Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem

MedPartnership

PAP/RAC

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ECONOMIC AND SOCIAL ASSESSMENT OF THE USAGE AND COST OF THE MARINE AND COASTAL ZONE DEGRADATION

The Institute of Economics, Zagreb and Faculty of Economics, Split

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Document:

Economic and Social Assessment of the Usage and Cost of the Marine and Coastal Zone Degradation

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Introduction

International obligations of the Republic of Croatia are numerous and ever increasing. In the field of environment they include nine general conventions and protocols, one convention and one protocol concerning climate changes, eleven conventions and protocols concerning the atmosphere, one convention on soil, one on toxic waste, and nine conventions and protocols on the protection of the marine environment[1]. All these were developed within the framework of the United Nations Environment Programme. The Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean, adopted in 1976, and amended in 1995 (Barcelona Convention), and seven protocols that followed it, are of particular importance as they cover almost all of the relevant aspects of the protection of the marine and coastal environment. Besides the obligations Croatia accepted as a UN member, there is a series of obligations imposed by the European Union. In 2008 the European Parliament and the Council enacted the Marine Strategy Framework Directive (MSFD)[2], obliging each Member State to develop a marine strategy which should culminate in the implementation of programmes of measures designed to achieve a good environmental status (GES) in the marine environment. In October 2011 the Croatian Government passed the Regulation on establishing the framework for activities of the Republic of Croatia for environmental protection, making it obligatory for the state institutions dealing with marine matters to comply with this directive.

The latest of the seven protocols of the Barcelona Convention, the Protocol on Integrated Coastal Zone Management (ICZM), differs from the others. Besides protection, it covers environmental management and refers to both the sea and the coast. The Protocol was signed in 2008 and ratified by the Croatian Parliament in October 2012[3]. Thus it became an integral part of the Croatian legal system, overruling other pieces of legislation in cases of conflicting regulations.

The Protocol obliges the Croatian state institutions to define the Coastal Zone according to given criteria, follow the given objectives and principles of the ICZM, apply the given criteria of sustainable development in the Coastal Zone, and take into account island specificities and preserve cultural heritage.

The Croatian state institutions are also obliged to produce a national strategy for integrated coastal zone management and the corresponding coastal plans and programmes, which may be self-standing or integrated with other plans and programmes. The strategy will set objectives, determine priorities, identify coastal ecosystems needing management, as well as all relevant actors and processes, enumerate the measures to be taken and their cost, as well as institutional instruments and the available legal and financial means. The strategy will also set an implementation plan.

In order to ensure efficient governance throughout the process of integrated management of the Coastal Zones, the Croatian institutions have to secure appropriate involvement of various stakeholders, including territorial units and public entities, economic operators, non-governmental organisations, social actors and the concerned public.

1 http://www.mzoip.hr/default.aspx?id=3704
2 Directive 2008/56/EC
3 Law on Ratification of the Protocol, Official Gazette 8/2012

In October 2014 the Croatian Government passed a regulation which encompassed the demands of the MSFD and the ICZM; the Regulation on the making and execution of documents from the Marine and Coastal Strategy (NN 112/14). Relying on the Marine Strategy Framework Directive and the Protocol on the ICZM, as well as this Regulation, the Ministry of Environment and Nature Protection is expected to prepare a Marine and Coastal Strategy, thus fulfilling the obligations defined in the two documents. In order to prepare it, the Ministry will be able to use various data, reports, studies, and analytical documents. Two reports may be of particular relevance.

The first document, the Initial Analysis of the State and Pressures of the Croatian Part of the Adriatic Marine Environment, which revealed the current environmental status of marine waters, was prepared in 2013. It has provided valuable data and estimates which can be used as relevant inputs to the strategy.

The second document, the Economic and Social Assessment (ESA) of the usage and cost of the marine and coastal zone degradation, is presented here. Its main purpose is to analyse the marine and Coastal Zone from the economic and social perspective, and provide recommendations for the Marine and Coastal Strategy. Recommendations are based on the analysis of the marine and coastal zone economy, and its influence on the marine and coastal environment. The existing legal framework, institutional capacity and the ability to enable stakeholders, in order to manage an environmentally sound coastal development, have also been taken into account. As a sustainable development concept is accepted by definition, recommendations refer exclusively to a development policy implying environmental care and considering the costs of environmental degradation.

Section 1 of the report presents the Croatian coast and activities in the Coastal Zone, as well as their change in recent years. Section 2 reviews the relative level of development of the counties, towns and municipalities in the Coastal Zone, and their fiscal situation, including the information related to their environmental protection investments. Section 3 lists an analysis of links between economic drivers, environmental pressures they generate, as well as their impacts on the coastal and marine environment. This section also considers the extent of environmental expenditures in relation to environmental pressures and impacts. Section 4 reports on some recent projections of the development of the Croatian economy in the short run, and relates them to the Coastal Zone. Section 5 deals with the costs of environmental degradation. Since estimating these costs poses serious methodological problems, this section lists the existing approaches and some quantitative and qualitative partial examples on how these costs could be estimated in the future; presently, the costs should be estimated according to the cost-based approach. Section 6 offers policy recommendations on the strategy coverage, data and data bases, descriptors for the coastal area wellbeing, improvement of the monitoring system, achieving sound management (bearing in mind the integration of two strategies via joint managing system), as well as possible methodology improvements with emphasis on the impacts of future measures.

1. The Croatian Coast

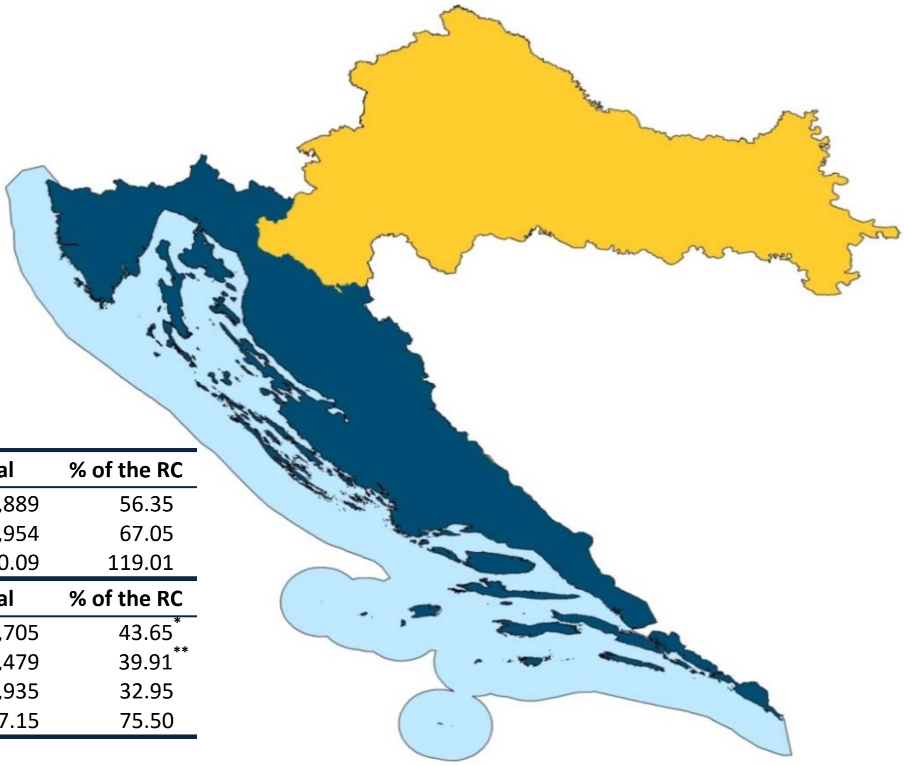
The Republic of Croatia (RC) is divided into 21 counties, including the City of Zagreb. The counties are grouped into two NUTS regions: Adriatic Croatia (AC) and Continental Croatia (CC) (Map 1). The two NUTS regions are quite different with respect to their natural features and economic structure.

1.1 Adriatic Croatia

The Continental Croatia stretches over 31,889 km^2 and the Adriatic Croatia over 24,705 km^2 of land, some 31,000 km^2 of the territorial sea and 23,000 km^2 of the Ecological *and Fisheries Protection Zone.*

Owing to its 1,246 islands, the Croatian coastline is rather long. It consists of the mainland part 1,880 km in length and the island part 4,398 km in length, amounting to 6,278 km. It is the second most indented coast in the Mediterranean (Duplančić, Leder et al., 2004).

According to the 2011 Census, there are 4,284,889 inhabitants in the Republic of Croatia, 2,872,954 of whom live in the Continental Croatia (790,017 in the City of Zagreb). There are 1,411,935 inhabitants in the Adriatic Croatia, out of whom 132,443 live in the 50 inhabited islands[4].



Continental Croatia	Total	% of the RC
Area – land (km^2)	31,889	56.35
Population	2,872,954	67.05
Density (inh/km^2)	90.09	119.01
Adriatic Croatia	**Total**	**% of the RC**
Area – land (km^2)	24,705	43.65*
Area – sea (km^2)	31,479	39.91**
Population	1,411,935	32.95
Density (inh/km^2)	57.15	75.50

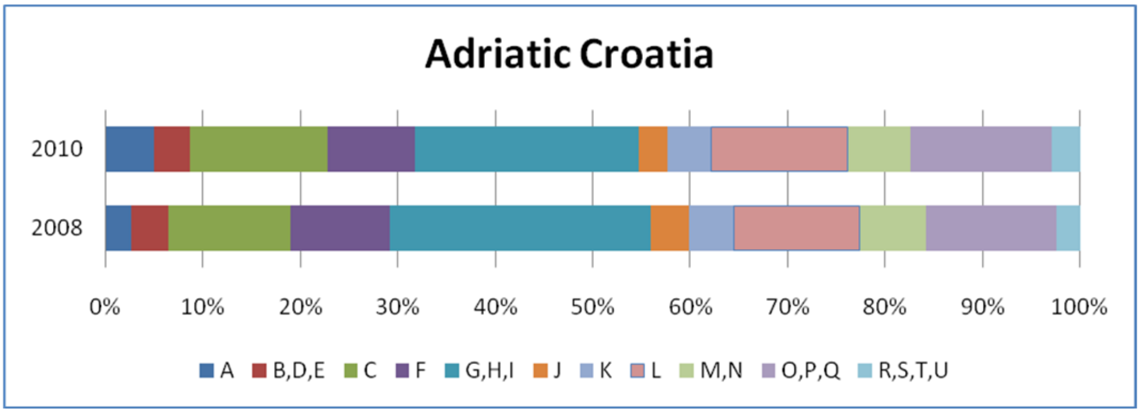
* Out of total land area
** Out of total RC area

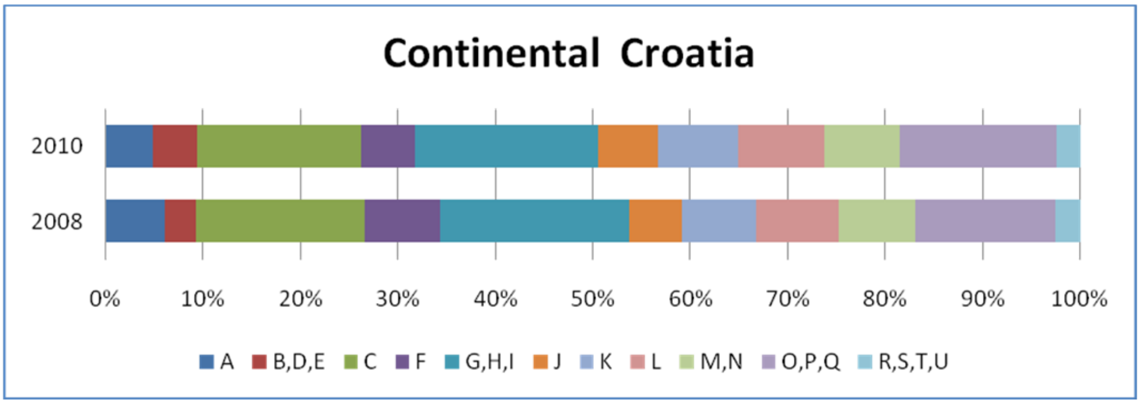
Map 1. The Continental and Adriatic Regions of Croatia

[4] Statistical Yearbook of the Republic of Croatia, CBS, 2013, p.56

There are significant differences between the two NUTS2 regions from the economic point of view. The best indicator in this respect is the structure of the Gross Value Added (GVA) of the two regions (Figure 1). The dominant economic activities in the Adriatic Croatia are tourism and trade (G, H, I sectors). In addition, there is manufacturing (C), real estate sector, public administration, and construction. In the Continental Croatia, the shares of agriculture and forestry, manufacturing, information and communication, as well as public administration and professional, scientific and other support services, are larger.

The differences between these two regional economies can also be illustrated by the number and structure of business entities (Table 1).





Legend:

A	Agriculture, forestry and fishing
B, D, E	Mining, quarrying and other industries
C	Manufacturing
F	Construction
G, H, I	Wholesale and retail trade, transportation and storage, accommodation and food service activities
J	Information and communication
K	Financial and insurance sector
L	Real estate sector
M, N	Professional, scientific, technical, administrative and support service activities
O, P, Q	Public administration and defence, mandatory social security, education, health care and social services
R, S, T, U	Other service activities

Figure 1. Share of activities in gross value added in the Adriatic and Continental Croatia in 2008 and 2010.
Source: Croatian Bureau of Statistics, First Release, No. 12.1.2., February 14, 2013

Table 1. Structure of business entities by regions, as of December 31st 2013

Area	Total registered entities	Trade companies		Enterprises and cooperatives		Registered institutions, bodies, associations, organizations	Entities in crafts and trades and free lances
		Registered	*Active*	*Registered*	*Active*		
Republic of Croatia	282,872	147,590	129,363	66,657	2,191	68,625	84,516
Continental Croatia	179,950	93,080	81,298	41,021	1,504	45,849	46,334
Adriatic Croatia	102,922	54,510	48,065	25,636	687	22,776	38,182

Source: CBS, First Release, No. 11.1.1/4, 14 February, 2014

As far as Gross Domestic Product (GDP) in 2010 is concerned, the Continental Croatia accounted for 67.38% of the Croatian GDP, while the Adriatic Croatia took a share of only 32.62%. The GDP per capita in the Continental Croatia was 0.9% above the Croatian average, while in the Adriatic Croatia it was 1.8% below the Croatian average[5]. Although not significant, the deviations from national average point that less productive sectors of the Croatian economy have larger shares in the economy of the Adriatic Croatia than in the economy of the Continental Croatia.

The Adriatic Croatia region encompasses seven (7) counties. Basic data on these counties are shown in Table 2.

Table 2. Surface area, population, density, number of towns and municipalities in the Adriatic Croatia

County	Surface area (km^2)	Population	Population density (population/km^2)	Number of towns	Number of municipalities
Istria	2,813	208,055	74.0	10	31
Primorje-Gorski Kotar	3,588	296,195	82.6	14	22
Lika-Senj	5,353	50,927	9.5	4	8
Zadar	3,646	170,017	46.6	6	28
Šibenik-Knin	2,984	109,375	36.7	5	15
Split-Dalmatia	4,540	454,798	100.2	16	39
Dubrovnik-Neretva	1,781	122,568	68,8	5	17

Source: Statistical Yearbook of the Republic of Croatia, CBS, 2013, p.56

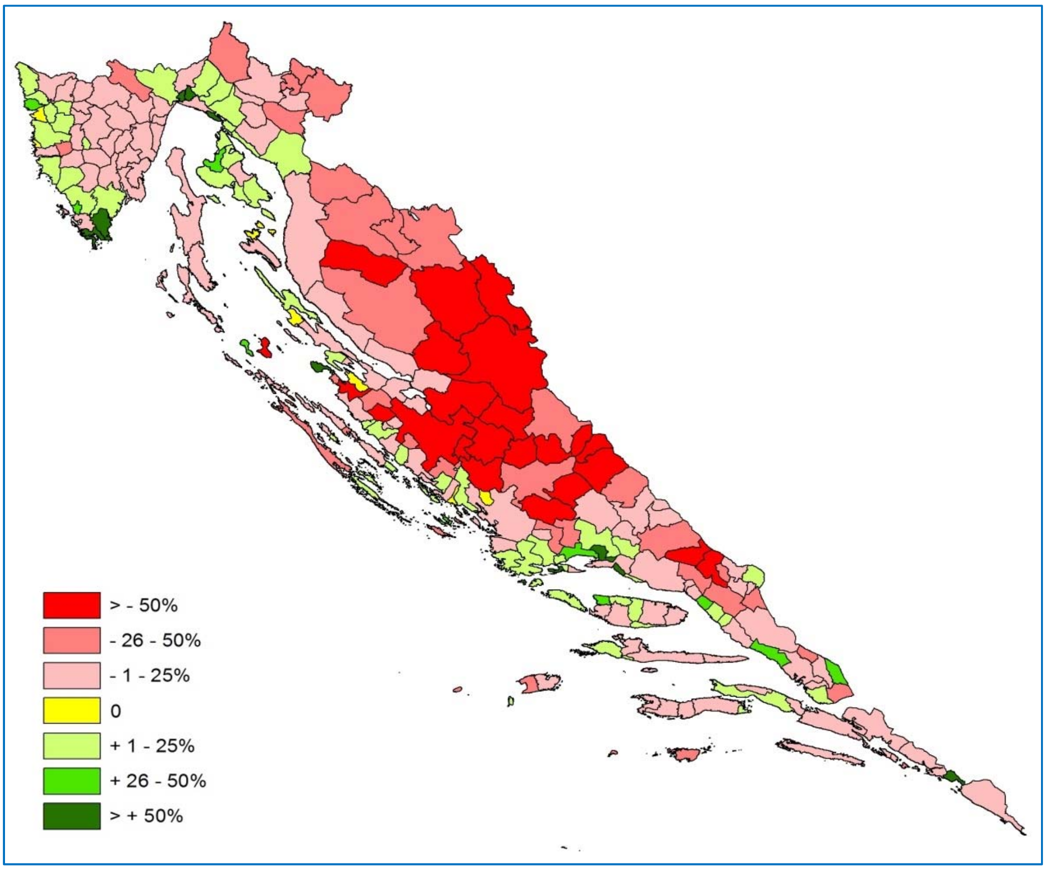
It should be noted that Croatian towns and municipalities are administratively defined at LAU (Local Administrative Unit – former NUTS IV) level and they do not differ significantly. Their prerogatives and policy instruments are virtually the same and administrative organisation is similar. Thus they can be simply referred to as local government units (LGUs) in terms of the ICZM.

