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URBANIZATION PROCESSES ALONG THE MEDITERRANEAN COAST OF ALICANTE PROVINCE.

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Abstract

This study of land use over the past two decades on the coast of Alicante province analyses the characteristics of new land use and new models of urban and territorial land use. These new spatial trends represent a major change in land use, which includes new spatial and functional relationships.

The objectives therefore are to identify and characterise areas of new recent growth and provide a quantitative (surface area, density, etc.) and qualitative (new landscapes, morphologies, etc.) assessment.

The methodology uses graphic and statistical analysis to make subsequent quantitative considerations. By comparing the three series of satellite images provided by the EU Corine Land Cover project in the Region of Valencia for the years 1990, 2000 and 2006, the aim is to identify the main areas of growth during these periods. Having defined these areas of growth, detailed graphic analysis is carried out on aerial photographs taken on dates closest to the dates of the images provided by Corine Land Cover.

Using statistics provided by the State (Census, Housing and Development Ministries), the Region of Valencia (Valencian Statistics Institute) and the local councils involved (municipal census), as well as other local data, this growth can be quantified and its density assessed.

The expected results are concerned with characterising and defining new models of urban land use on the coast of Alicante, and the territorial characteristics of new recent urbanism. Identifying new residential models helps to shape future territorial and municipal planning.

Keywords: Town planning, sprawl, coastline, Alicante

1. INTRODUCTION

According to the report published by the Observatory on Sustainability in Spain, “Changes in Land Use in Spain. Implications for Sustainability”, the amount of land transformation over the past 20 years in Spain is equivalent to more than a third of all land transformation that has occurred over the country’s entire history. Artificial surface has increased more in Spain (along with Ireland and Portugal) than anywhere else in Europe.

Clearly, this change in land use has not occurred evenly across the country; the metropolitan area of Madrid and the coastal regions of the Mediterranean are where the highest rates of transformation have been recorded.

It is the Region of Valencia that has experienced the greatest increase in artificial surface at 50%. The processes of intensive coastal urbanisation are largely determined by the “littoralisation” of urban development in Spain. As tourism is such a driving force behind the economy in many areas of eastern Spain, population movement has arisen for two specific reasons. Firstly, people are attracted by the availability of work in the construction and tourism sectors, and secondly others (particularly retired people) migrate from other EU countries, attracted by the favourable climate and the multiple leisure and recreational possibilities that the coast has to offer.

Of the three provinces in the Region of Valencia, Castellón, Valencia and Alicante, the latter has recorded the highest levels of coastal land transformation. According to the data, for the strip of land between 0 and 2 kilometres from the coast, Alicante is the third Spanish province (behind Castellón and Huelva) with the highest levels of artificial land transformation, but is the first province in the country for the strip from 2 to 5 kilometres, recording an increase of 92.2%, with all other Spanish provinces (including those on the Mediterranean and Atlantic coasts, and the islands) below 40%. Alicante province, therefore, has the highest level of artificial coastal land transformation, not just in the Region of Valencia but in the whole of Spain.

The strong growth of both the continuous and particularly the discontinuous urban fabric has produced the greatest impact on the coastline of Alicante province, causing a major environmental burden in terms of resource consumption, emissions and waste. Furthermore, in recent decades these processes of intensive urbanisation along the coastline have transformed the landscape to a high degree both on the coast itself and in immediately adjacent areas.

	Strip 0 to 2 kilometres from coast				Strip 2 to 5 kilometres from coast			
	Total surface area	Artificial surface area in 2000 (Ha)	% total that is artificial	Increase 1987-2000 (%)	Total surface area	Artificial surface area in 2000 (Ha)	% total that is artificial	Increase 1987-2000 (%)
GIRONA	29333	7070	24,1%	0,3%	36299	3274	9,0%	11,3
BARCELONA	22791	11366	49,9%	12,0%	34314	11618	33,9%	13,4%
TARRAGONA	35505	9721	27,5%	9,0%	47154	5113	10,8%	20,7%
CASTELLÓN	21905	3732	17,0%	46,2%	33039	2173	6,6%	34,0%
VALENCIA	21480	4672	21,8%	35,1%	31800	5078	16,0%	20,8%
ALICANTE	33414	12629	37,8%	40,8%	51610	8047	15,6%	92,2%
MURCIA	30185	5800	19,2%	23,3%	37162	3757	10,1%	28,1%
ALMERÍA	40160	4093	10,2%	14,1%	58014	1873	3,2%	31,1%
GRANADA	12954	1191	9,2%	24,1%	18724	361	1,9%	5,9%
MÁLAGA	31316	13549	43,3%	16,5%	47836	6276	13,1%	29,9%
TOTAL MEDITERRANEAN COAST	278841	73823	26,5%	19,1%	393953	47569	12,0%	28,7%

Table 1. Artificial surface area by strips of land parallel to the coast between 1987 and 2000.

