

URBANISATION AND TOURISM IN THE CAMPO CARTAGENA-MAR MENOR AREA (MURCIA, SPAIN). IMPACT ON SOIL SEALING

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1. INTRODUCTION

The building boom (1998-2007) that took place along the Mediterranean coast of Spain, where the Region of Murcia is situated, produced an enormous increase in the extent and number of built-up areas, partly as a consequence of the demand on the part of retired people (mainly from the north of Europe) drawn, amongst other factors, by the climate. Indeed, the number of this type of resident increased 7.5-fold between 1991 and 2011 (Membrado Tena, 2015). Among the regions affected along the Spanish Mediterranean coast is the administrative area known as the “Comarca del Campo de Cartagena Mar Menor” (CCCMM), where the change from the classic “sun and beach” tourism to residential tourism is evident. The result here and in other areas along the coast is a radical transformation of the landscape

The absence of any planning and the rapid way in which such tourism has extended has had a strong environmental impact. Some of the most negative consequences have been changes in soil use (IGN, 2006; Burriel, 2008; Gaja, 2008; Romero 2010; Rullán, 2011; the destruction of the landscape; drought in regions with water shortage (Vera, 2006); artificial soil sealing (Docampo Calvo, 2011; Romero Díaz et al., 2011), with the consequent increase of flood risk (Pérez Morales et al., 2015).

The area analysed is one of the most important tourism attractions of the province of Murcia due to its climatic characteristics, natural spaces and recreational potential (García Sánchez et al., 2002). It is also an area where second homes have been built since the mid 1970s, especially around the Mar Menor lagoon.

The general objective of this study is to analyse the effect the expansion of urbanized areas and tourism in general have had on soil sealing in the Campo de Cartagena-Mar Menor (CCCMM) more specifically, the aims are to: (1) analyse the typology of housing

and the national and foreign population as a consequence of the influence of tourism with reference to statistical data; (2) evaluate the urbanised areas by reference to the years 1956, 1981 and 2011 in each of the municipal areas studied by digitalisation of ortophotographs; (3) construct a map of anthropic soil sealing and (4) study the influence of soil sealing on flooding.

Ortophotographs dating from 1956, 1981 and 2011 contained in the Cartomur webpage of the Autonomous Community of Murcia (CARM) were digitalised. The geographic information was treated using the gvSIG program. Statistical information was obtained from the yearbooks of CARM and the National Institute of Statistics. Information on floodable areas was taken from the National System of Floodable Zones of MAGRAMA, and with the same we calculated the number of buildings constructed in such zones with reference to the different return periods (RP 10, RP50, RP100 and RP500). For the road network the free digital information available in Open Street Map was downloaded by means of the OSM plugin in QGIS 2.2. Numerous visits were made to the study area to confirm the studied aspects in situ.

2. RESULTS

In connection with soil sealing, the following were analysed: (1) type of construction and population; (2) changes in urbanised area in the three years studied; (3) the road network and (4) the effect of soil sealing on the risk of flooding.

(1) A comparison of the two last national censuses carried out in 2001 and 2011 (INE, 2013) shows that the Autonomous Community of Murcia occupied first place of all the autonomous regions as regard the growth in the number of houses (31.1%) and fourth place if the figures are considered at provincial scale. Moreover Torre Pacheco was the third municipality in Spain of over 20,000 inhabitants as regard the growth in the number of houses (115.5%).

In 2011, second homes in the province of Murcia represented 20% of the total housing stock, compared with 14.6% for Spain as a whole (INE, 2013). This made the province seventh in the list of autonomous communities with the highest percentage of second homes (INE, 2013). Between the 1970s and 1990s, there was a rapid increase in second home ownership as a result of the national and international tourism that accompanied the economic bonanza of these decades. Between 1986 and 1992 there was a boom in construction, which lasted until the end of 2007 / beginning of 2008, when the economic crisis began to be felt in Spain. From the beginning of this century growth in the construction of this type of housing slowed down although not equally throughout the province. It is of note that 63.7% of the second homes built in the province are concentrated in the study area. In 2011 second home ownership was of enormous importance in the CCCMM, representing as much as 70% of all houses in Los Alcázares (81% in 2001), 59% in San Javier (71% in 2001) and 45% in San Pedro del Pinatar. However, it should be noted that a large part of San Javier does not form part of the municipality corresponding to the landward coast of the Mar Menor (part of our study area) but belongs to a sector in La Manga del Mar Menor (outside our study area).

Another housing type of interest for this study can be referred to as “empty”, mainly the consequence of speculative building and the housing bubble. According to INE (2013), the number of empty houses in Spain rose between 2001 and 2011 by 10.8%, with Galicia, la Rioja and Murcia having the highest percentages in this category. In 2011 the number of houses in this category in the province of Murcia as a whole numbered 129,111, of which 48% (62,458) were in the study area. Among municipalities with more than 20,000 inhabitants Torre Pacheco led the way with the highest number of empty houses: 35.9% (INE, 2013).