The number of inhabitants declined in the Adriatic Croatia by about 10.56% in the period 1991–2011, with notable variations by counties (Map 2). Many coastal towns and municipalities experienced the population growth, whereas the municipalities in the hinterland experienced population decline with only a few exceptions.

During the 2008–2010 period the GDP of the Adriatic Croatian economy declined in all counties, except for Dubrovnik-Neretva and Istria where it remained at the same level (with a 2009–2010 decline). The largest decline of GDP happened in the County of Lika-Senj (15.17%). A considerable decline has been noted in the counties of Šibenik-Knin, Split-Dalmatia (about 4.5%), and Primorje-Gorski Kotar (about 4%). GDP per capita declined in all counties, in line with the GDP rates.

Largest shares of GDP in the AC are in the counties of Split-Dalmatia (26.89%), Primorje-Gorski Kotar (25.86%), and Istria (19.12%). These three are followed by the counties of Zadar (9.96%) and Dubrovnik-Neretva (close to 10%), Šibenik-Knin (6.15%). The lowest share of GDP in the AC is in the County of Lika-Senj (2.80%).

[5] CBS, First Release, No. 12.1.2, February 14, 2013



Map 2. Population increase in the Adriatic Croatia in the period 1991–2011.
Source: Croatian bureau of Statistics, 1999 and 2011 Census

In the 2008–2010 period the counties of Istria, Dubrovnik-Neretva and Primorje-Gorski Kotar increased their shares in the Adriatic Croatian GDP, each by less than 1%. A decrease in the share, again less than 1% each, was noted in the counties of Šibenik-Knin, Split-Dalmatia, Lika-Senj, and Zadar. The County of Istria had the largest GDP per capita (30.59%). Above the average counties, in terms of GDP per capita, are Primorje-Gorski Kotar and Dubrovnik-Neretva. Counties where the GDP per capita was below the average are Lika-Senj, Zadar and Split-Dalmatia. The lowest GDP per capita was noted in the County of Šibenik-Knin (20.13% lower than the AC average).

In the 2008–2010 period, the GDP per capita increased above the average in the counties of Istria, Primorje-Gorski Kotar, and Dubrovnik-Neretva. It remained stable in the County of Šibenik-Knin and declined in the counties of Split-Dalmatia and Zadar. The greatest decline was noted in the County of Lika-Senj.

In short, the trends show that the population is decreasing in the hinterland and on the islands. Also, negative population trends are more prominent in the south than in the north. The same can be said for the economic activities, except in some cases, described in the following parts of the document.

1.2 The Coastal Zone

Due to a rather narrow shape of the Adriatic Sea and the far reaching outer Croatian islands, both coastal waters – as defined by Water Framework Directive (WFD) and marine waters – as defined by the Marine Strategy Framework Directive (MSFD), encompass a large area.

The Article 2 of the WFD defines *Coastal water* as "*surface water on the landward side of a line, every point of which is at a distance of one nautical mile on the seaward side from the nearest point of the baseline from which the breadth of territorial waters is measured, extending where appropriate up to the outer limit of transitional waters*". *Transitional waters* are defined as "*bodies of surface water in the vicinity of river mouths which are partly saline in character as a result of their proximity to coastal waters but which are substantially influenced by freshwater flows*". *Inland water* is defined in accordance with usual definition: "*all standing or flowing water on the surface of the land, and all groundwater on the landward side of the baseline from which the breadth of territorial waters is measured*".

Article 3 of the MSFD defines "marine waters" as:

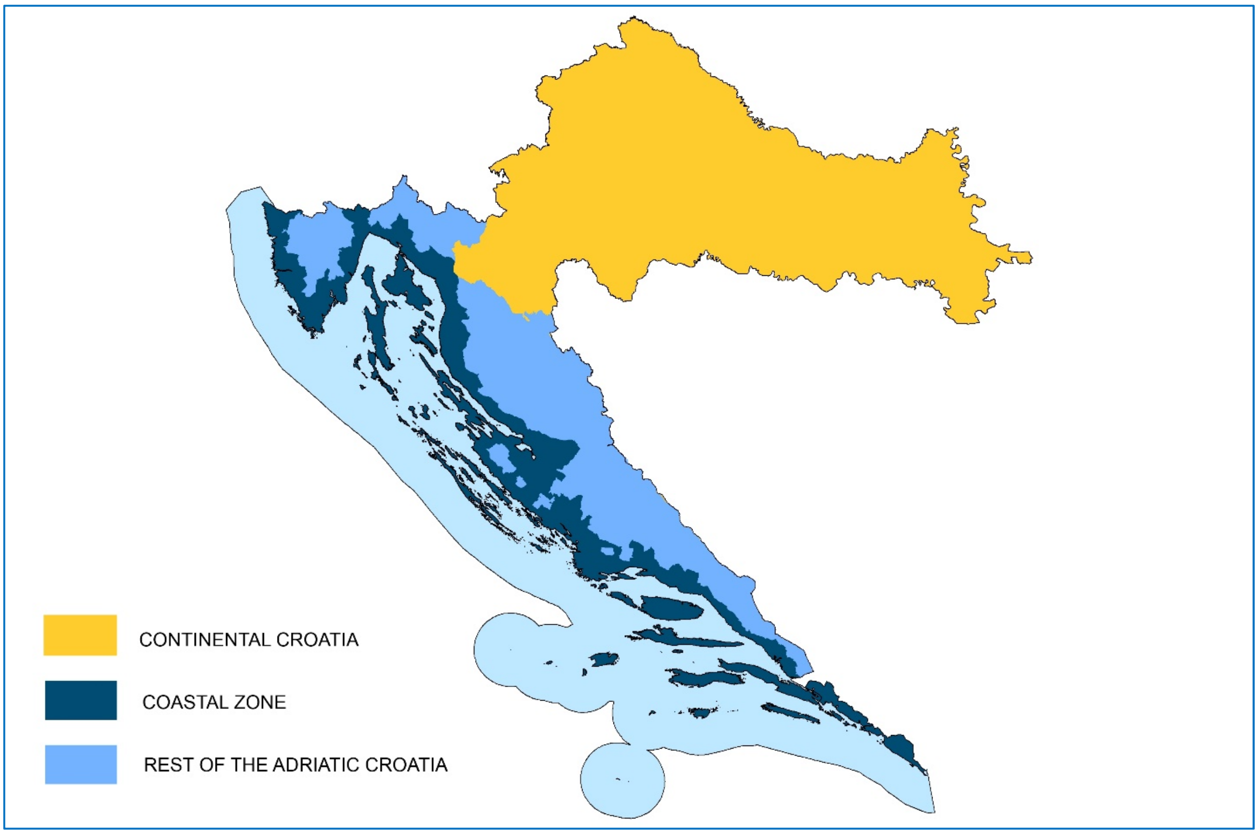
a) waters, the seabed and subsoil on the seaward side of the baseline from which the extent of territorial waters is measured extending to the outmost reach of the area where a Member State has and/or exercises jurisdictional rights, in accordance with the Unclos; and
b) "coastal waters" as defined by the WFD.

The ICZM Protocol ratified in 2012 provided grounds for defining the maritime and mainland part of the Coastal Zone. The Protocol defines the Coastal Zone as the "… *geomorphologic area covering either side of the seashore in which the interaction between the marine and land parts occurs in the form of complex ecological and resource systems made up of biotic and abiotic components coexisting and interacting with human communities and relevant socio-economic activities*" (Article 2). Operationally, such an area is defined by:

a) The seaward limit of the Coastal Zone, which shall be the external limit of the territorial sea of Parties to the Protocol; and
b) The landward limit of the Coastal Zone, which shall be the limit of the competent coastal units as defined by the Parties. (Article 3).

In the course of the Protocol ratification, and the introduction of the Regulation on the making and implementation of documents from the Marine and Coastal Strategy (NN 112/14), the Croatian Government has defined the marine and land administrative boundaries of the Coastal Zone. As far as the sea is concerned, that is the outer border of the Croatian territorial sea, while on land it encompasses the boundaries of coastal LGUs, and LGUs with territory on the land part of the protected coastal zone of 1,000 m. The coastal zone encompasses all Croatian islands as well.

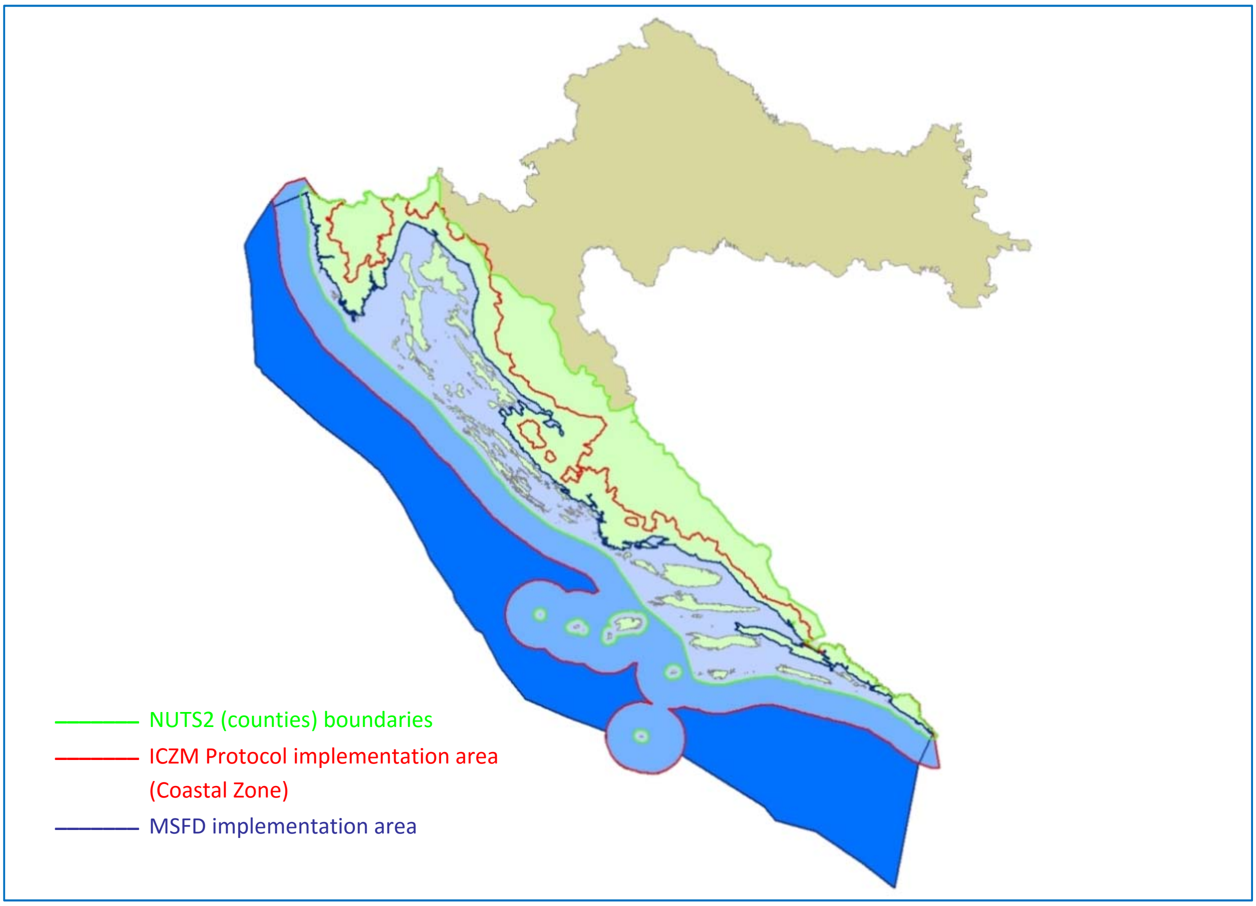
The Croatian Coastal Zone, as declared to the Depositary, thus encompasses the entire Croatian territorial sea and 134 towns and municipalities of the seven Adriatic counties, all island towns and municipalities are taken as parts of the Zone by definition (Map 3). The scope of research of this document is in accordance with the one defined by the ICZM Protocol Ratification Law, but it also includes 5 LGUs which lie within 3 km from the coast. Since the MSFD refers to the marine zone under sovereignty and jurisdiction of the Republic of Croatia, the Marine and coastal strategy will be implemented at sea defined by the outer borders of sovereignty and jurisdiction of the Republic of Croatia. The landward implementation limit is defined by the boundaries of the continental LGUs. The Coastal Zone covers 47% of the Adriatic Croatia. Some 72% of the inhabitants of the AC live there.



Map 3. The Coastal Zone

Following the provisions of the Protocol on the ICZM, the sea boundary of the Coastal Zone is undisputable, and so are the islands. An argument may be raised concerning the landward limit, however. Due to the indentedness of the Croatian coast, there are LGUs in central Dalmatia with hardly any coastal characteristics except a kilometre or two wide exit to the sea. The best example is the town of Benkovac which exits to a small sea bay. Benkovac and several other LGUs that belong to the Coastal Zone surround six LGUs in the County of Zadar (Poličnik, Zemunik Donji, Škabrnja, Galovac, Polača and Stankovci) which are too far away from the coast to be in the Zone. A couple of similarly located municipalities in the County of Split-Dalmatia surround the municipality of Primorski Dolac which is too far away from the coast as well. There is also the problem of estuaries which should be included by the ecosystem approach, but mostly they are not. If the ecological arguments are taken into account, karstic characteristics of the Adriatic coast and a good part of the hinterland could be used as a criterion. There is enough evidence that pollutants discharged deep in the hinterland are transported by karstic underground waters all the way to the sea, which means that the continental area in which certain measures are to be taken should be much wider than the Coastal Zone defined by the ratified Protocol. On the other hand, it would imply an international policy formation and implementation, as five LGUs in the County of Dubrovnik-Neretva have their boundaries on the state border and quite a few LGUs in the southern Dalmatia are near the state border.

The Strategy is to be produced following the provisions of the Marine Strategy Framework Directive. The MSFD refers to marine waters which in the Croatian case encompass the entire marine zone under sovereignty and jurisdiction of the Republic of Croatia. This part of the Adriatic is marked with dark blue on Map 4. Seven coastal counties which constitute the Adriatic NUTS2 region are marked light green. Within the region the red line marks the seaward and landward boundaries of the Coastal Zone.



Map 4. Areas of implementation of the Marine and Coastal Strategy

The remainder of the chapter presents the main human activities on the Croatian side of the Adriatic. According to the MSFD documents and guidelines, two main approaches can be applied: the ecosystem approach and the marine account approach. The ecosystem approach is based on identifying the ecosystem services used by particular human activities. The marine account approach is based on identifying the human activities which affect the environment. For each economic activity it is necessary to estimate the benefits originating from the use of the environment, and identify environmental impacts of these uses.

In the Croatian case, the marine account approach was applied rather than the ecosystem approach. It should be noted that the marine account approach was applied to total activities, the ones affecting the environment of both marine and the Coastal Zone. The main reason is a significant lack of data (see Chapter 5 on cost of environmental degradation). The most important economic activities in the Coastal Zone were identified and described, along with the issues regarding population and urbanization and the corresponding infrastructure. The values of basic economic indicators (revenues, wages, employment, GDP, GVA) were calculated for each economic activity.

Economic sectors were analysed at two levels: Adriatic Croatia (NUTS2 level) and the level of 134 LGUs marked as an area of implementation of the ICZM Protocol. Local development indices and data on LGU's fiscal capacities were presented as well. Both will be necessary in the preparation of the Marine and Coastal Strategy, particularly when discussing the financing of the measures connected to the protection of the marine and coastal environment.

