Gomaríz Castillo, 2006). Any significant alteration in these sources of sediment or in the processes of coastal dynamics will determine the advance or regression of the coastline itself.

In natural conditions, a coast is in dynamic equilibrium when the quantity of material reaching it is the same as that which leaves it (Bayo Martínez, 2005). Erosion can only be said to exist when the system as a whole loses sediment (De la Peña Olivás and Sánchez Palomar, 2008).

Such a loss of sediment may have three causes: (1) human actions along the coast, such as the construction of ports for maritime transport or pleasure harbours, which are often reclaimed from the sea, by occupying dunes or even by taking over beaches; (2) activity, albeit far from the coast, which significantly affects the quantity of sediments reaching the coast, such as the extraction of sand from river beds for building purposes, channelling that alters the water flow and dams that retain much of the sediment - the European Commission (2005) estimated that as many as 100 million tons of sand is extracted annually from rivers before it enters the sea; (3) recent increases in sea level through global warming. According to the results of the Spanish Oceanographic Institute (Vargas-Yañez, *et al*, 2010), this increase in sea level along the southern edge of the Mediterranean Sea can be put at 2.5 mm/year since the 1990s, that is about 5 cm to date, meaning that many beaches have significantly retreated.

All these causes are responsible for most of the erosion seen along the Spanish Mediterranean coast, which has seen a gradual reduction in the «recreational capacity» of beaches. This recreational capacity represents the number and type of users a beach can support without any unacceptable environmental or social impact (Jiménez and Valdemoro, 2003), and is evaluated by taking into consideration two fundamental aspects: the *biophysical* component, which refers to the «integrity» of the resource itself (the beach) and the *perceived* component, which takes into consideration the degree of satisfaction of the users (Saveriades, 2000).

In beaches destined for tourist use the biophysical component is almost exclusively restricted to physical aspects since the environmental value of this type of beach is usually low (Jiménez and Valdemoro, 2003) the perceptive component is limited to cleanliness, services, access and overcrowding. But natural beaches, which are not yet used as tourist sites and, paradoxically for the same reason, found attractive by tourists who seek tranquillity and contact with a relatively natural environment, the biophysical component (natural state of the beach, associated ecosystems and landscape) is of great importance, while of the more perceptive components, the area of beach available and, consequently, the degree of saturation, is the most important.

This level of saturation has been established as an available area of 4 m²/user (MOP, 1970), although other authors (PAP, 1997; Anton, 1997; Roig i Munar, 2002), depending on the type of beach mention maximum capacities that run from 5 m²/user in urban beaches to 25 m²/user in natural surroundings.

The southernmost coast of the province of Murcia between the Sierra de las Moreras (Mazarrón) and Cabo Cope (Águilas), is a 26 km long stretch of Mediterranean coast that is still relatively unaltered. However, it is threatened by a gigantic tourist complex comprising 20 hotels and 9,000 houses, five golf courses, ten football pitches, a pleasure harbour for 2,000 boats and a congress centre, all of which would involve «de-protecting» 64% of the 1,600 ha that are protected, 700 declared of community interest and a botanical paradise (Alcaraz Ariza, 2001).

Whether or not this macro-project sees the light of day, the beaches of Marina de Cope constitute one of the main tourist attractions of the municipalities of Águilas and Lorca. However, they are affected, as is the rest of the Spanish coast, by a process of accelerated erosion, which, in this case, is due not to direct human activity along the coast or the intensive or inadequate use of the same, but to another type of economic activity which frequently rubs up against tourism - intensive agriculture.

The development of intensive agriculture in a small coastal basin and, more particularly, the occupation of the wide beds of most of the intermittent streams («ramblas») which drain the landscape has led to them being reduced in many cases to simple agricultural tracks, along which water flows only after the most torrential downpours, since agricultural usage has led to an increase the area that has been levelled and ploughed, considerably increasing filtration. In 2002, the cultivated area, mostly intensive, irrigated crops (in greenhouses and in the open air), although still with some dryland crops (mostly almonds) was calculated at 2,350 ha, while in 1956 the sole area cultivated – almost totally almonds and cereals, with some isolated patches of horticultural crops irrigated with well water – did not exceed 800 ha.