Source: Observatory of Sustainability in Spain, 2006

For these reasons it is pertinent to study and characterise settlements in Alicante province's coastal towns, with the aim of determining how and where coastal land has been used in recent decades.

2. COASTAL DEVELOPMENT IN ALICANTE BETWEEN 1990 AND 2006

The process of coastal land transformation in Alicante province was particularly intense during this period, as shown by the data comparing the area with the coastlines of the rest of Spain and Europe. It is also significant that the increases in population and in artificial surface area for the coast as a whole are of a very similar percentage, at 50% and 48%, respectively. However, the disparities between these sets of figures when studying the data for individual towns are highly surprising and show the compact or disperse way in which different towns have grown, as well as other processes of second home use.

As well as the intense coastal land transformations mentioned above, the area has also recorded significantly high and perceptible levels of landscape transformation. Among the various processes of how the coastline and its nearby areas are used, two characteristic

processes can be identified which sometimes occur simultaneously in a town, but do not on other occasions. These two processes are, on the one hand, the consolidation of traditional land use carried out to date, and on the other, the introduction of a new type of use, according to new ways in which the land is defined, its use allocated, etc.

	Artificial land 1990 (Ha)	Artificial land 2006 (Ha)	Land Increase 1990-2006 (%)	Population 1990 (inhab.)	Population 2006 (inhab.)	Population Increase 1990-2006 (%)
DÉNIA	1272,07	1538,61	21%	24764	42704	72%
JÁVEA	2769,44	3170,45	14%	16473	29923	82%
BENITACHELL	238,16	454,41	91%	1641	4773	191%
TEULADA	943,44	978,96	4%	5230	13281	154%
BENISA	909,61	922,54	1%	8045	12690	58%
CALP	1054,40	1220,92	16%	10683	27768	160%
ALTEA	815,90	964,28	18%	12286	22648	84%
L'ALFAS DEL PI	746,86	850,41	14%	9075	19913	119%
BENIDORM	881,19	1055,06	20%	42442	69058	63%
FINESTRAT	50,05	148,18	196%	1315	4945	276%
VILLAJYOYOSA	197,92	534,98	170%	21982	30550	39%
EL CAMPELLO	648,04	831,34	28%	10802	25055	132%
ALICANTE	2841,33	4315,92	52%	265473	322673	22%
ELCHE	2350,83	4469,84	90%	188062	222422	18%
SANTA POLA	438,55	875,09	100%	14957	29221	95%
GUARDAMAR DEL SEGURA	125,47	389,65	211%	6899	15132	119%
TORREVIEJA	1076,07	1961,81	82%	25014	94006	276%
ORIHUELA	1033,50	2508,52	143%	49475	80468	63%
PILAR DE LA HORADADA	448,20	729,98	63%	7500	20338	171%
TOTAL MEDITERRANEAN COAST	18841,03	27920,95	48%	722118	1087568	50%

Table 2. Artificial areas and population of coastal towns in Alicante province between 1990 and 2006.

Source: author's own using data from Corine Land Cover, National Statistics Institute, national census and municipal census.

Different morphologies and strategies have also been used to transform the province's various coastal areas, and it is interesting to analyse the changes that have occurred over the past two decades in comparison with their initial status, from the northernmost districts to the areas furthest to the south.