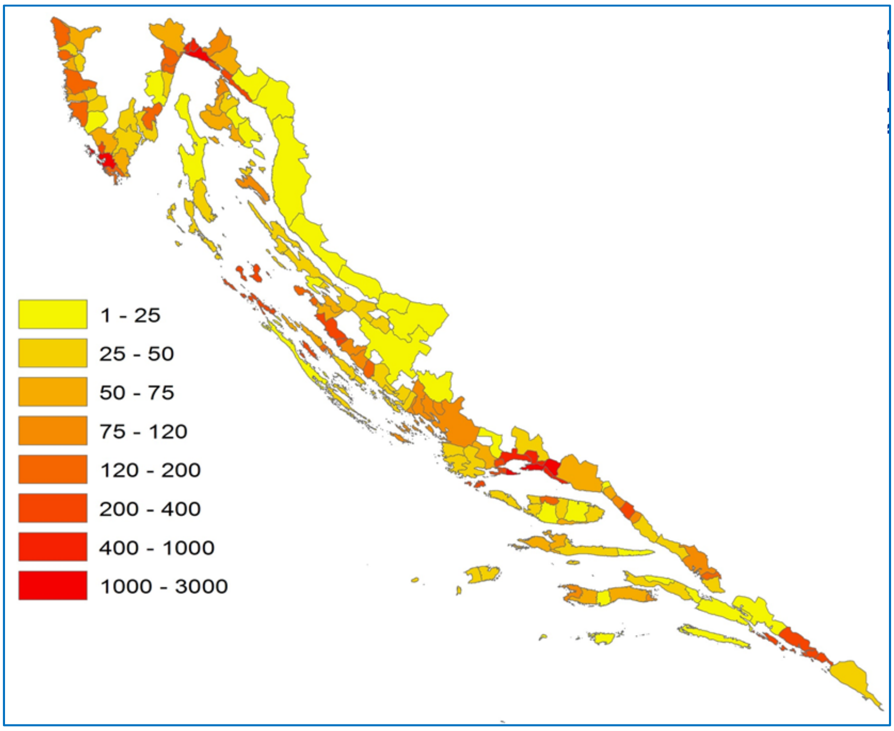
1.2.1 Population and urbanization

The population of the Coastal Zone decreased by 4.67% between the two Censuses (1991–2011) compared to the population of the Adriatic Croatia that decreased by 10.56%. Within the Coastal Zone the decrease inland was 5.27%, while the islands experienced an increase of 0.5%. It should be pointed out, however, that the number of islanders is unreliable – islands are zones of special interest with softer tax and other burdens, so that the data contain 'fake inhabitants' (Map 5).

The population increased in the coastal parts of the counties of Istria (4.08%) and Split-Dalmatia (1.58%). Population in the coastal parts of other counties declined, most in the counties of Zadar (16.41%), Lika-Senj (12.36%) and Šibenik-Knin (11.76%). The largest increase in the island population was noted in the counties of Lika-Senj (15.65%) and Primorje-Gorski Kotar (5.47%). The County of Dubrovnik-Neretva is the only county where the number of islanders decreased (8.80%).

During the period between the two Censuses the **urban population** of the Coastal Zone declined by 8.10%. The decline was more prominent on the mainland coast (8.44%) than on the islands (2.53%). As for the counties, the sharpest decline of urban population took place in the counties of Šibenik-Knin (18.77%), Dubrovnik-Neretva (15%), Primorje-Gorski Kotar (14.15%), Zadar and Lika-Senj (both about 12.5%). The smallest decline was in the County of Istria (0.44%) and Split-Dalmatia (0.54%). A decrease in the urban population in the mainland part of the Coastal Zone took place in the counties of Lika-Senj (22.16%), Šibenik-Knin (18.77%), Primorje-Gorski Kotar and Dubrovnik-Neretva (both about 15.49%). The smallest decline was in the counties of Istria (0.44%) and Split-Dalmatia (0.47%).

The urban population of the island part of the Coastal Zone increased in the county of Lika-Senj (15.65%). It declined in other counties. The greatest decline in urban population was in the counties of Dubrovnik-Neretva (9.71%), Zadar (4.03%), Primorje-Gorski Kotar (3.22%) and Split-Dalmatia (1.78%).



Map 5. Population density in the Coastal Zone in 2011 by towns/municipalities (inhabitants/km^2).
Source: Croatian bureau of Statistics, 2011 Census

The rate of decline of urban population is larger than the rate of decline of total population in the Coastal Zone (8.1% and 4.7% respectively). The largest difference in the rate of decline of urban population compared to the total one is noted in the County of Primorje-Gorski Kotar, particularly in its coastal part. The smallest differences are noted in the counties of Split-Dalmatia and Istria. However, the total population increased in both counties. At the same time the urban population declined (much faster on the islands than on the coast of the County of Split-Dalmatia). The rates of growth of urban and total population in the County of Lika-Senj are equal, whereas the rise in island population entirely consists of the urban population.

The only county where the decline in total population is larger than the decline in urban population is the County of Zadar, implying that the share of urban population grows. However, an increase took place on the coast only, and the decline of urban population is more rapid than the decline in the total population of the islands.

The **urban population rate** (share of urban population in total) 2011/1991 in the Coastal Zone has fallen by 3.6%, slightly more on the mainland coast than on the islands. The largest drop took place in the counties of Dubrovnik-Neretva (9.80%), Primorje-Gorski Kotar (7.65%) and Šibenik-Knin (7.61%). The urban population rate remained constant in the County of Lika-Senj.

In the County of Zadar, the urban population has increased by 4.5%, but it refers only to the mainland coast (6.37%). It decreased on the islands (2.53%). In the mainland coastal part the largest drop in urban population was noted in the counties of Primorje-Gorski Kotar (8.24%), Split-Dalmatia (4.03%), Zadar (2.53%) and Dubrovnik-Neretva (1.02%). On the islands of the County of Lika-Senj the urban population rate remained constant.

Depopulation took place in the hinterland, in municipalities surrounding big coastal towns and on the islands (especially on the outer ones) leading to a quite heterogeneous population density in the Coastal Zone. The population is concentrated on the coast, the overall urban population rate declined whereas the coastal urbanization with no urbanity has been one of the key threats to the Coastal Zone for decades.

It can be stated that, along with the concentration of the population in the narrow coastal strip, the process of formation of four/five larger urban areas is underway: areas of Pula, Rijeka, Zadar, Split and Dubrovnik. In other words, population is concentrating in these areas, while the rest of the coastal strip tends to depopulate.

Nevertheless, the future of Zadar and Dubrovnik as urban agglomerations is also disputable, since population is decreasing in the surrounding areas. In other cases, there is a clear trend of population movement from urban centres to the surrounding towns and settlements (especially in Rijeka and Split).

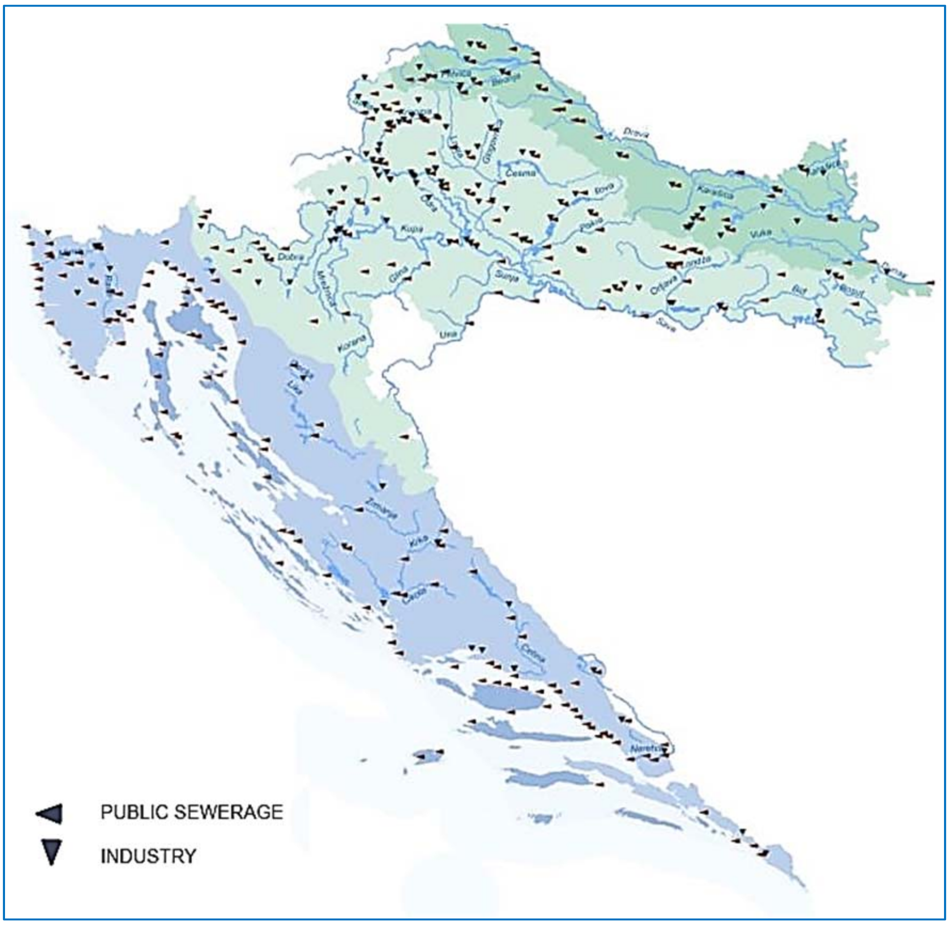
From the early 1960s the Croatian coast has been experiencing a dramatic **urban growth and the accompanying environmental pressures**. According to some analyses not more than 150 km of the coastline was urbanised in the year 1960. In 2000 the urbanised coast accounted for 837 km. Over the past 40 years this generation has urbanised 5 times as much of the coastline as all previous generations together. On the other hand, the population of Croatia remained almost constant; most of the new housing has been built as second homes or as tourist apartments. Finally, according to the data available at the coastal county institutes for physical planning, the most recently produced county physical plans envisage further urbanization. If the plans come true, 1,562 km of the coastline will be urbanized in the near future making it almost a quarter (24.8%) of the 6,278 km long Croatian coastline[6].

[6] MCPP, Report on the State of the Spatial Development 2008-2012, December 2012, pg. 48

Along with the problems due to the extensive land-take, especially due to residential (second residence) and tourism construction (out of 529 km of coastline taken for economic activities, 425 km refer to the tourism and catering facilities), urbanization brings about environmental problems and concerns referring to the communal infrastructure.

Water supply is relatively satisfactory in the Coastal Zone, as some 93% of residential dwellings are connected to the public water supply systems, which is higher than the Croatian average (82% in 2011). Other residents obtain water from precipitation collected in local wells or in their private house tanks. Water supply relies mostly on the underground waters. The quantity of water is satisfactory, except in Istria and Ravni Kotari (the County of Zadar hinterland). The quality of these waters is mostly satisfactory as well. Just in some isolated cases pollution was recorded (nitrate concentration in south Istria and Ravni Kotari areas, and intrusion of salt water in the southern parts of the Coastal Zone). There are also some other water supply problems: leakages in public water supply system amount to 48% at Croatian level and experts estimate that water supply systems in the Coastal Zone leak at least as much. Water consumption in the entire Coastal Zone in summer months increases significantly, thus increasing the leakage as well.

Some 48% of the residential dwellings are connected to the public waste water collection systems in the Adriatic Croatia, which is slightly above the Croatian average (46%). However, only 42% is connected to the waste water treatment facilities, which are mainly equipped for primary treatment only. These outlets represent a major part of point sources of marine and water pollution (Map 6).



Map 6. Spatial distribution of the waste water outlets – point sources of pollution (2009).
Source: Croatian Waters

Large quantities of **waste** have been produced on the coast. It particularly holds for communal biodegradable waste. The highest quantities of this waste are recorded in the counties of Primorje-Gorski Kotar and Split-Dalmatia.

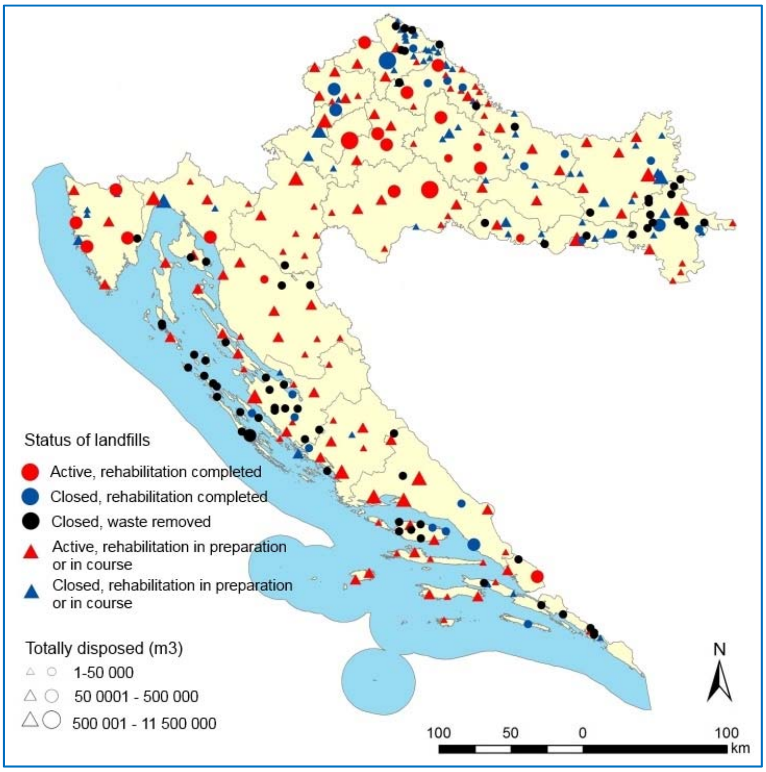
The County of Primorje-Gorski Kotar has the highest share of reused waste (14.4%). The lowest amount of communal waste is being reused in the counties of Split-Dalmatia and Zadar.

In addition, illegal, not recovered dumps cause soil and underground water pollution as well as landscape degradation. The construction of waste management centres is slow (currently, three centres are under construction in the counties of Šibenik-Knin, Istria and Primorje-Gorski Kotar), whereas the existing waste disposal sites are reaching the limits of their capacities. Waste accumulation and its seasonal variations appear to be the most pressing problem in the Coastal Zone (Table 3; Map 7).

Table 3. Communal waste management in 2012

County	Total produced communal waste (t)	Quantity of waste *per capita* (kg/inh.)	Brought to the disposal site (t)	Sent directly to the reuse (t)	Share of reuse (%)
Istria	107,627	495	99,754	7,300	6.8
Primorje-Gorski Kotar	119,301	399	73,032	17,219	14.4
Lika-Senj	23,117	443	21,565	1,550	6.7
Zadar	86,954	514	85,446	1,476	1.7
Šibenik-Knin	50,976	406	49,358	1,618	3.2
Split-Dalmatia	205,092	433	202,854	2,238	1.1
Dubrovnik-Neretva	67,955	538	63,424	4,532	6.7
Adriatic Croatia (AC)	661,022	461.14	595,433	35,933	5.80
Republic of Croatia (RC)	1,670,005	390	1,380,397	247,026	14.8
AC/RC (%)	39.58	118.24	43.13	14.55	39.19

Source: Report on the State of Environment, draft, 2014, p.140



Map 7. Locations of official landfills according to the rehabilitation status and operations (2012).
Source: Report on the State of Environment in the Republic of Croatia, draft, 2014 (period from 2009 to 2012), p. 150

Furthermore, there are the so called hot spots i.e. locations polluted by the waste originating from inadequate management of industrial waste and creating health hazards (Table 4). Waste is no longer being dumped on those locations, but risks remain.