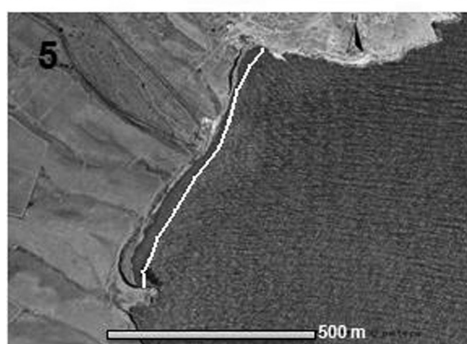
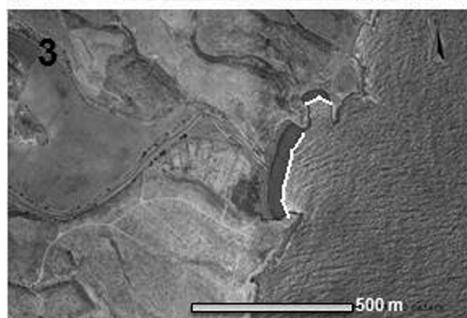
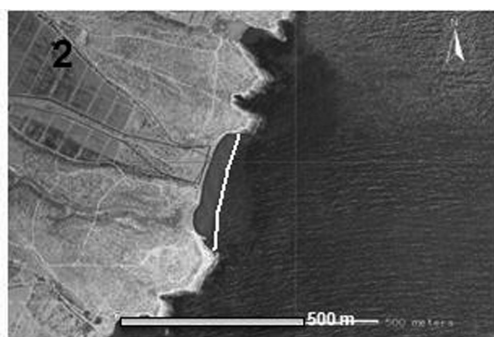
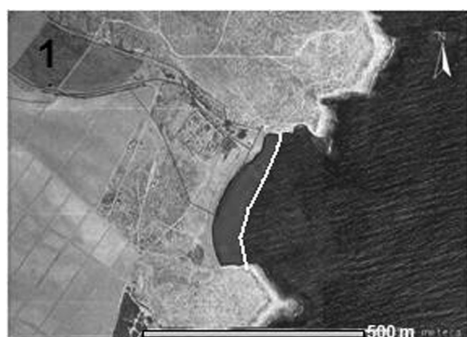
Of the 2,350 ha cultivated in 2002, 533 ha correspond to the beds of «ramblas» that were not cultivated in 1956 and another 1,000 ha (slopes and land between the ramblas) are now dedicated to arable farming, whereas before they were occupied by scrub and cereals. The percentage of the rambla surface occupied by crops now represents more than 85% in five of the seven that exist in the area, reaching almost 93% in the case of the Rambla de Los Pinares.

This has led to a sediment imbalance in the beaches that have developed at the mouths of the ramblas, which has set off a process of erosion that is evident from the shoreline which has retreated by between 16 and 68 metres. The diminution in the surface area of the beaches is calculated to be about 50% compared with the figures available for 1956.

This landward retreat of the shoreline has affected the zonation of the beaches concerned, reduced the areas available for recreation or relaxation, and has undermined safety and services. This represents a reduction in the potential capacity of the seven beaches studied. In 1956, this load/capacity was between 7,400 and 4,400 users per day (according to the criterion of 15 or 25 m²/user) while this capacity had been reduced to 3,700 and 2,200 users per day by 2002. That is, coastal erosion has led to a 50% loss of capacity for the beaches as a whole.

Since the use of these beaches is restricted to the summer, if we calculate the figures only for July and August and use the lower occupation potential of 25 m²/user, the loss of capacity as regards the number of possible users between 1956 and 2002 is 132,000 users.

Besides this reduction in capacity, the occupation of the ramblas in the area by agricultural activities has severely restricted access to the beaches. Those with wide flat beds, especially, have always served as pathways from the mouths practically to the foothills in the nearby sierras. This was the case, for example, with the ramblas at Marina de Cope. After their transformation into agricultural «fields», the ramblas maintain their use as communication routes, although in many cases these new agricultural tracks are barred by chains in order to protect crops, hindering passage to the beaches at the mouths.



1. El Rafal
2. Rambla Elena
3. Las Huertas
4. La Galera
5. Playa Larga
6. Los Hierros
7. Cala Blanca