As regards the population, there was a considerable increase from the 1970s onwards, especially in the 1990s, an increase related with the arrival of immigrants, whether workers in the construction industry and agriculture (mainly from Africa and Central and South America) or residential tourists (mainly from the EU). In the 2011 census, 15 % of the population of CCCMM were non-Spanish, including those from the EU. Los Alcázares received the highest number (41.2% foreign residents), followed by San Pedro del Pinatar (36.4%) and San Javier (30.9%). In the study area as whole, 30% of the non-Spanish inhabitants were EU citizens, a group that tends to buy individual houses and therefore occupy a larger proportion of land than those with a lower standard of living.

(2) The way extent of urbanisation in the study area in the last half century has been spectacular. From 8.2 km² it rose to 21.8 km² in 1981 and 88.5 km² in 2011. In percentage terms the urbanized area increased from 1% in 1956, to 2.7% in 1981 and 11% in 2011. Of particular note is the construction that took place along the northern shore of the Mar Menor, corresponding to the municipalities of San Pedro del Pinatar, San Javier and Los Alcázares. In 1956 a tendency for the previously dispersed population to become more concentrated around the Mar Menor began to be observed, especially Los Alcázares and San Javier. In 1981 it was clear that the built up areas had expanded, especially along the northern shoreline of the lagoon, while new developments were built inland. At present 40% of the land area of Los Alcázares is urbanised and third of San Pedro del Pinar. In Torre Pacheco, the expansion of the main urban nucleus was accompanied by new built up areas attached to newly constructed golf resorts.

(3) Roads constitute another element responsible for soil sealing. Present day agricultural activity in the area (mainly dedicated to the export of horticultural crops) and the increase in residential tourism has led to an increase in road construction and the widening of already existing roads. The total length of the road network in the study area is 4,297 km, covering a surface area of 8 km². The municipal districts of Cartagena and Murcia that are included in the area that interests us have the largest number, while smaller municipalities like San Pedro del Pinar and Los Alcázares, have fewer kilometres but a more dense network.

(4) One of the effects of increased impermeabilisation of the land surface is soil sealing with the consequent increased risks of flooding. The urbanised area (88.4 km²) and the road network (7.9 km²) together represent 12.4% of the land surface, which is now permanently sealed. To this must be added the area under glasshouses, which also count as artificially sealed surfaces (Romero Díaz et al., 2011, Caballero Pedraza et al., 2015). The result is that, the flood risk has increased and the CCCMM frequently suffers the effects of torrential rainfall. To confirm the effect of soil sealing on flooding events, we analysed the

number of buildings constructed in areas subject to different repeat period (RP10, RP50, RP100 and RP500). The accumulated growth of construction along the CCCMM coastline exceeds 13,778 buildings, representing a total area of 8.504 km² (PR500). Cadastral plots represent 29.9% of the total and the exposed surface to flood risk is 18.8%. Of note is the fact that such plots have grown most in RP 10 zones – the most commonly effected by floods. The reason for this is the low perception of the risk of flooding (Llasat et al., 2008), which presents an open invitation to occupy the areas close to the watercourse and even within the same, often blurring the original outline (Belmonte Serrato et al., 2011).

3. CONCLUSIONS

The building boom from 1998 to 2007 and increased tourism in CCCMM has led to a spectacular increase in urbanised areas. Digitalisation of the built up areas existing in three years (1956, 1981 and 2011) points to a notable increase in the first period but spectacular growth from 1981 to 2011. In Los Alcázares 40% of the land area is has been built on and 30%.in San Pedro. The road network has also expanded to service intensive agricultural activities and tourism. The total length of the roads in CCCMM is 4,297 km, occupying a surface area of 8 km², a mean density of 5.4 km/km².

The construction of houses and large housing developments (88.4 km²), the enlarged road network (7.92 km²) and the area occupied by greenhouses (30.32 km²) has led to a total sealed area of 126.64 km² in CCCMM, which means that 16.3% of the soil surface is sealed, which favours runoff and flooding during intense rainfall.

Relating the built up area with floodable areas for different repeat periods reveals the large surface area of CCCMM that may be affected by floods – as, indeed occurs. The reason behind this is the man-made alterations in the floodwater courses (“ramblas”). Due to the construction of buildings along the shore of the Mar Menor, in many occasions the numerous floodwater courses that empty into the lagoon have been integrated into the urban street network, with disastrous consequences for the inhabitants when rainfall results in rivers of floodwater. In other places, the upper stretches of the river basins have been impermeabilised by the construction of buildings and roads, leading to increased flows in the “ramblas” from their very beginning.

What is evident from this study is the negative effect that changes in land use have had in the CCCMM and how soil sealing has led to the increased risk of flooding. It is also evident that local authorities have not acted as they should have to protect the population from the risk of flooding.