Table 4. Hot Spots and costs related to their regeneration

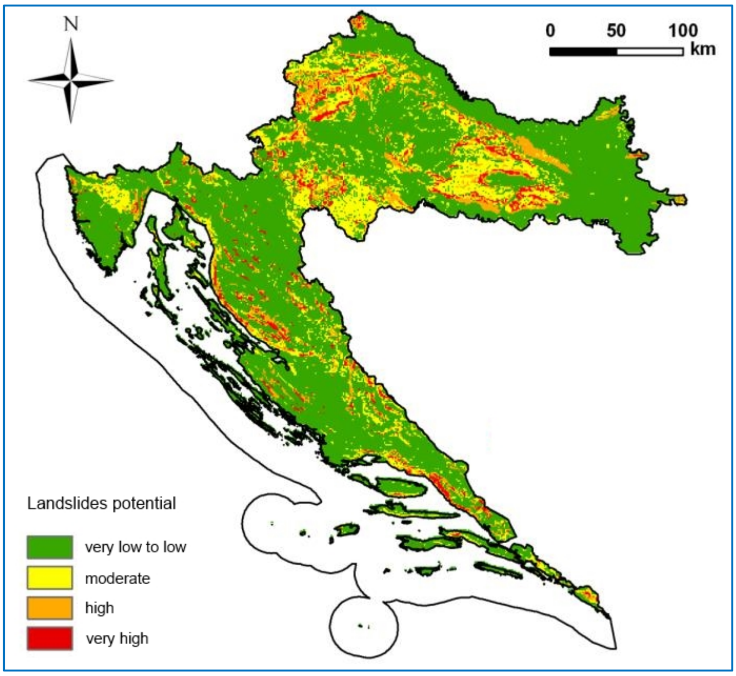
No.	Hot Spots	Costs occurred (000 kn/year)							Total (000 kn)
		2006	2007	2008	2009	2010	2011	2012	
1.	Pools of red mud and waste base – former alumina plant in Obrovac	0	89,921	17,328	11,528	8,024	7,123	2,216	136,140
2.	Salonit factory	303	15,053	23,399	52,994	17,694	2,020	9,645	121,108
4.	Slag landfill – Kaštela Bay	0	0	0	0	763	55		818
5.	Coke plant – Bakar	2,400	362	13,788	25,633	4,660	0	145	46,988
6.	Slag landfill – TE Plomin I	0	0	0	0	0	0	0	0
9.	Sovjak near Rijeka	0	0	0	0	0	0	361	361
10.	Factory of electrodes and ferroalloys – Šibenik	0	13	4,674	8,110	3,790	0	0	16,587
12.	Salbunara beach – Island of Biševo	0	104	0	0	0	0	0	104
13.	DIV Ltd. (screws factory TVIK) Knin	0	0	0	0	0	0	0	0
14.	Adriatic Croatia (AC)	2,703	105,453	59,189	98,265	34,931	9,198	12,367	322,106
15.	Republic of Croatia (RC)	3,130	105,458	59,224	100,907	36,141	9,247	12,367	326,474
16.	AC / RC (%)	86.36	99.99	99.99	97.38	96.65	99.47	100.00	98.66

Legend:

Regeneration completed
Regeneration in process
Regeneration in preparatic

Source: Report on the State of Environment in the Republic of Croatia, draft, 2014 (period from 2009 to 2012), p. 239

Further problems related to the environmental degradation of land and soil appear due to erosion and landslides. The erosion due to the wind has been particularly recorded in Istria (the Field of Čepić). Map 8 shows potential landslides in the Republic of Croatia.



Map 8. Potential landslides in the Republic of Croatia.
Source: *Report on the State of Environment in the Republic of Croatia, draft, 2014 (period from 2009 to 2012), p. 245*

Mine suspected areas are a problem specific to Croatia. They remained after the Homeland War, and to some extent, after the World War II as well. In 2012 the mine suspected areas are mostly found in the counties of Lika-Senj, Split-Dalmatia, Zadar, Šibenik-Knin and Dubrovnik-Neretva.

1.2.2 Protected areas

Some 7,179.21 km^2 (8.2%) of the Croatian territory (12.2% of land and 1.94% of the territorial sea) is under protection (Map 9). According to the Register administered by the Ministry of Environmental and Nature protection (31 December 2013), there are 419 areas under various degrees of protection[7]. In Croatia, ecological network Natura 2000 encompasses 36.67% of the land territory and 16.39% of the territorial sea (29.38% of the total area of the RC).

According to the Law, all protected areas are managed by specially established public institutions. Public institutions that manage national parks and nature parks are established by a Government Act, and directly controlled by the Ministry. Other public institutions are established at the county level. Along the Coastal Zone, the protected areas are as follows:

- Highly protected nature reserve:
  - Bijele i Samarske stijene
  - Hajdučki i Rožanski kukovi
- National Parks:
  - Brijuni
  - Krka
  - Kornati
  - Mljet (western part of the island)
  - Paklenica
  - Northern Velebit
- Nature Parks:
  - Lastovo Archipelago
  - Telašćica
  - Lake Vrana
  - Velebit
  - Učka Biokovo
- Special reserves:
  - Limski Bay – reserve
  - Malostonski Bay
  - Neretva Estuary – the south-eastern part
  - Pantan
  - Prvić and Grgur Bay
  - Dundo (oak forest 'Dundo' on the island of Rab)
  - Lokrum (island of Lokrum)

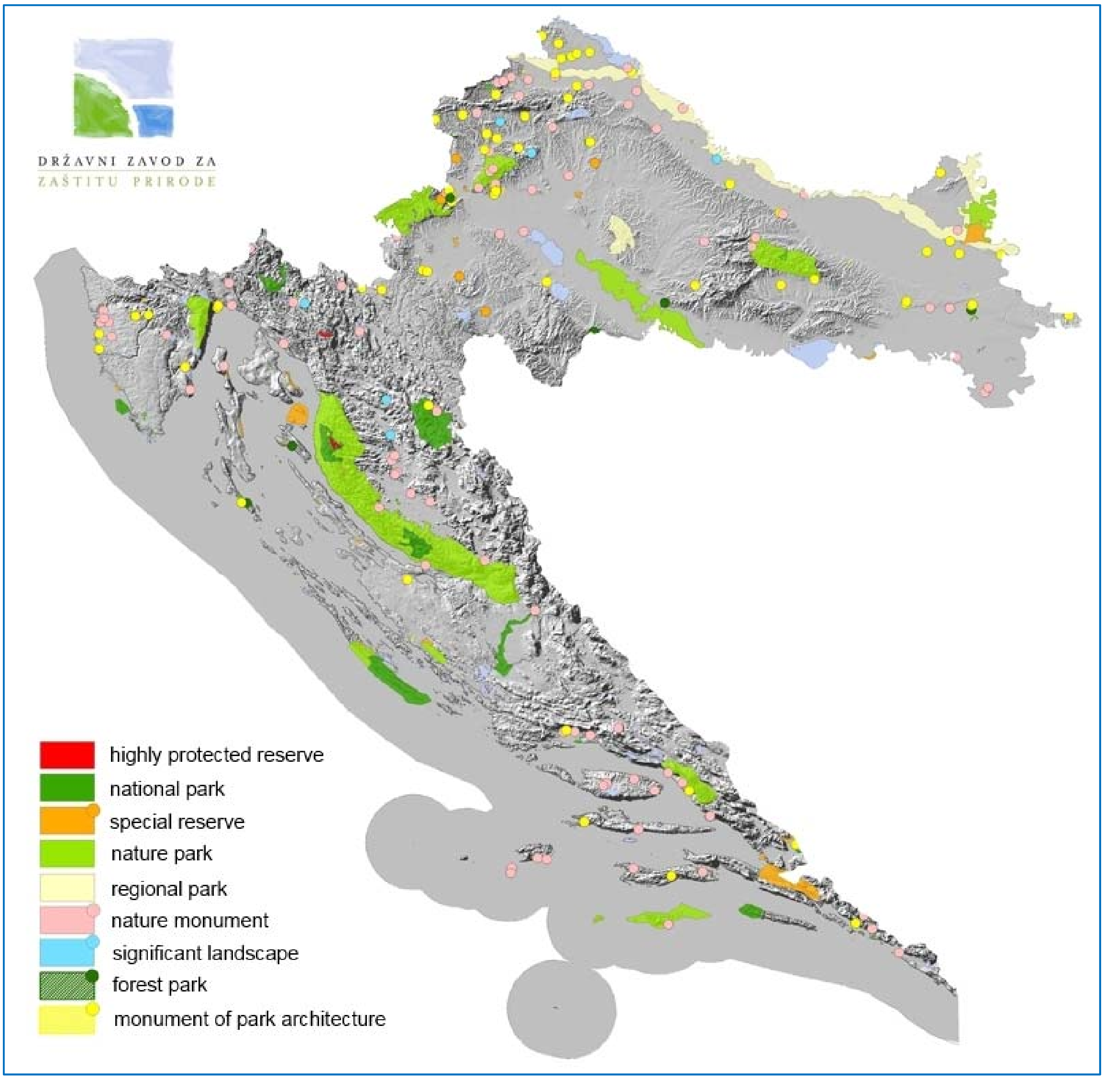
Apart from national parks, nature parks and special reserves, there are also some islands and archipelagos, groups of capes, bays and beaches protected as Nature monuments or Important landscapes which are managed at the county/local (local self-governed unit) level. They are managed by Public institutions for the management of other protected areas and/or other protected parts of nature of those units.

Expert basis for the Physical plans with Specific Characteristics are prepared by the State Institute for Nature Protection in cooperation with the Ministry of Environmental and Nature Protection, while the

[7] The highest degree of protection is prescribed in two highly protected reserves. Other reserves are: eight national parks, 79 special reserves, 11 nature parks, two regional parks, 85 nature monuments , 84 significant landscapes, 28 forest parks and 121 monuments of park architecture

plans are approved by the Ministry of Physical Planning and Construction. Management plans for the national parks and nature parks are prepared by the Public institution which manages the park, with the approval of the Ministry of Environmental and Nature Protection. The parks are financed directly from the Ministry (state budget) and from other sources (tickets, projects, donations, etc.).

So far, management plans have been adopted for the following national parks and nature parks: Brijuni (NN 45/01), Kornati (NN 118/03), Krka (NN 01/90), Mljet (NN 23/01), Paklenica (NN 23/01), Lake Vrana (NN 58/12), Telašćica (NN 22/2014), Učka (NN 24/06), Northern Velebit (NN35/12). Physical plan with Specific Characteristics for nature park Biokovo is in preparation, as well as a new one for the Krka National Park. For the national parks of Brijuni, Kornati and Mljet revision and extension of physical plans is in preparation.



Map 9. Protected areas in the Republic of Croatia.
Source: State Institute for Nature Protection

Interviews made with the national park managers revealed serious problems in park management, particularly in marine parks. The most important one appears to be a non-defined maritime domain. Almost all public utilities in the marine parks are located in the narrow zone of the maritime domain (supply areas, nautical ports, etc.). Public institutions that manage the Park have no jurisdiction over the maritime domain. The next important problem refers to the unsolved ownership over the land in the protected areas. In most cases, the land is private and the number of owners is rather large, making it very hard to get a consensus on common actions in the parks. A study on the definition of the enlisting and registration methodology for the boundaries of nature and national parks is being published.

Marine parks are facing serious problems regarding nautical tourism, since the number of vessels has constantly been growing, both of those sailing through the park, and those from the mainland (or other islands) visiting the park on a daily basis. Apart from producing significant pressures on the marine environment, this increasing number of nautical tourists produces other pressures on the environment, e.g. underwater noise. During the project Adriatic monitoring programme – Phase II, initial measurings of underwater noise were performed on three locations in two separate time periods. It has been established that the underwater noise in Kornati in August is greater than in the port of Rijeka. Increasing pressures create ever growing costs, especially in terms of waste collection. Among parks to which this document applies, only the Public Institution of the Krka National Park has a self-sustained finance structure. Other parks rely on the income from the state budget, not being able to finance themselves.

There is also a problem of fishing permits in the marine parks. Until recently, in the Lastovsko otočje Nature Park, only local fishermen were allowed to fish, since the rules of the Nature Park overpower the national rules on fishing areas (fishermen from the surrounding islands could not fish there, which caused disputes). In the Kornati National Park, fishing permits can be issued to the local people who pursue some kind of agriculture activity in the Park. Control mechanisms are weak, however, and it is very hard to check whether the reported activities are true or false.

Management problems in the protected areas may not be representative for the policy implementation in the entire Coastal Zone but they do show adverse effects caused by non integrated development and environmental policies. Protected areas, thus, deserve a special attention in the course of preparation of the Marine and Coastal Strategy. They could also serve as pilot areas for the implementation of development/environmental measures derived from the strategy goals.

1.2.3 Transport infrastructure

Road network

Being long, narrow and detached from hinterland by the Velebit mountain range and a couple of mountains in the south, the Coastal Zone has always been difficult to connect. The road network appears thus as the most important part of the overall infrastructure in the Zone. As data on roads are not available on the LGU level, the following tables and figures contain data on the county level.

Up to 44% of total Croatia road network is situated in the Adriatic Croatia. The share of the motorways alone is slightly higher; almost half of the Croatian motorways are built in the coastal counties.

Among the Adriatic counties, the county of Split-Dalmatia has the largest road network. Road-network density is the highest in the County of Istria. Most of the roads there are local, however.

In line with other development indicators, the lowest road density is in the County of Lika-Senj. The only county without motorways is the County of Dubrovnik-Neretva. Motorway network is expected to extend to the Croatian–Montenegrin border within the next ten years.

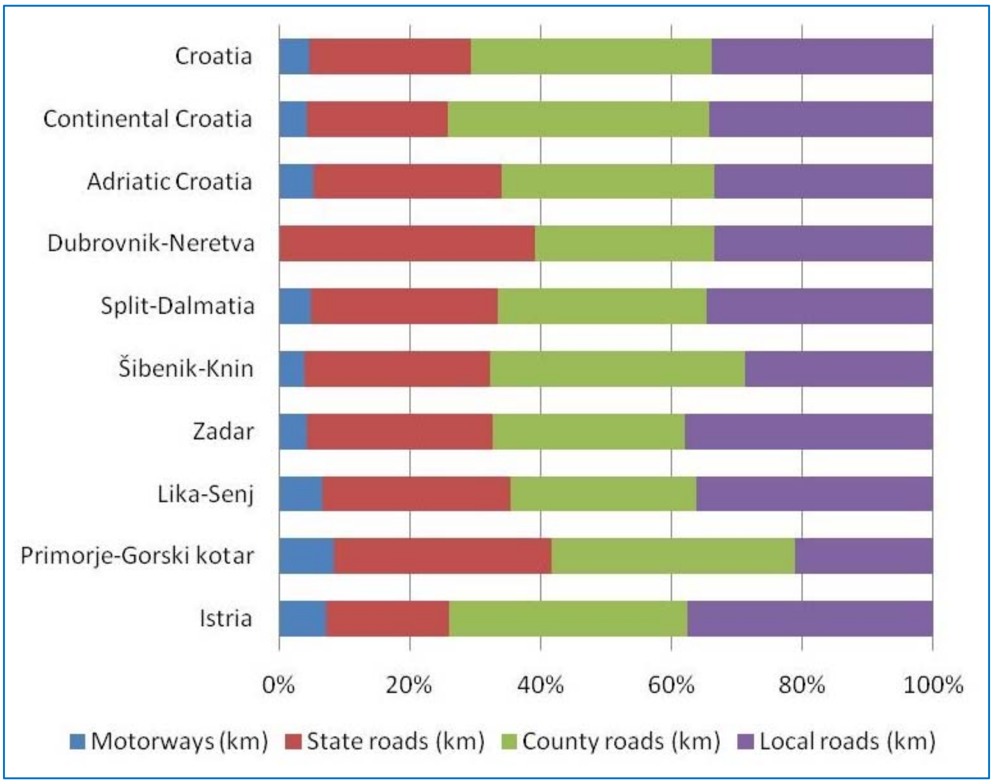


Figure 2. Road network in the Coastal Zone by counties and by types of road in 2012.
Source: Transport and communications in 2012, Statistical reports pg.123, Bureau of Statistics

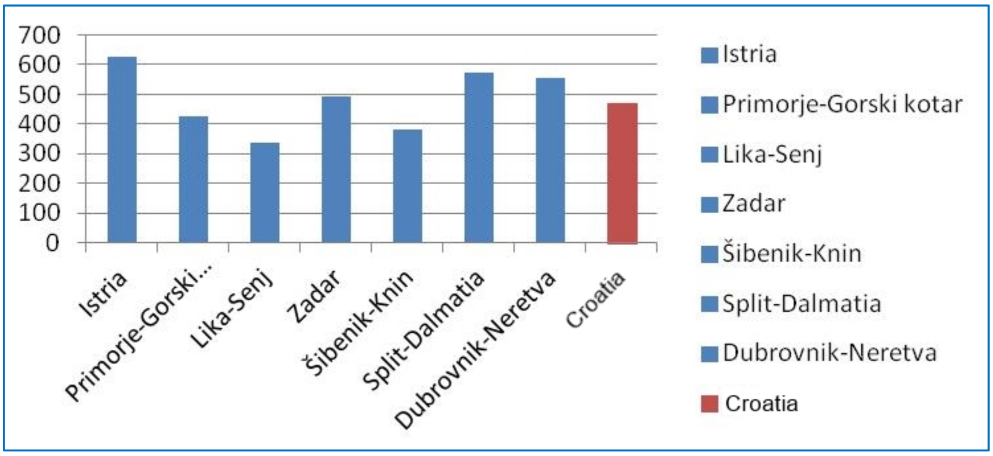


Figure 3. Density of the road network (m/km^2) in the Coastal Zone by counties in 2012.
Source: Transport and communications in 2012, Statistical reports pg.123, Bureau of Statistics

Data on registered road vehicles provide an additional view on road transport in the Adriatic Croatia and in the Coastal Zone in particular. Although 44% of the Croatian network is situated there, only 36% of vehicles have been using it in 2012. Also, the number of vehicles per km of road in the Adriatic Croatia is much below the Croatian average, while the number of vehicles per inhabitant is above it. This could lead to the conclusion that the local traffic pressure in the Adriatic Croatia is lower than in the rest of the country. Tourist vehicles are not counted in, however so that the overall picture is not complete. Data on tourist vehicles are not available but it is nevertheless clear that coastal road network is underused out of the tourist season, and that motorways and state roads become overburdened as soon as tourists start arriving in summer (usual peak of the season is in the period 15 June – 15 August).