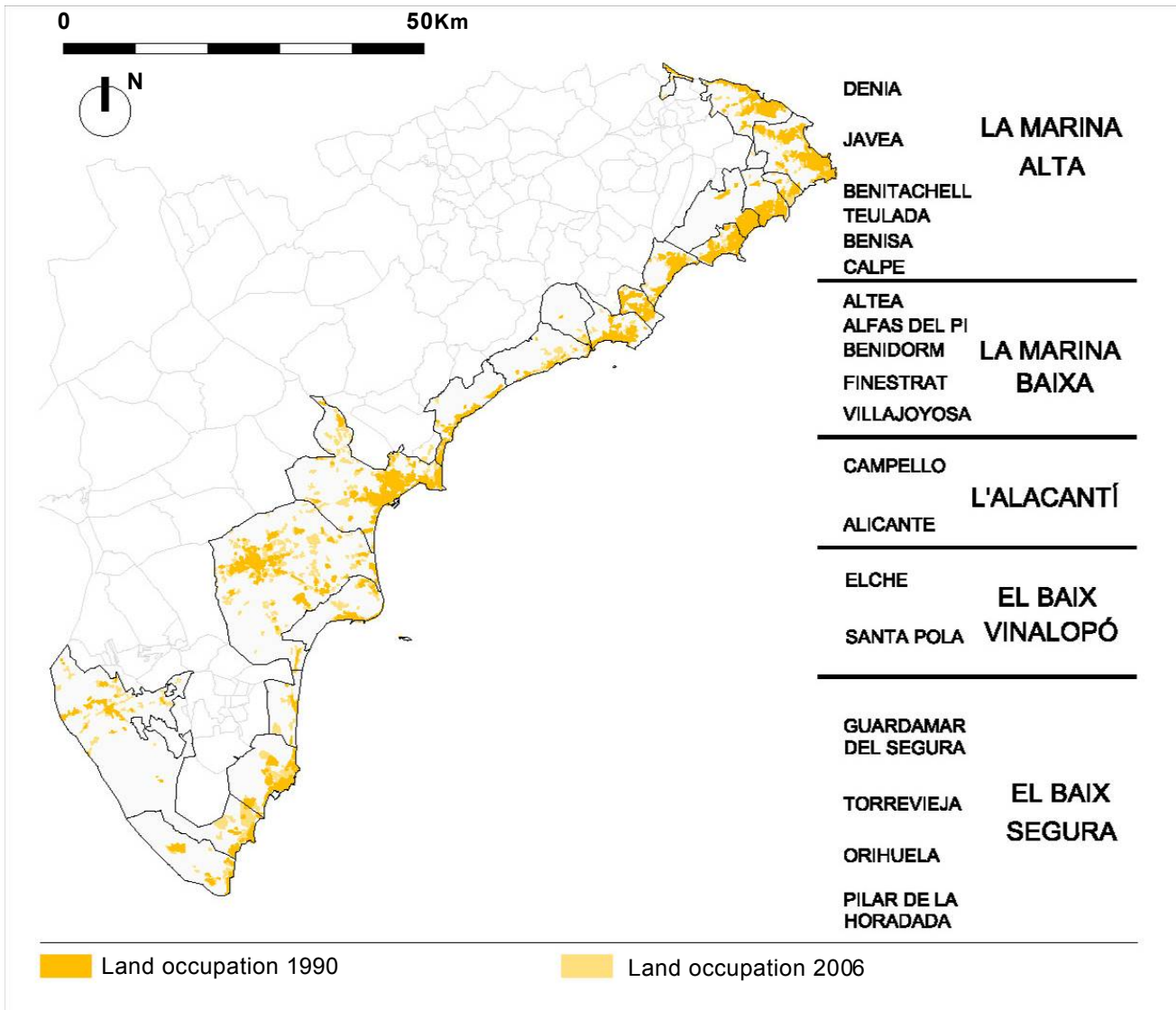


Figure 1. Artificial areas of coastal towns in Alicante province between 1990 and 2006.

Source: author's own using data from Corine Land Cover.

2.1. La Marina Alta (Dénia, Jávea, Teulada, Benitachell and Calp)

Since the 1970s, tourist destination development in the north of Alicante province has been based on a model combining residential and seasonal tourism with single-family housing on private plots located inland (a short distance from the coast) and multifamily summer apartments next to the beaches, and maintaining traditional urban centres. During these decades, the three aforementioned land use models have been strengthened, but new activities and residential types that did not form part of the traditional use of this district.

Regarding traditional urban centres of coastal towns, a considerable increase has been observed in the use of coastal land in towns such as Denia, Jávea and Calp. In Denia, where the continuous urban fabric has grown the most, with a 9.8% increase, use of the ring around

the traditional urban centre has become consolidated, together with areas linked to roads connecting the town with outlying areas. In Jávea, the urban centre has spread towards the coast, establishing a new continuous area between the historic part of the town and areas of coastal use, and occupying the town's coastal strip to a width of almost half a kilometre which up to the 1970s had received only low levels of artificialisation. In the case of Calp, the little coastal space that existed prior to the period in question has been saturated, with all land between the urban centre and the Peñón de Ifach being used.