On the other hand, there are more vehicles per inhabitant in the Adriatic Croatia than in Croatia as a whole, with an uneven distribution across the counties. The counties of Istria, Primorje–Gorski Kotar and Dubrovnik-Neretva have more vehicles per inhabitant than Croatia. The others are below the Croatian average.

Table 5. Registered road vehicles in the Coastal Zone by counties and by types of vehicles on December 31st 2012

County Police Department	Total	Mopeds and motorcycles	Passenger cars	Buses	Cargo vehicles	Other vehicles	Vehicles/ km	Vehicles/ inh.
Istria	125,086	13,484	97,357	223	10,178	3,844	70.91	0.60
Primorje-Gorski Kotar	152,006	16,440	121,954	446	11,038	2,128	98.90	0.51
Lika-Senj	21,430	1,381	15,656	58	1,994	2,341	11.80	0.42
Zadar	68,910	6,644	55,229	198	6,088	751	38.45	0.41
Šibenik-Knin	46,212	6,895	35,545	122	3,235	415	40.54	0.42
Split-Dalmatia	193,489	23,417	153,852	574	14,638	1,008	74.33	0.43
Dubrovnik-Neretva	58,570	8,380	44,838	320	4,802	230	59.16	0.48
Adriatic Croatia (AC)	665,703	76,641	524,431	1,941	51,973	10,717	57.18	0.47
Republic of Croatia (RC)	1,863,741	156,981	1,445,220	4,655	141,567	115,318	69.83	0.43
AC/RC (%)	36	49	36	42	37	9	82	109

Source: Transport and communications in 2012, Statistical reports pg.123, Bureau of Statistics

It should be noted that although the counties of the Adriatic Croatia count for less than a half of the total registered road vehicles, the shares of mopeds, motorcycles and buses are somewhat above the Croatian average. This comes about due to the favourable climate and a specific tourist demand for road transport.

Railways

Railroad network has never been developed in the Coastal Zone. The largest railroad network is in the Šibenik-Knin County, followed by the counties of Istria and Primorje-Gorski Kotar. This is due to the location of the railway corridors, both national and international (connecting the port of Rijeka in the north, as well as Šibenik and Zadar along the Split–Zagreb railway).

The railroads in the Adriatic Croatia are old to the extent that quite a few railway lines have been cancelled recently. There is no railroad connecting the coastline from north to south – the railroad stops in Split, while the southern port of Ploče used to be connected with Bosnia and Herzegovina railways all the way to Budapest. The City of Dubrovnik has no railroad connection with the rest of Croatia.

Table 6. Railroad network in the Coastal Zone

	International		Regional		Local		Total	
County	Length (km)	Density (km/km^2)	Length (km)	Density (km/km^2)	Length (km)	Density (km/km^2)	Length (km)	Density (km/km^2)
Istria	0	0	91.1	0.03	53.0	0.02	144.1	0.05
Primorje-Gorski Kotar	158.3	0.04	0	0	2.0	0	160.3	0.04
Lika-Senj	106.9	0.02	0	0	0	0	106.9	0.02
Zadar	94.3	0.03	16.4	0	0	0	110.7	0.03
Šibenik-Knin	149.3	0.05	26.2	0.01	0	0	175.5	0.06
Split-Dalmatia	44.0	0.01	0	0	5.3	0	49.3	0.01
Dubrovnik-Neretva	22.7	0.10	0	0	0	0	22.7	0.01
Adriatic Croatia (AC)	575.5	0.02	133.7	0.01	60.3	0	769.5	0.03
Republic of Croatia (RC)	1.712.0	0.03	583.8	0.01	660.4	0.01	2.955.6	0.05
AC / RC (%)	33.62	66.67	22.9	100.00	9.13	0	26.04	60.00

Source: Report on the state in the area of the Republic of Croatia 2008–2012, pg. 101

The existence and functioning of the railways was mainly connected to the operations of the ports – Rijeka, Pula, Zadar, Šibenik, Split, Ploče. During the last few decades, the port traffic, especially cargo, has been decreasing immensely (see data for sea ports) on one hand, and the road and air traffic have been ever more affordable in terms of passenger transportation (along with the closing down of big industries on the coast, resulting in disappearance of passenger-local workers daily migrations), so that railways lost their role in traffic networks.

Ports and maritime transport

During the whole period from 2006 to 2010, general cargo ships, passenger ships and cruise ships with gross tonnage up to 499 GT were the most represented type of ships in the total ships arrivals in seaports. The ship type "General cargo, non specialised ships" has been dominant. It represents 70% of the total gross tonnage of vessels and 52% of the total ship movements in 2010. Ferries are the most dominant type in this category. The second most important ship category is passenger ships. They represent almost 22% of the total traffic in terms of the total gross vessel tonnage and 44% of the total movements of ships. The share of container ships in the total gross vessel tonnage is 3.3% and only 0.2% in the total movements of ships.

The number of arrived ships in seaports of the Republic of Croatia in 2010 decreased by 4.7% compared to 2009, while the total gross tonnage of arrived ships increased by 4.5%, confirming the trend of increase of size of ships operating in the Croatian ports. Out of the total arrived ships in 2010, the domestic flags were represented with 97.2%. The decrease of arrived ships in 2010, as compared to 2009, was recorded in the statistical ports of Ploče (12%), Zadar (9.9%), Dubrovnik (6.3%), Jablanac (5.5%), Rab, (4.8%), Biograd (1.8%), Cres (1%) and Split (0.1%). These results are the outcome of the distribution of traffic between different categories of vessels in each statistical seaport.

In 2010, the number of arrivals of dry cargo barges decreased by 47.3% compared to 2009, of dry bulk ships by 14.4%, of liquid bulk ships by 7.3%, of passenger ships by 6.6%, of container ships by 5.8% and of general cargo, non specialised ships by 3.3%. The increase of arrivals was shown in the traffic of specialised ships (by 150%), offshore activity ships (by 38.4%) and fishing ships (by 2.2%). The total number of embarked and disembarked passengers in seaports of the Republic of Croatia in 2010 was 27.5 million. Out of total number of passengers, 24.5 million (88.9%) embarked and disembarked in the national traffic and 3 million (11.1%) in the international traffic. As compared to 2009, when the total number of passengers amounted to 28 million, data for 2010 showed a decrease of 2.4%. The national traffic of passengers decreased by 4.0%, while the international traffic increased by 11.8%. There were no significant differences in the number of arrivals (disembarkation) and departures (embarkation) of passengers. This is due to the fact that the major part of the passenger transport takes place on the ferries and passenger boats, and only a minor part on cruise ships. The same passengers are counted both in the port of embarkation and in the port of disembarkation.

These figures include all national ferry lines. The data for the following statistical ports show a decrease of passenger traffic in 2010 as compared to 2009: Novalja (Prizna–Žigljen) traffic decreased by 14.4%, port of Cres (Brestova–Porozina) by 9.2%, Jablanac (Jablanac-Mišnjak) by 8.9%, the port of Korčula (including the total number of passengers on the line Korčula-Orebić) by 4.5% and the port of Preko (Preko–Tkon) by 4.4%.

Out of total number of passengers in 2010, 3,837,000 (14%) passed through the port of Split and 2,940,000 passengers (11%) through the port of Dubrovnik. Out of the total of 3,071,000 passengers in the international traffic, 2,741,000 (89.3%) arrived and departed by ships with foreign flags. 1,542,000 passengers arrived from foreign ports and disembarked in seaports in the Republic of Croatia in 2010, including cruise passengers.

Table 7. Traffic of passengers in seaports, 2005–2010 (in 000)

	Total traffic of goods	National traffic	International traffic
2005	23,419	21,459	1,960
2006	24,535	22,462	2,073
2007	26,296	23,913	2,383
2008	28,282	25,541	2,741
2009	28,257	25,509	2,748
2010	27,565	24,495	3,071

Source: Traffic in Seaports, 2006–2010, CBS, 2011, pg. 40

In 2010, the total traffic of goods in seaports of the Republic of Croatia amounted to 24,329,000 tons, which was by 4.1% more than in 2009. Out of the total traffic of goods, the share of the international traffic was 86.2% (20,962,000 tons) and the share of the national traffic was 13.8% (3,368,000 tons). As compared to 2009, the international traffic in 2010 increased by 5.3% (the unloading of goods increased by 9.7% and the transit with transhipment by 7.1%, while the loading decreased by 1.2%). In 2009, the total traffic of goods amounted to 23,377,000 tons, which was by 20% less than in 2008.

The general economic crisis had the greatest impact on the unloading (a decrease of 31.9%) and the transit of goods (a decrease of 26.3%). Total quantity of goods in the international traffic loaded in the seaports of the Republic of Croatia in 2010 was 8,321,000 tons. Total quantity of goods in the international traffic unloaded in the seaports of the Republic of Croatia in 2010 was 12,641,000 tons.

Table 8. Traffic of goods in seaports (in 000 tons), 2005–2010

	Total traffic of goods	National traffic	International traffic
2005	26,201	4,924	21,277
2006	26,326	4,933	21,393
2007	30,097	4,954	25,143
2008	29,223	4,603	24,620
2009	23,377	3,460	19,917
2010	24,329	3,368	20,962

Source: Traffic in Seaports, 2005–2010, CBS, 2011, p. 51

In 2010, the total amount of goods loaded in the seaports (in national and international traffic) amounted to 10,041,000 tons. Out of that, 23.7% related to the loading of metal ores and other mining and quarrying products, 20.5% to coke and refined petroleum products and 13.8% were other non-metallic mineral products. The total amount of unloaded goods (national and international) amounted to 14,289,000 tons, out of which 60.3% related to coal and lignite, crude petroleum and natural gas, and 11.9% to coke and refined petroleum products.

According to the type of the handling of cargo in seaports, 57.5% of loaded cargo was dry bulk, 17.4% was liquid bulk and 3.4% was container cargo. Out of the total unloaded cargo, 49.6% related to the liquid cargo, 36.7% to dry cargo and 5.3% to goods in containers. The traffic of containers in TEUs shows an increase ranging from 114,300 TEU in 2006 to 144,649 TEU in 2010, an increase of 26.6%. As compared to 2009, when the total traffic amounted to 151,926 TEU, there was a decrease of 4.8%. Out of the total traffic in 2010, the share of full containers was 67.2%.

In 2010, six ports recorded traffic of over one million tons of goods, as follows: the port of Omišalj with 5,931,000 tons, Ploče with 4,486,000 tons, Split with 2,746,000 tons, Bakar with 2,441,000 tons, Rijeka with 2,095,000 tons and the port of Raša with the traffic of 1,935,000 tons of goods.

Table 9. Traffic of ships in seaports, arrivals, 2005–2010

	Total traffic of goods	National flags	International flags
2005	221,960	215,671	689
2006	223,967	217,636	6,331
2007	235,489	229,005	6,484
2008	248,539	241,184	7,355
2009	247,547	240,990	6,557
2010	235,841	229,327	6,514

Source: Traffic in Seaports, 2006–2010, CBS, 2011, pg. 22

In Croatian ports in 2010 there were 4,676,000 of loaded and unloaded passenger cars, motorcycles and trailers, which was by 5.8% less than in 2009 when that number amounted to 4,966,000, 49,000 buses, which was by 5.8% more than in 2009, and 719,000 road goods, vehicles and trailers, which was by 0.8% less than in 2009. The total number of live stock loaded and unloaded in seaports amounted to 11,922 in 2010, which was almost twice as much as in 2007.

The total goods on road goods vehicles amounted to 1,925,000 tons in 2010, which was by 4.7% less than in 2009. The total traffic of dangerous goods in Croatian seaports amounted to 8,696,000 tons, which was a decrease of 5.5% compared to 2009. The major share in the traffic of dangerous goods related to flammable liquids, 8,500,000 tons in 2010, which was a decrease of 4.8% compared to 2009.

In 2012, trends shifted. The number of vessels in ports increased, while the total tonnage decreased. The number of passengers, both in arrivals and departures, increased, and it was the highest ever since 1980. On the other hand, the goods traffic decreased; it was the lowest since 2000.

Across the harbour master's offices, Dubrovnik recorded an increase in all numbers; still, there is a decrease in all items in island ports. Ploče continued to lose cargo. Similar is in Pula harbour office. In Rijeka office, the number of passengers is growing (except in ports of Omišalj, Rijeka, Susak, Šilo). Cargo is decreasing, mainly because of the drop in Omišalj, although some other ports recorded an increase in goods traffic (Rijeka and Crikvenica in particular).

Table 10. Traffic of ships, passengers and goods by Harbour master's offices and statistical ports in 2012

Harbour master's office	Arrivals of ships		Passenger traffic			Goods traffic, tons		
	Number	GT, '000	Total	Number	GT, '000	Total	Number	GT, '000
Pula	25,293	10,014	2,171,806	1,111,862	1,059,944	2,032,980	1,101,575	931,405
Rijeka	39,819	44,036	4,216,230	2,080,136	2,136,094	9,806,163	3,004,429	6,801,734
Senj	18,743	17,657	2,301,346	1,128,054	1,173,292	123,762	104,590	19,172
Zadar	34,967	42,666	4,943,932	2,490,178	2,453,754	498,475	168,723	329,752
Šibenik	29,721	4,656	1,124,315	564,074	56,041	434,432	224,218	210,214
Split	52,323	78,431	9,077,489	4,537,117	4,540,372	3,190,226	1,555,128	1,635,098
Ploče	2,042	5,997	175,837	87,679	88,158	2,524,574	766,152	1,758,422
Dubrovnik	44,663	84,321	5,460,326	2,718,215	2,742,111	361,604	177,948	183,656
Total	**247,571**	**287,782**	**29,471,281**	**14,717,315**	**14,753,966**	**18,972,216**	**7,102,763**	**1,1869,453**

Source: CBS, Statistical report – Transport in 2012, pg. 104–105

In Senj, there is a decrease in the arrival of ships, but goods and passenger traffic is growing in Jablanac and Novalja (ferry lines). In Split harbour office, the number of vessels and passengers is growing, while the goods traffic is stagnating. Somewhat more intense trends can be seen in Šibenik harbour office, in the port of Šibenik especially. Finally, in Zadar, the number of ships and passengers is stable, while the goods traffic is dropping rapidly, especially in the ports of Preko and Zadar.

Airports

There are seven commercial airports in the Coastal Zone: Pula, Rijeka, Mali Lošinj, Zadar, Split, Brač, and Dubrovnik. However, there are also other smaller airports and land strips, serving for agricultural, tourism and sport purposes: Campanož-Medulin, Vrsar, Grobničko Polje, Hvar, Unije. Only the first group of airports have more significant environmental impact, and may contribute to the economic activities in the Coastal Zone.

All airports have been growing but Split and Dubrovnik appear most frequent according to all indicators. Airports in the Coastal Zone participate with more that 50% in total plane operations in Croatia, more than 60% in total passenger traffic, but with only 14% in cargo traffic. This is quite understandable concerning the great importance of air traffic to the tourism activity along the coast.

All aspects of traffic (operations, passenger and cargo) are showing better trends in the Coastal Zone than in Croatia – even the cargo is decreasing slower in the Coastal Zone than in Croatian total. As a result, the importance and share of Coastal Zone in Croatian air transportation seems to be growing.

Table 11. Plane operations by airports (landing/take off) 2011–2013

Airport	2011	2012	2013	2013/2011 (%)
Split	17,418	17,403	18,227	104.64
Dubrovnik	16,050	16,216	16,126	100.47
Zadar	6,802	7,819	8,029	118.04
Pula	6,821	7,179	7,339	107.59
Rijeka	2,680	2,265	2,653	98.99
Brač	1,519	1,423	1,304	85.85
Mali Lošinj	3,656	3,256	3,443	94.17
Adriatic Croatia (AC)	54,676	55,561	57,121	104.47
Republic of Croatia (RC)	98,884	95,876	97,166	98.26
AC / RC (%)	55.29	57.95	58.79	106.33

Source: Croatian Civil Aviation Agency (available at: http://www.mppi.hr/default.aspx?id=8691

Table 12. Passengers traffic in airports 2011–2013

Airport	2011	2012	2013	2013/2011 (%)
Split	1,271,202	1,393,649	1,558,812	122.63
Dubrovnik	1,326,250	1,455,470	1,502,165	113.26
Zadar	265,982	345,659	453,791	170.61
Pula	344,640	362,415	351,196	101.90
Rijeka	79,316	71,558	139,296	175.62
Brač	11,367	11,402	9,433	82.99
Mali Lošinj	1,597	794	-	-
Adriatic Croatia (AC)	3,300,354	3,640,947	4,014,693	121.64
Republic of Croatia (RC)	5,578,771	5,960,281	6,304,089	113.00
AC / RC (%)	59,16	61,09	63,68	107,65

CBS, First Release, February 2014, No. 5.1.5/12 CBS, First Release, February 2013, No.5.1.5/12
CBS, First Release, February 2014, No. 5.1.5/12

Table 13. Cargo traffic in airports, 2011–2013 (in kg)

Airport	2011	2012	2013	2013/2011 (%)
Split	697,536	622,112	449,031	64.37
Dubrovnik	419,612	356,777	374,684	89.29
Zadar	14,520	7,415	16,084	110.77
Pula	9,490	10,151	9,146	96.38
Rijeka	-	-	9,779	-
Brač	-	-	-	-
Mali Lošinj	-	-	-	-
Adriatic Croatia (AC)	1,141,158	996,455	858,724	75.25
Republic of Croatia (RC)	9,153,231	6,816,020	6,121,796	66.88
AC / RC (%)	12,47	14,62	14,03	112,51

Source: Croatian Civil Aviation Agency (available at: http://www.mppi.hr/default.aspx?id=8691)

1.2.4 County economic overview

In order to identify the key environmental pressures, the economic structure of the Coastal Zone has been analysed. Dominant sectors[8] in the part of the each county that belongs to the Coastal Zone have been identified and broken down to dominant sectors in the mainland part of the Coastal Zone and dominant sectors on the islands. The analysis is based on the employment data and business revenues provided by the Croatian financial agency FINA. The period 2008–2011 is chosen because of negative economic trends that started in 2008, marking the beginning of the crisis which still has not been overcome. Employment and business revenues are taken as criteria and five most successful sectors are ranked accordingly. Since ranks in terms of employment do not necessarily match the ranks in terms of business revenues, some sectors appear differently ranked in tables and figures for the same county. Variations within a particular sector over time may also disrupt ranks as some sectors entered and then exited the group of the highest five within the observed period 2008–2011. Data on such sectors are included in tables only in years during which they were ranked as dominant. In the years when they were ranked sixth or lower, a mark "–" is used instead. Dominant sectors in the Coastal Zone are presented in the following tables and figures for each county.

The **County of Istria** is the only county with no inhabited islands. Islands in the county's Coastal Zone are few and small and they belong to the LGUs on the mainland. Activities that take place there are almost exclusively touristic and controlled by a couple of big mainland coastal firms. The sectoral structure is thus presented only for the mainland part of the county's Coastal Zone.

Istria is the most developed Adriatic county due to a well balanced sectoral structure and the most advanced touristic sector in the Adriatic Croatia. As most of the tourist facilities and industrial units are located on the coast, the Coastal Zone is the most developed part of the county. The agricultural sector is located mainly in the middle of the Istrian peninsula, outside the Coastal Zone. Employment and business revenues across sectors have been declining or stagnating mostly due to the overall crisis. Tourism is an exception because of the rising demand for Croatia as a tourist destination in recent years. This sector has survived with a remark that its share in the overall structure rose not only due to new investments and/or a significant increase of revenues, but also due to a decline in other sectors.

Table 14. Dominant sectors in the Coastal Zone of the County of Istria by employment

[8] Sectors are marked according to the NACE classification: **A** – Agriculture, forestry and fishing, **B** – Mining and quarrying, **C** – Manufacturing, **D** – Electricity, gas, steam and air conditioning supply, **E** – Water supply; sewerage; waste management and remediation activities, **F** – Construction, **G** – Wholesale and retail trade, **H** – Transporting and storage, **I** – Accommodation and food services, **J** – Information and communication, **K** – Financial and insurance sector, **L** – Real estate sector, **M** – Professional, scientific and technical activities, **N** – Administrative and support service activities, **O** – Public administration and defence; mandatory social security, **P** – Education, **Q** – Health care and social services, **R** – Arts, entertainment and recreation, **S** – Other service activities

Activity	2008	2009	2010	2011
C	27%	28%	28%	27%
F	11%	10%	10%	9%
G	19%	18%	18%	18%
I	19%	19%	20%	21%
M	6%	7%	6%	5%
Other activities	18%	19%	19%	20%
Total (no. empl.)	**40,278**	**38,998**	**38,286**	**38,007**

Table 15. Dominant sectors in the Coastal Zone of the County of Istria by business revenues

Activity	2008	2009	2010	2011
C	34%	37%	39%	35%
D[9]	-	-	3%	5%
F	9%	9%	10%	6%
G	25%	23%	21%	23%
I	12%	13%	12%	15%
M[10]	5%	4%	-	-
Other activities	15%	15%	14%	17%
Total business revenues (mil. kn)	**25,859**	**23,500**	**24,995**	**22,265**

The **County of Primorje-Gorski Kotar** appears as "Croatia in small" as it encompasses a good part of the coast, mountain district Gorski Kotar in the hinterland and northern islands. Geographical heterogeneity, the long run development policy which favoured the port of Rijeka and the rise of tourist sector from 1960s onwards, determined the sectoral structure in the long run. Structural changes in the short run have been determined by the ongoing economic crisis.

Dominant sectors in the overall Coastal Zone of the County of Primorje-Gorski Kotar have been declining both in terms of employment and revenues, but they have retained more or less the same structure. A sub-regional view provides a different picture as restructuring and privatization of shipyards located near the City of Rijeka in 2012 and 2013 affected the overall industrial structure on the mainland coast. On the other hand, the islands were targeted by developers and most of the recent construction (legal and illegal) took place there. The share of construction sector reached almost one fifth of the island economy, significantly more than in the mainland part of the Coastal Zone.

Table 16. Dominant activities in the Coastal Zone of the County of Primorje-Gorski Kotar by employment

Activity	Coastal Zone				Mainland Coast				Islands			
	2008	2009	2010	2011	2008	2009	2010	2011	2008	2009	2010	2011
C	21%	21%	22%	20%	22%	22%	23%	21%	14%	15%	14%	14%
E	-	-	-	-	-	-	-	-	6%	6%	7%	7%
F	10%	10%	9%	9%	9%	8%	-	7%	18%	17%	17%	18%
G	25%	25%	23%	25%	26%	26%	24%	26%	20%	18%	19%	18%
H	12%	11%	11%	12%	13%	13%	13%	13%	-	-	-	-
I	10%	10%	10%	10%	7%	7%	8%	8%	26%	25%	26%	25%
M[11]	-	-	-	-	-	-	8%	-	-	-	-	-
Other activities	23%	23%	25%	24%	23%	24%	25%	25%	17%	19%	17%	18%
Total (no. empl.)	**62,151**	**60,597**	**58,019**	**57,795**	**54,136**	**52,858**	**50,317**	**50,216**	**8,015**	**7,739**	**7,702**	**7,579**

[9] Activity D is one of the five largest activities according to the business revenues in 2010 and 2011 only
[10] Activity M is one of the five largest activities in terms of business revenues in 2008 and 2009 only.
[11] Activity M is one of the five largest activities according to number of employees only on mainland coast of Primorje-Gorski Kotar in 2011

Table 17. Dominant sectors in the Coastal Zone of the County of Primorje-Gorski Kotar by business revenues

Activity	Coastal Zone				Mainland Coast				Islands			
	2008	2009	2010	2011	2008	2009	2010	2011	2008	2009	2010	2011
C	19%	17%	19%	22%	20%	17%	18%	23%	9%	13%	24%	20%
F	9%	9%	8%	6%	7%	7%	6%	5%	23%	23%	18%	20%
G	45%	45%	44%	43%	47%	47%	47%	45%	30%	28%	25%	25%
H	9%	9%	9%	8%	9%	9%	9%	9%	10%	7%	5%	5%
I	5%	5%	5%	5%	-	-	-	-	17%	17%	16%	18%
M	-	-	-	-	5%	5%	5%	4%	-	-	-	-
Other activities	14%	16%	15%	15%	13%	15%	15%	15%	11%	12%	11%	13%
Total business revenues (mil. kn)	**35,977**	**32,393**	**31,049**	**33,910**	**31,637**	**28,117**	**26,540**	**29,639**	**4,340**	**4,275**	**4,509**	**4,271**

The **County of Lika-Senj** encompasses the northern and central part of the Velebit mountain range, an undeveloped and scarcely populated mountain district in the hinterland, a part of the island of Pag and a rather small and touristically least attractive part of the coast. It is an Adriatic county with least Mediterranean characteristics, which affects its economic structure.

The economy of the Coastal Zone of the County of Lika-Senj is dominated by wholesale and retail trade which indicates a rather poor economic structure with not much manufacturing industry. Tourism is concentrated on the county's only island and in several small towns and villages on the mainland coast. The island tourist sector has been growing in 2010 and 2011. Tourist growth on the less attractive coast was much slower.

Table 18. Dominant sectors in the Coastal Zone of the County of Lika-Senj by employment

Activity	Coastal Zone				Mainland Coast				Islands			
	2008	2009	2010	2011	2008	2009	2010	2011	2008	2009	2010	2011
C	22%	18%	16%	21%	36%	30%	29%	34%	-	-	-	-
E	13%	15%	15%	13%	15%	17%	19%	16%	10%	11%	10%	10%
F	11%	11%	13%	10%	12%	9%	11%	9%	10%	13%	15%	12%
G	30%	28%	20%	18%	16%	16%	13%	11%	49%	44%	27%	27%
H	-	-	-	-	-	-	-	-	10%	9%	9%	10%
I	9%	13%	22%	21%	7%	12%	14%	13%	10%	14%	30%	30%
Other activities	15%	15%	14%	17%	13%	15%	15%	16%	10%	9%	9%	12%
Total (no. empl.)	**1,003**	**915**	**889**	**978**	**574**	**511**	**447**	**537**	**429**	**404**	**442**	**441**

Table 19. Dominant sectors in the Coastal Zone of the County Lika –Senj by business revenues

Activity	Coastal Zone				Mainland Coast				Islands			
	2008	2009	2010	2011	2008	2009	2010	2011	2008	2009	2010	2011
C	16%	9%	10%	11%	31%	20%	22%	20%	-	-	-	-
E	8%	8%	9%	7%	11%	12%	14%	8%	6%	6%	6%	6%
F	10%	8%	9%	26%	9%	7%	9%	40%	11%	9%	10%	11%
G	49%	55%	43%	31%	35%	40%	38%	19%	62%	67%	45%	42%
H	9%	-	-	-	7%	-	-	-	10%	6%	7%	6%
I	-	10%	21%	18%	-	10%	8%	6%	8%	9%	29%	31%
Other activities	9%	9%	9%	7%	8%	11%	9%	7%	4%	3%	4%	3%
Total business revenues (mil. kn)	**475**	**412**	**401**	**533**	**226**	**174**	**155**	**267**	**249**	**238**	**246**	**266**

The **County of Zadar** encompasses the southern part of the Velebit mountain range, a part of the north-Dalmatian coast, north-Dalmatian islands and an agricultural district in the hinterland that reaches the border with Bosnia and Herzegovina. Due to indented county coast the Coastal Zone reaches rather deep into the hinterland, covering a good part of the agricultural district.

Due to a large area of fertile soil in the hinterland of Zadar, agriculture appears as one of the dominant sectors in the Coastal Zone of the County of Zadar, making its economic structure richer than in the rest of the overall Adriatic Coastal Zone. Whereas the northern islands historically retained a significant degree of independence from the coastal centres, much smaller islands remained highly dependent on their economic and administrative centre, the City of Zadar. The island economic structure thus remained poor, boiling down to tourism and once a much more developed agriculture. Construction sector has been growing as islands were targeted by developers, same as the northern ones. On the other hand, the area around Zadar has been growing both touristically and industrially with a couple of major infrastructure investments at the turn of the century. The construction boom slowed down with the crisis, however, allowing for larger shares of manufacturing industry, and wholesale and retail trade.

Table 20. Dominant sectors in the Coastal Zone of the county of Zadar by employment

Activity	Coastal Zone				Mainland Coast				Islands			
	2008	2009	2010	2011	2008	2009	2010	2011	2008	2009	2010	2011
A	-	-	-	-	-	-	-	-	21%	24%	31%	26%
B	-	-	-	-	-	-	-	-	8%	-	-	-
C	19%	19%	18%	17%	20%	19%	19%	16%	-	17%	11%	26%
E	-	-	-	-	-	-	-	-	-	-	-	6%
F	14%	13%	12%	10%	13%	13%	12%	11%	24%	12%	10%	-
G	25%	23%	22%	22%	26%	24%	23%	23%	18%	16%	17%	15%
H	-	-	-	9%	-	-	-	10%	-	-	-	-
I	8%	9%	10%	10%	8%	9%	10%	11%	9%	9%	9%	9%
N	7%	8%	8%	-	7%	8%	9%	-	-	-	-	-
Other activities	27%	28%	30%	32%	25%	27%	28%	30%	20%	22%	23%	17%
Total (no. empl.)	**19,487**	**18,777**	**18,637**	**19,108**	**17,691**	**16,941**	**16,839**	**16,980**	**1,796**	**1,836**	**1,798**	**2,128**

Table 21. Dominant sectors in the Coastal Zone of the County of Zadar by business revenues

Activity	Coastal Zone				Mainland Coast				Islands			
	2008	2009	2010	2011	2008	2009	2010	2011	2008	2009	2010	2011
A	5%	6%	7%	8%	-	-	-	-	26%	33%	37%	28%
B	-	-	-	-	-	-	-	-	11%	7%	14%	3%
C	18%	18%	18%	19%	19%	19%	19%	13%	-	14%	6%	45%
E	-	-	-	-	-	-	-	-	5%	-	-	-
F	13%	12%	10%	9%	13%	12%	11%	10%	12%	8%	-	-
G	34%	31%	29%	28%	35%	32%	30%	31%	31%	22%	23%	12%
H	12%	12%	15%	14%	13%	13%	16%	16%	-	-	-	-
I	-	-	-	-	4%	6%	7%	9%	-	-	5%	3%
Other activities	17%	20%	21%	23%	16%	17%	17%	20%	15%	16%	14%	8%
Total business revenues (mil. kn)	**11,203**	**9,549**	**9,340**	**9,564**	**10,337**	**8,660**	**8,447**	**7,937**	**866**	**889**	**893**	**1,627**

The Coastal Zone of the county of **Šibenik-Knin** covers a small inner archipelago, a part of the outer archipelago of Kornati which is a national park, a part of the middle Dalmatian coast and a part of the hinterland which does not reach as deep as in the case of the part of the Coastal Zone in the County of Zadar. The only significant economic activities take place in Šibenik and in its vicinity, whereas the island economy boils down to tourism (highly important for islands and not so much for the county economy).

Table 22. Dominant sectors in the Coastal Zone of the County of Šibenik-Knin by employment

Activity	Coastal Zone				Mainland Coast				Islands			
	2008	2009	2010	2011	2008	2009	2010	2011	2008	2009	2010	2011
A	-	-	-	-	-	-	-	-	6%	-	-	-
C	29%	27%	27%	27%	30%	27%	27%	27%	17%	29%	26%	26%
E	-	5%	-	-	-	5%	-	-	-	7%	6%	5%
F	11%	11%	10%	9%	11%	12%	11%	9%	-	-	-	-
G	16%	16%	17%	15%	16%	16%	16%	15%	15%	10%	23%	19%
H	6%	-	6%	7%	6%	-	6%	7%	-	-	-	-
I	16%	15%	15%	16%	15%	15%	15%	16%	25%	8%	8%	9%
R	-	-	-	-	-	-	-	-	21%	24%	23%	22%
Other activities	22%	26%	25%	25%	22%	25%	24%	25%	16%	22%	14%	19%
Total (no. empl.)	**9,914**	**9,301**	**9,153**	**9,165**	**9,609**	**9,039**	**8,877**	**8,883**	**305**	**262**	**276**	**282**

Table 23. Dominant sectors in the Coastal Zone of the County of Šibenik-Knin by business revenues

Activity	Coastal Zone				Mainland Coast				Islands			
	2008	2009	2010	2011	2008	2009	2010	2011	2008	2009	2010	2011
A	-	-	-	-	-	-	-	-	-	4%	6%	6%
C	37%	34%	38%	40%	37%	33%	38%	41%	34%	41%	30%	26%
E	-	-	4%	5%	-	3%	4%	5%	-	-	-	-
F	11%	12%	9%	7%	11%	12%	9%	7%	-	-	-	-
G	24%	21%	20%	19%	24%	22%	20%	19%	20%	11%	21%	19%
H	-	-	-	-	4%	-	-	-	-	-	-	-
I	10%	11%	11%	10%	10%	11%	11%	10%	17%	-	-	4%
M	-	-	-	-	-	-	-	-	-	-	3%	-
N	-	-	-	-	-	-	-	-	5%	5%	-	-
R	4%	4%	-	-	-	-	-	-	17%	25%	26%	28%
Other activities	15%	18%	18%	20%	14%	18%	18%	19%	7%	13%	14%	17%
Total business revenues (mil. kn)	**4,951**	**4,156**	**4,468**	**4,877**	**4,798**	**4,030**	**4,339**	**4,748**	**153**	**126**	**128**	**130**

The Coastal Zone of the County of **Split-Dalmatia** encompasses a narrow but a rather long part of the mainland coast, and three big and several smaller islands. The structure of island economy does not differ much from the structure on the mainland coast, as the big islands historically retained a significant degree of independence from the coastal centres. On the other hand, spatial distribution of economic activities is uneven as there is strong tendency of concentration in the City of Split and in the industrial zones on its northern and western suburbs.