Figure 2. Jávea 1984 and 2009.

Source: Instituto Geográfico Nacional and Google Earth.

In this last case, it is highly significant that this land use process should occur at the same time as the landmark declaration of the area as a Nature Park, in 1987, with the value of the Peñón being recognised at the same time as the whole of the coastal strip from the urban centre to the park's entrance became fully developed.

With regard to tourist use of the land, it should be pointed out that the two aforementioned characteristic models have become consolidated: single-family housing as a part of inland urban sprawl, and summer apartments in coastal areas. The urban sprawl of single-family housing remains a characteristic part of the landscape in Denia and Jávea, with reduced increases of 19.26% and 10.79% in the discontinuous urban fabric, and is contained in Moraira (Teulada) and Benisa, with a 1.8% and 0.25% increase in each case. In other towns, this type of land use has expanded hugely. For example, in Benitaxell the discontinuous urban fabric amounts to 56.32% of surface area in this period. Added to this process of expansion is the change in type of new buildings being built, producing a major impact on both the land and the landscape.

This is a change in the configuration of new homes and their size. Until then, land planning for housing developments had followed the directives set by the authorities of each area; roads and plots were adapted to the orography, and matched the rural subdivision of land and changes in elevation. Furthermore, the size of plots allowed the perception of geographical relief to be maintained, on the one hand, and on the other provided a large free surface area (usually areas of greenery) that reduced the visual impact of what had been built. However, certain new developments (under the auspices of planning that fails to distinguish between urban and rural areas) have totally changed intervention in the area, producing new artificialised land with a major visual impact not at all in keeping with the underlying orography, and of very little quality in terms of town planning and architecture. These are operations in which all previously existing grid systems and thoroughfares are done away with, producing a completely decontextualised and anachronistic system with regard to their surroundings. If, as usually happens in most of these cases, the grid is very small and tight for single-family housing or adjoining dwellings that do not provide any free areas (so no areas of greenery), what is built has a very high impact. If this were not enough, some of these new interventions feature uninterrupted rows up to 800 metres long of homes in line with the road (and not set back from the road as traditional with single-family housing), like a new kind of city wall. Until then, this situation had not occurred in the north of Alicante province.

Finally, mention should be made of new activities that have been incorporated, including not only new and greatly expanded industrial and commercial areas, but also new golf courses. Finally, new activities include not only new and greatly expanded industrial and commercial areas, but also new golf courses. Two new courses opened, one in Denia (Club de Golf Jávea in 1981), and one in Jávea only a few kilometres from Benitaxell (La Sella Golf in 1991), both of which feature associated low-density housing.

2.2. La Marina Baixa (Altea, Alfàs del Pi, Benidorm, Finestrat and Villajoyosa)

This area, which is dominated by the presence of Benidorm, as a tourist destination that has successfully trialled a model of high-rise housing (linked to the provision of hotels and apartments), features major growth including the ongoing skyscraper model, low-density developments and the inclusion of major new activities in the area. Many of the towns in this district are in fact those with the highest percentages of land transformation increase throughout the north of the province (196% for Finestrat, and 170% for Villajoyosa).

Coastal town centres have continued to experience major growth. In Altea, developments have grown along two lines, the first running parallel to the coast following the N-322 road heading north, and the second heading inland and helped by the creation of Miguel Hernández University's new Fine Art Faculty. Benidorm has experienced a major increase in artificial surface, where traditional land use close to the coast combines with new activities such as theme parks (Aqualandia and Mundomar), and with areas between the coastal part of the town and the motorway being developed where new low-density buildings and a new golf course have appeared. Villajoyosa has undergone major growth next to the urban centre along the coast in both directions, although particularly towards Benidorm. Despite this growth, there are still unused areas along Villajoyosa's long coastline.

Regarding the discontinuous urban fabric, there has been a major increase in land used for new low-density housing developments, some of which have had a considerable impact on the land. In the first of these, in Altea, housing developments in the foothills of the Sierra de Bernia have had a particularly surprising visual impact, as not only has an area been used that traditionally formed part of the green system of the hills, the types of buildings erected increase the impact on the landscape: some of these are four-storey multifamily buildings in linear blocks which in some instances are almost three hundred metres long. Taking into account that they are at a certain elevation and that they overlook the basin formed by the estuary of the River Algar, the visual impact stretches for more than ten kilometres.