Agriculture appears dominant only in the islands, primarily because there is not much activity from the construction and transportation sectors there. Island agriculture production tends to be of high quality (extra virgin olive oil, wines made of endemic vine species etc.), whereas the demand for food in the Split area is met by the supply mainly from the hinterland. Manufacturing industry in the islands is reduced to a couple of companies which hold a significant share in both employment and revenues, simply because the island economy is small sized. There are many more activities on the mainland coast of the Coastal Zone, particularly in wholesale and retail trade, and in construction which boomed in the early 2000s and started declining in 2008. Although important, the tourist sector held none of dominant positions on the mainland in the observed period due to a rich economic structure. On the other hand, island tourism holds more than a quarter of the island economy although it is smaller in capacity than the mainland tourism.

Table 24. Dominant sectors in the Coastal Zone of the County of Split-Dalmatia by employment

Activity	Coastal Zone				Mainland Coast				Islands			
	2008	2009	2010	2011	2008	2009	2010	2011	2008	2009	2010	2011
A	-	-	-	-	-	-	-	-	-	5%	4%	5%
C	26%	26%	26%	26%	26%	26%	26%	26%	25%	21%	21%	22%
E	-	-	-	-	-	-	-	-	7%	7%	8%	9%
F	14%	11%	13%	12%	14%	11%	13%	13%	4%	-	-	-
G	26%	27%	25%	24%	27%	28%	26%	25%	10%	11%	10%	9%
H	6%	6%	6%	6%	6%	6%	6%	6%	-	-	-	-
I	9%	9%	9%	10%	7%	7%	7%	7%	39%	38%	37%	37%
Other activities	20%	21%	21%	22%	20%	21%	21%	22%	15%	19%	20%	18%
Total (no. empl.)	**71,676**	**66,084**	**65,719**	**63,700**	**66,692**	**61,132**	**61,124**	**59,210**	**4,984**	**4,952**	**4,595**	**4,490**

Table 25. Dominant sectors in the Coastal Zone of the County of Split-Dalmatia by business revenues

Activity	Coastal Zone				Mainland Coast				Islands			
	2008	2009	2010	2011	2008	2009	2010	2011	2008	2009	2010	2011
A	-	-	-	-	-	-	-	-	4%	5%	-	4%
C	22%	22%	22%	27%	22%	22%	22%	27%	29%	27%	22%	27%
E	-	-	-	-	-	-	-	-	5%	5%	7%	8%
F	18%	12%	13%	12%	18%	13%	14%	12%	-	-	5%	-
G	39%	42%	40%	37%	39%	43%	41%	38%	19%	22%	19%	18%
H	5%	5%	6%	5%	5%	5%	6%	5%	-	-	-	-
I	4%	4%	5%	5%	-	-	-	-	27%	25%	30%	28%
M	-	-	-	-	4%	4%	4%	4%	-	-	-	-
Other activities	12%	14%	15%	14%	11%	13%	14%	14%	16%	16%	17%	15%
Total business revenues (mil. kn)	**44,338**	**34,733**	**32,226**	**34,663**	**42,730**	**33,176**	**30,756**	**33,089**	**1,608**	**1,557**	**1,470**	**1,574**

The County of **Dubrovnik-Neretva** encompasses a rather narrow coastal belt determined by the border with Bosnia and Herzegovina, the peninsula of Pelješac and the remaining southern islands. The county is quite specific because of territorial 'discontinuity', on the part of the coast where Bosnia and Herzegovina exits the Adriatic Sea. Its Coastal Zone is thus relatively big reflecting the structure of the economy of the county. The economy of small and outer islands is marginal to the economy of the county, unlike the economy of the inner island of Korčula the economy of which has the most developed manufacturing sector of all Croatian islands. The data on island employment and business revenues refer thus almost entirely to the island of Korčula. The spatial distribution of economic activities is uneven, however. Most of the tourist and trade sectors are concentrated in Dubrovnik so that it appears as the place of highest demand for food in the county.

The City of Dubrovnik is a famous tourist destination and a place of a complex and well structured touristic offer aimed at consumers with various, often very high, preferences. Agriculture is a dominant sector in the Neretva estuary and in the islands. In the islands the economic structure is simpler. The manufacturing industry is not much developed on the mainland part of the Coastal Zone, so that the island manufacturing industry, no matter how significant in the bigger islands in the Zone, does not contribute significantly to the overall manufacturing sector. On the other hand, almost equal shares of construction on the mainland and in the entire Coastal Zone confirm that this sector is concentrated in the City of Dubrovnik and its vicinity. Extra ordinary attractiveness of the city and its long tradition in the trade sector contributed to a high share of wholesale and retail trade on the mainland and in the entire Coastal Zone. Differences between shares in employment and business revenues in tourist sector point to the fact that tourism is a labour intensive activity which, given the attractiveness of the destination, does not yield a proportional share in revenues. This applies particularly to the islands.

Table 26. Dominant sectors in the Coastal Zone of the County of Dubrovnik-Neretva by employment

Activity	Coastal Zone				Mainland Coast				Islands			
	2008	2009	2010	2011	2008	2009	2010	2011	2008	2009	2010	2011
A	-	-	-	-	-	-	-	-	9%	10%	9%	9%
C	9%	9%	10%	10%	-	-	-	-	30%	30%	32%	32%
D	-	-	-	-	-	-	-	-	-	-	-	-
E	-	-	-	-	-	-	-	-	7%	7%	8%	8%
F	13%	13%	13%	12%	14%	14%	14%	12%	-	-	-	-
G	17%	16%	15%	15%	18%	16%	15%	16%	11%	13%	11%	11%
H	13%	11%	12%	11%	14%	12%	13%	13%	-	-	-	-
I	25%	26%	25%	27%	24%	26%	26%	28%	27%	23%	21%	23%
N	-	-	-	-	8%	9%	9%	9%	-	-	-	-
Other activities	24%	25%	26%	25%	21%	21%	22%	22%	17%	16%	18%	17%
Total (no. empl.)	**19,790**	**19,835**	**18,175**	**17,822**	**16,506**	**16,663**	**15,230**	**14,914**	**3,284**	**3,172**	**2,945**	**2,908**

Table 27. Dominant sectors in the Coastal Zone of the County of Dubrovnik-Neretva by business revenues

Activity	Coastal Zone				Mainland Coast				Islands			
	2008	2009	2010	2011	2008	2009	2010	2011	2008	2009	2010	2011
A	-	-	-	-	-	-	-	-	12%	12%	10%	9%
C	-	-	-	-	-	-	-	-	34%	33%	35%	36%
E	-	-	-	-	-	-	-	-	6%	7%	7%	7%
F	11%	11%	11%	11%	12%	12%	11%	12%	-	-	-	-
G	26%	26%	21%	21%	28%	26%	22%	22%	18%	20%	19%	19%
H	23%	15%	20%	15%	25%	17%	22%	17%	-	-	-	-
I	14%	16%	18%	21%	14%	16%	19%	22%	16%	14%	14%	15%
N	7%	10%	10%	11%	7%	11%	12%	12%	-	-	-	-
Other activities	19%	22%	19%	20%	14%	17%	14%	15%	14%	14%	15%	14%
Total business revenues (mil. kn)	**9,605**	**8,248**	**7,633**	**7,706**	**8,510**	**7,207**	**6,695**	**6,769**	**1,094**	**1,041**	**939**	**937**

1.2.5 Sectors of the Coastal Zone Economy

Given the structure of the Croatian coastal economy it is not necessary to analyse all the sectors defined by the NACE classification. Six most important sectors analysed here capture 53.2% of the GVA in the Adriatic NUTS 2 region (the same sectors capture 50.9% of the GVA in the Continental NUTS2 and 51.6% of the GVA in the entire Croatian economy). These are:

A – Agriculture, forestry and fishing;
B – Mining and quarrying;
C – Manufacturing;
F – Construction;
H – Transportation and storage; and
Tourism.

As tourism does not appear in the NACE as a separate activity the sector **I** – Accommodation and food service activities is used as a proxy. This sector covers up to 90% of activities usually referred to as tourism. Tourism is also partly covered by **H** – Transportation and storage (in the part concerning the transportation of tourists), **R** – Arts, entertainment and recreation and **T** – Activities of households as employers (covering the activities of tourist agencies), but its share is minor.

Data on revenues, wages and environmental expenditures per employee (HRK in 2011) are presented for the firms in six main sectors, based on the data provided by the Financial agency (FINA). Coefficients present deviations of the value of indicators of each LGU from the Coastal Zone average, calculated as (sector revenues/sector employment)/(total revenues/total employment), (sector wages/sector employment)/(total wages/total employment) and (sector environmental expenditures/sector employment)/(total environmental expenditures/total employment). If the sector revenues/sector employment = total revenues/total employment, the coefficient = 1. LGUs are grouped in four classes according to deviations of the above indicators of their firms from 1.

It should also be noted that the following maps were based on sector information, meaning that the value coefficient 0 indicates a lack of environmental expenditures only for the sector shown on a certain map. Furthermore, the information on environmental expenditures is not available for crafts, so there may be LGUs with firms without environmental expenditures and crafts which do have environmental expenditures, but that is not visible from the information. On the other hand, it is generally known that firms are the only subjects with environmental expenditures in most sectors and LGUs. Therefore, we can conclude that the information listed is a valid indicator of a concern for the environment in the Coastal Zone economy.

Agriculture

As elsewhere in the Mediterranean, agriculture has been an important economic activity on the Croatian coast and the islands for centuries. The importance of the sector decreased during the 20th century, and especially after the Second World War. The overall economy developed and the focus shifted to industry and, later on, to services. In addition, migrations towards the coast and the corresponding urbanization resulted in depopulation of rural areas, nowadays inhabited mostly by the elderly. Valuable agricultural land was lost due to urbanization.

Currently, the main problems in the sector are: unsolved property rights, small plots of cultivated land, traditional farming and small crafts and family households. New trends can be observed however, as farmers are turning to ecological farming, along with increasing efforts of fostering development of rural areas in line with the EU development goals. The potential is evident, especially in growing traditional herbs for food processing and pharmaceutical usage, the production of goat and sheep cheese, etc. The production of high quality wine and olive oil has been expanding as well.

In addition, an institutional support (Ministry of Agriculture, Ministry of Regional Development etc.) has been given to branding and labelling of agricultural products: eco product label and labels of origin (Croatian product; Croatian Island product) or quality (Croatian Quality). Also, there are increasing efforts to link the agricultural production to tourism, in the framework of development of rural agricultural households.

The share of cultivated land in the Adriatic Croatia in total cultivated land in the Republic of Croatia amounts to only 17%. Regarding the structure of agricultural activity, production of fruits, olives and viticulture prevail (Table 28). It is notable that the entire Croatian production of almonds, figs, oranges, tangerines, lemons, olives and olive oil takes place in the Adriatic Croatia. The shares in the production of peaches, nectarines, cherries, grapes are high. As for the livestock, sheep and goats traditionally prevail.

Table 28. Cultivated agricultural land, by type of cultivation in the Adriatic Croatia 2008–2012 (in ha)

Type of cultivation	2008 AC	2008 RC	2008 %	2009 AC	2009 RC	2009 %	2010 AC	2010 RC	2010 %
I. Vegetables	877	5,337	16.43	779	5,315	14.66	1,144	4,902	23.34
II. Orchards, vineyards, olive groves (including kitchen gardens)	3,454	84,645	40.82	35,020	86,343	40.59	39,484	82,694	47.75
▪ orchards	4,604	35,933	12.81	4,566	36,659	42.46	6,929	32,889	21.07
▪ vineyards	14,979	33,741	44.39	15,150	34,380	44.07	15,459	32,709	47.26
▪ olive groves	14,971	14,971	100.00	15,304	15,304	100.0	17,096	17,096	100.0
III. Nurseries	120	346	34.68	108	579	18.65	68	429	15.85
IV. Osier willows	418	917	45.58	91	1,016	8.96	144	827	17.41
V. Permanent crops (excluding strawberry) (II + III +IV)	35,092	85,908	40.85	35,219	87,938	40.05	39,696	83,950	47.29
Potato	1,684	15,000	11.23	1,655	14,000	11.82	3,599	12,038	29.90
Permanent grassland	141,589	342,430	41.35	141,346	343,306	41.17	143,000	345,389	41.40
Arable land and gardens	35,724	855,416	4.18	36,476	863,023	4.23	38,647	899,594	4.30
Total (000 ha)	**213**	**1,289**	**16.52**	**214**	**1,300**	**16.46**	**223**	**1,334**	**16.72**

Type of cultivation	2011 AC	2011 RC	2011 %	2012 AC	2012 RC	2012 %
I. Vegetables	1,107	4,233	26.15	753	2,933	25.67
II. Orchards, vineyards, olive groves (including kitchen gardens)	40,332	82,245	49.04	39,384	78,183	50.37
▪ orchards	7,488	32,560	23.00	7,295	30,846	23.65
▪ vineyards	15,644	32,485	48.16	13,989	29,237	47.85
▪ olive groves	17,200	17,200	100.0	18,100	18,100	100.0
III. Nurseries	84	389	21.59	61	248	24.60
IV. Osier willows	-	592	-	63	540	11.67
V. Permanent crops (excluding strawberry) (II + III +IV)	40,416	83,226	48.56	39,508	78,971	50.03
Potato	2,966	11,359	26.11	2,734	10,648	25.68
Permanent grassland	149,476	346,403	43.15	149,339	345,561	43.22
Arable land and gardens	36,989	892,221	4.15	36,433	903,508	4.03
Total (000 ha)	**228**	**1,326**	**17.19**	**226**	**1,331**	**16.98**

Source: CBS, Data bases: Agriculture, hunting, forestry and fishing – plant production

Table 29. Production and yield of fruits, grapes and olives in the Adriatic Croatia 2008–2012

	2008 Product. (t)	2008 Yield (t/ha)	2009 Product. (t)	2009 Yield (t/ha)	2010 Product. (t)	2010 Yield (t/ha)	2011 Product. (t)	2011 Yield (t/ha)	2012 Product. (t)	2012 Yield (t/ha)
I. Fruits										
Apple	4,582	8.9	5,907	11.3	7,121	13.5	4,090	7.8	929	1.9
Pear	184	2.2	199	2.4	184	2.3	224	2.9	66	1.0
Peach and nectarine	3,193	4.3	4,689	6.0	3,818	3.6	2,847	2.9	3,382	3.4
Apricot	204	2.8	109	1.4	96	1.2	104	1.4	92	1.6
Cherries	1,852	2.3	1,271	1.5	1,208	1.3	6,177	6.7	3,976	4.3
Plum	3,833	3.3	3,291	2.8	4,946	3.5	6,023	4.5	3,592	2.7
Walnut	46	0.3	47	0.3	101	1.1	62	0.6	5	0.1
Hazelnut	1	0.3	2	0.7	5	1.3	20	5.0	1	0.2
Almonds	651	1.4	1,493	3.3	143	0.7	143	0.7	158	0.6
Fig	1,388	3.5	1,221	3.1	908	2.7	1,287	3.9	1,266	3.4
Strawberry	116	14.5	79	9.9	48	8.0	816	30.2	392	10.6
Other berries	-	-	38	3.8	36	1.1	52	1.8	21	0.9
Orange	416	2.6	524	3.3	202	4.0	315	6.3	269	6.3
Tangerine	48,297	39.8	35,907	29.4	55,000	30.7	41,870	23.8	50,786	29.5
Lemon	247	2.3	236	2.2	138	2.9	200	5.0	195	6.7
II. Grapes, total	72,935	4.9	89,933	5.9	100,969	6.5	88,869	5.7	92,511	6.6
III. Olives, total	35,955	2.4	32,592	2.1	38,001	2.2	31,423	1.8	50,945	2.8

Source: CBS, Data Bases: Agriculture, hunting, forestry and fishing – Plant production

Table 30. Production of olive oil and vine in Croatia, 2008–2012

Level	Product	2008	2009	2010	2011	2012
Adriatic Croatia (AC)	Olive oil (hl)	57,665	53,735	52,055	50,000	55,000
	Vine (000 hl)	472	580	588	578	530
Republic of Croatia (RC)	Olive oil (hl)	57,665	53,735	52,055	50,000	55,000
	Vine (000 hl)	1278	1,424	1,433	1,409	1,293
AC / RC (%)	Olive oil (hl)	100.00	100.00	100.00	100.00	100.00
	Vine (000 hl)	36.93	40.73	41.03	41.02	40.99

Source: CBS, Data bases: Agriculture, hunting, forestry and fishing – plant production