Figure 3. New linear types of buildings near Altea

Source: Google Earth 2007.

The other case of relevant land transformation is that of Benidorm, as this town had been associated with high-density tourist hotels and apartments next to the sea. This model

remains and has been strengthened along the more inland strips, but an alternative and totally different land use proposal has arisen in recent decades. This new strategy concerns the use of inland areas, the linear strip between the AP-7 motorway and the hills of the Sierra Cortina, where the land has been given new uses: the Terra Mítica, Terranatura and Aquanatura theme parks, and an important amount of land used for golf courses (Viallaitana levante and poniente), together with a hotel and apartment complex imitating a traditional Mediterranean village far from the type of tourism offered by Benidorm to date. It should be considered that these new uses next to the AP-7 motorway follow a prior well-established trend in this period in the neighbouring town of Finestrat which, despite having little coastline, has a considerable strip of land in the area surrounding the aforementioned motorway.

2.3. L'Alacantí (El Campello and Alicante)

The influence of the province's capital, the city of Alicante, is felt most particularly in this area, where land use is closely linked to the coast, in terms both of continuity with previously developed areas and of vacant land. In fact, the coastline from north to south has, with some exceptions, now been fully developed, and the only stretches that remain vacant are the cliff areas and the mouth of the River Seco, to the north of Campello, and the tidal marsh of Agua Amarga, in the south of Alicante.



Figure 4. Alicante 1984 and 2009.

Source: Instituto Geográfico Nacional and Google Earth.

Regarding coastline use, the most important areas are Campello, where the continuous fabric has increased by 37%, and the San Juan beach area (within Alicante's municipal boundaries), where all land near to the coast not previously developed has now been

transformed. If use of the first coastal strip was based on second homes used during the summer, new uses have maintained this but combined it with first homes and leisure-related activities. Development in this area combines low-density housing with medium-density areas similar to those in the ring outside Alicante, with very urban characteristics. The area also features a large golf course linked to the single-family housing built next to the San Juan de Alicante beach.

The inland area has also undergone major development in this period, with the following main characteristics: on the one hand, the availability of residential accommodation that was an alternative to town centre housing and based on single-family adjoining housing, and on the other hand, the development of new activities, including the recurring new golf courses, both to the north in Mutxamel linked to property developments, and to the south in Alicante, close to a new area of tertiary activities.

2.4. El Baix Vinalopo (Elche and Santa Pola)

Until recently, this district had been less affected by the characteristic dynamics of tourism experienced by the rest of the province, although this trend has changed in recent years. The administrative configuration of this area has led the municipal area of Elche to include just the northern and southern points on the coast of this district, with the central area occupied by Santa Pola, and it is precisely here where the second largest increase of land used for discontinuous urban fabric has been experienced, with a 634% increase between 1990 and 2006.



Figure 5. Sierra de Santa Pola 1984 and 2009.

Source: Instituto Geográfico Nacional and Google Earth.

Faced with the contention of Elche's urban criteria, which have only strengthened the pre-existing development on the coast though with restrained growth, with most of the coastline remaining undeveloped, the move by Santa Pola to use the hills and cape of the same name speculatively is particularly significant. As well as the large amount of artificial surface area incorporated, constructions in the hills of the Sierra de Santa Pola on the north and east side with the heavy development of the highest areas have caused one of the most notable visual impacts, as the high-density developments render the natural topography of the hills unrecognisable.

As a result of these interventions, the whole of the Santa Pola coastline, with the exception of the saltworks, is almost entirely occupied by buildings, with only the coastal edges belonging to Elche (the dunes at El Altet, Carabassí and Elche) remaining undeveloped.

2.5. El Baix Segura (Guardamar, Torrevieja, Orihuela and Pilar de la Horadada)

The south of Alicante province is characterised by large natural areas along its coastline and strong pressure from low-density urbanisation for residential tourism purposes. During this period, the natural areas have continued to enjoy protected status, but with property development very close by. The surface area of traditional town centres has increased and inland areas close to the coast have become consolidated as alternative land for low-density housing developments.

The areas of nature include the Guardamar dunes and the lagoons of la Mata and Torrevieja. The dunes are populated by pine trees along most of the Guardamar coastline and have been preserved during this period, although in counterpoint the traditional town centre has increased in size and new developments have been created along the second line of the coast, only a few kilometres from the sea. The lagoons have been more affected by urban activity, as on the narrow strip of land between the two lagoons that form part of the Lagunas de Torrevieja y la Mata nature park, there is a large residential development that has had a major impact on the land and on the landscape. And as with the case of the Peñón Ifach, it is again significant that the creation of the nature park and the areas of development around and between the park's elements have occurred simultaneously.

Regarding town centre growth, Torrevieja has undergone continued urban expansion since the 1970s, characterised by sprawling development within the municipal boundary as a result of the proliferation of low-density developments that are added to with no clearly defined road structure or land designation.



Figure 6. Torrevieja 1984 and 2009.

Source: Instituto Geográfico Nacional and Google Earth.

Continuing from Torrevieja, to the south, Orihuela has opted for the same kind of residential land use, with coastal areas up to the AP-7 motorway and strips parallel to the sea up to six kilometres wide all having been fully developed. This use has been based on adjoining housing developments on very small plots, with the resulting connotations for the landscape, as mentioned previously. This low-quality, high-quantity urban sprawl is in contrast with the traditional use of coastal land in Orihuela, which is characterised by high-quality tourist settlements such as the Dehesa de Compoamor and Cabo Roig, featuring a predominance of single-family housing in independent plots of land of a certain size, as well as other areas being used, including for high-rise apartments.

The expansion of these land use models has even spread to some towns that do not have any coastline, such as San Fulgencio and Rojales. In these towns on the second line of the coast, large areas of land have been used for low-density housing developments, including golf courses in one of them, with very small plots of land on higher areas of ground on both sides of the Segura river basin, with the resulting visual impact on the land as mentioned previously.

	LA MARINA ALTA						LA MARINA BAIXA						L'ALACANTÍ		EL BAIX VINALOP		EL BAIX SEGURA		
	Dénia	Jávea	Benitachell	Teulada	Benissa	Calp	Alfàs del Pi	Altea	Benidorm	Finestrat	Villajoyosa	Campello	Alicante	Elche	Santa Pola	Guardamar del Segura	Torre Vieja	Orihuela	Pilar de la Horadada
Continuous residential fabric	●	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●
Discontinuous residential fabric	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●
New types	●	●	●	○	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Golf courses	●	●	○	○	○	○	●	○	●	●	○	●	●	○	○	●	●	●	○
Economic activities	●	●	○	●	○	○	○	●	●	●	●	●	●	●	●	●	●	●	●
Asset land	●	●	○	●	○	●	○	●	●	●	●	●	●	●	●	●	●	●	●
Coastal land use	●	●	●	○	○	●	●	●	●	●	●	●	●	○	●	○	●	●	●
Inland use	●	●	○	○	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Landscape impact	●	●	●	○	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Table 3. Increase of various types of land use in coastal towns between 1990 and 2006.

Key:

- Major land growth
- Moderate growth of land or in neighbouring towns
- Lack of land increase

Source: author's own using data from Corine Land Cover, aerial photographs and fieldwork.

3. CONCLUSIONS

Between 1990 and 2006, Alicante province experienced intensive coastal land transformation, and towns that had not previously undergone urban development began intensive land development processes, whilst most towns that had already begun development increased their territorial occupation.

In this period, the few remaining vacant areas were all used from north to south. Only the protected parts of the coastline or coastal areas with conditions preventing development,

such as cliffs or sand dunes, were left untouched. Regarding natural areas, two simultaneous and contradictory processes occurred: various areas next to the coastline were declared nature parks, whilst areas close to and neighbouring those areas of nature became strongly artificialised.

Large inland areas not far from the coast were also transformed. This trend occurred in all districts, albeit with varying intensity, and created a second row of buildings running parallel to the coast, even affecting inland towns with no coastline within their municipal boundaries.

The impact on the landscape is considerable, due to the certain types of land use that are not at all in keeping with the type of land itself, due to the transformation of areas with singular orographical characteristics and the extent to which land development has spread.

Finally, although much planning has been approved and is currently pending execution, the current economic context will probably result in a delay in such developments. As a result, the coming years may compensate for the voracity with which land has been transformed during this period in many towns along the Alicante province coastline.

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