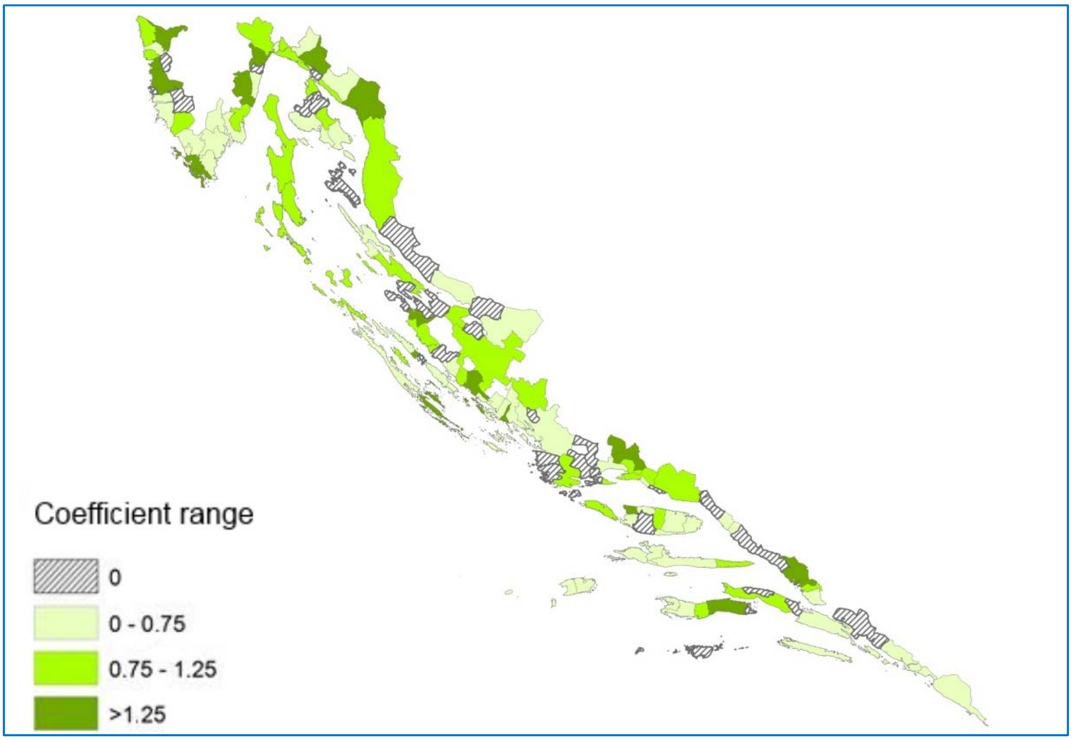
Table 31. Livestock in Croatia, 2008–2012

	2008			2009			2010		
	RC	AC	AC/ RC	RC	AC	AC/ RC	RC	AC	AC/ RC
Cattle	453,555	40,307	8.89	447,151	40,367	9.03	444,314	32,385	7.29
Pigs	1,103,882	13,821	1.25	1,249,874	17,379	1.39	1,230,574	25,093	2.04
Sheep	643,384	372,584	57.91	619,044	339,416	54.83	629,437	329,717	52.38
Goats	83,877	25,647	30.58	76,119	27,273	35.83	75,215	39,052	51.92
Poultry	10,014,601	1,271,230	12.69	10,787,196	1,285,041	11.91	9,469,441	963,030	10.17

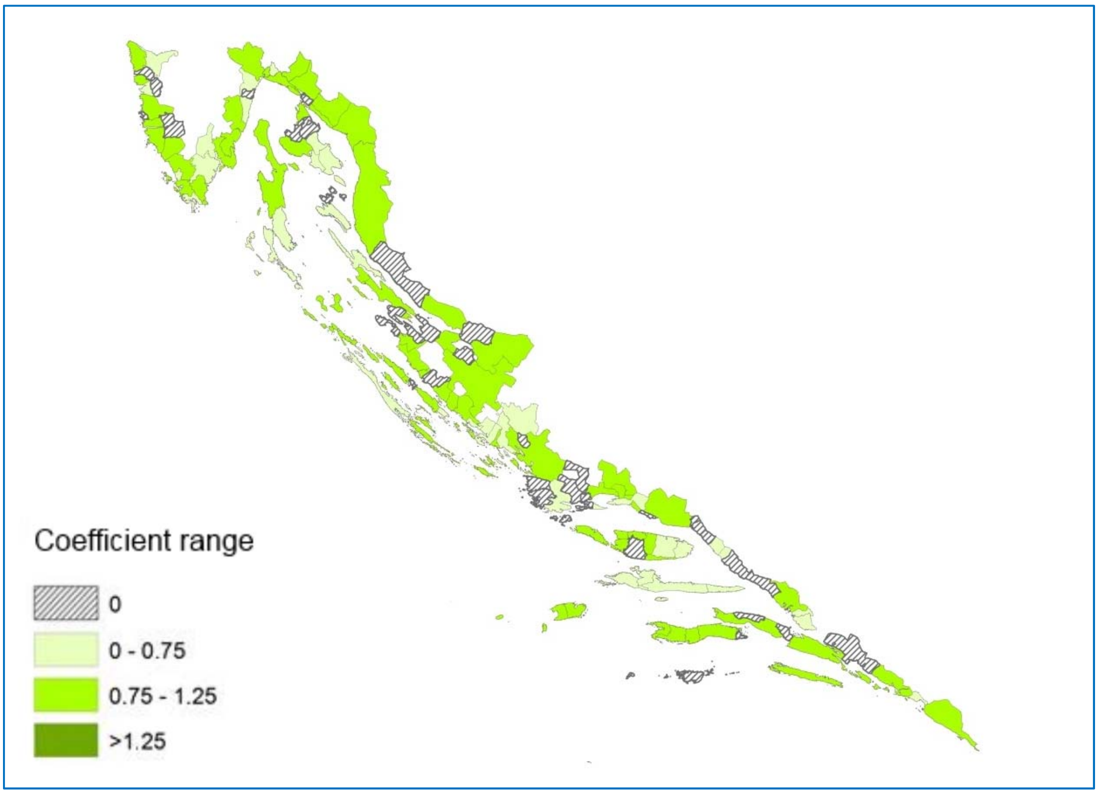
	2011			2012		
	RC	AC	AC/ RC	RC	AC	AC/ RC
Cattle	446,55	43,849	9.82	451,517	39.669	8.79
Pigs	1,233,406	160,863	13.04	1,182,347	120.494	10.19
Sheep	638,608	320,676	50.21	679,313	353.792	52.08
Goats	70,030	30,169	43.08	71,978	27.059	37.59
Poultry	9,523,432	890,388	9.35	10,160,379	598,440	5.89

Source: CBS, Data bases: Agriculture, hunting, forestry and fishing – cattle raising

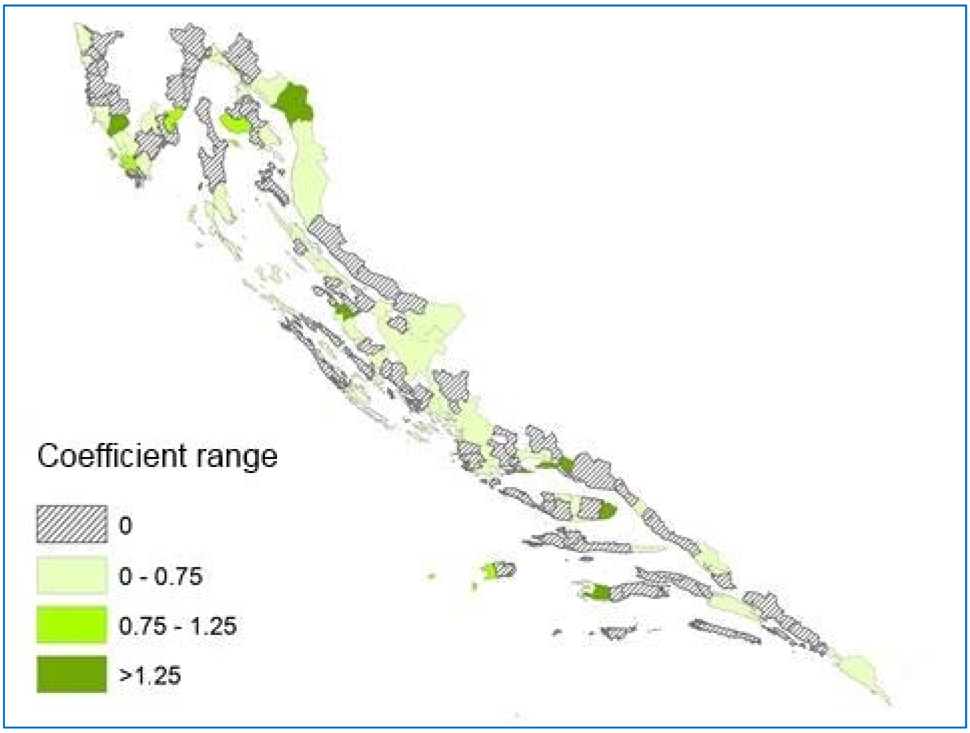
The most successful firms are grouped in the northern part of the Coastal Zone but it does not mean that they spend more for the environment than less successful firms in the south. LGUs with firms that did not have environmental expenditures in 2011 are equally distributed across the Coastal Zone. The same holds for the wages; all firms regardless of their size minimize their employees' wages.



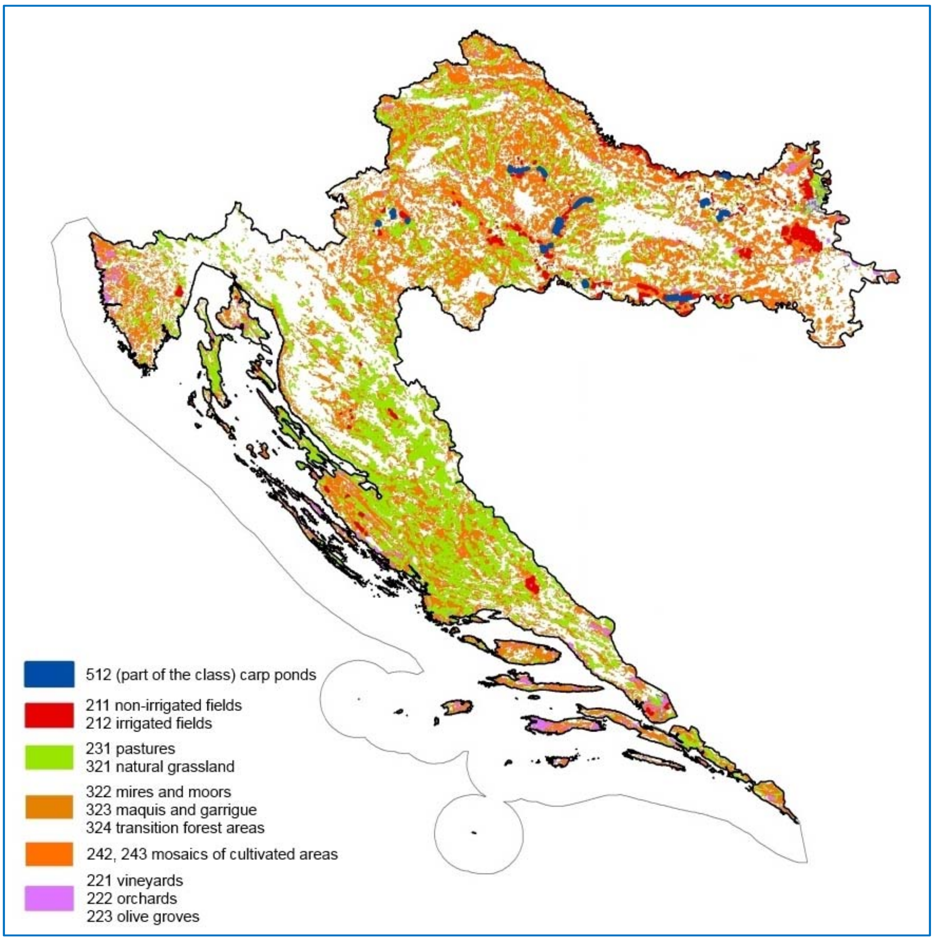
Map 10. Agriculture, forestry and fishing – revenues/employment in 2011



Map 11. Agriculture, forestry and fishing – wages/employment in 2011



Map 12. Agriculture, forestry and fishing – environmental expenditures/employment in 2011



Map 13. Highly valuable agricultural land in Croatia.
Source: Report on the State of Environment in Croatia, 2014 (2009–2012), draft, p. 74

According to the Report on the State of the Environment in Croatia (for the period 2009–2012), 2014, the greatest economic damage in agriculture in Croatia is caused by droughts and heat waves (the Adriatic coast and the islands are especially sensitive in this regard). In addition, precipitation has been changing too, indicating statistically significant decrease of precipitation in Gorski Kotar, Istria, and the southern coastal area. According to the same source, there are numerous areas of high natural value with high biodiversity and low management intensity.

In spite of decreased precipitation, valuable agricultural land is endangered because precipitation brings contaminants and pollutants. Between 2007 and 2011, the highest concentrations of sulphate ions were recorded in wider areas of Rijeka, Zavižan on the Velebit ridge, and Ogulin and Gospić in the hinterland. Nitrate ions were recorded in the areas of Rijeka and Zadar. Accumulation was the highest in the areas around Rijeka, Zavižan and Ogulin.

There is evidence of heavy metals in soil, which also hampers agricultural production, human health and the environment. In the Adriatic Croatia, there are high levels of chromium and arsenic, especially in Ravni Kotari and Obrovac where bauxite ore is found. Concentration of nickel is also high in the Coastal Zone due to particular types of soil and sediment. Concentration of lead (Pb) is also high, especially in the Velebit area, Dalmatian hinterland, and the islands of Brač and Hvar. The presence of lead is natural but it is also a result of air pollution. Concentration of zinc is high for the same reason. It should be noted that Croatia has no prescribed limit values for soil pollutants considering the type of land usage, which would lay foundations for sustainable management and the protection of soil and land resources.

On the other hand agriculture does influence the environment. Ammonia ions have been polluting the areas of northern Adriatic and Istria and there is evidence of overuse of pesticides in the areas of Dubrovnik, Split, Bakar, Rijeka and Pula. Intensive agricultural activities, especially viticulture, results in high concentration of copper (in particular in Istria, around Vinodol, Drniš, Neretva estuary, Konavli, islands of Krk, Vis, Korčula and Hvar, and Pelješac peninsula).

One of the main problems in the Coastal Zone concerning this sector is **forest fires**, occurring during summer. They degrade natural habitats, contribute to soil erosion and the extinction of animal and plant species, increase CO_2 emissions and have adverse effects on the coastal economy, especially agriculture and tourism.

In the period of 2005–2011, 1,540 forest fires recorded in Croatia damaged 54,890 ha of forest and forest land. Some 1,223 fires took place in the karst area. In 2012 alone, 569 forest fires were recorded in the Adriatic Croatia, damaging a total of 24,804 ha of forests and forest land.

In spite of significant efforts in modernization of equipment and increasing capacity and organization of fire brigades, fires remain a constant environmental threat in summer, particularly in the tourist season.

Floods cause damages in agriculture, especially in Neretva estuary. On the other hand, summers are dry, so droughts often destroy crops as well. The national irrigation program has been established, but it has not yet been put to use due to the lack of funds. In recent years, the connection between frequent flooding (including the flooding of urban centres) and droughts, as a result of climate changes, has been studied.

Fishery

According to the NEAC fishery encompasses marine fishing, mariculture and the processing of fish and other fishery products. Its direct contribution to the Croatian GDP varies from 0.2 to 0.7%.

Marine fishing has always been an important part of life and economy in the Coastal Zone. Indeed, there have always been numerous local communities whose income depended exclusively on fishing. Nowadays, fishing is still a part of culture and tradition in many settlements in the Coastal Zone, although the importance of marine fishery in the overall economy has been declining. The number of fishermen involved in commercial fishing has been declining since 2010 (Table 32).

Table 32. Number of fishermen involved in commercial marine fishing

Year	2008	2009	2010	2011	2012
No. of fishermen	3,740	3,886	3,995	3,564	3,322

Source: CBS

Eastern Adriatic area is rich in fish and other marine organisms. Its main feature is multispecies and presence of young specimen (1–2 years old) in catches. The Croatian waters (territorial sea and PEFZ) have been divided in several fishing zones, as presented in the Map 14.

Map 14. Fishing zones in the Croatian waters.
Source: National Strategic Programme for Fishery Development, Draft, pg. 10

Main problems in marine fishery refer to the fleet: the vessels are small (81.29% are under 12 m long) and most of them are used for multi-purpose fishing (over 45% of total fleet) which is typical for the Mediterranean. Besides, the fleet is old – 72.7% of the vessels are older than 20 years. Consequently, the fleet is neither competitive nor efficient. For example, only 40% of trawlers reached annual yield of more than 5 tons in 2011. As for the yield structure, over 80% of total yield is small pelagic fish. However, in terms of catch values, demersal fishing brings more revenues.

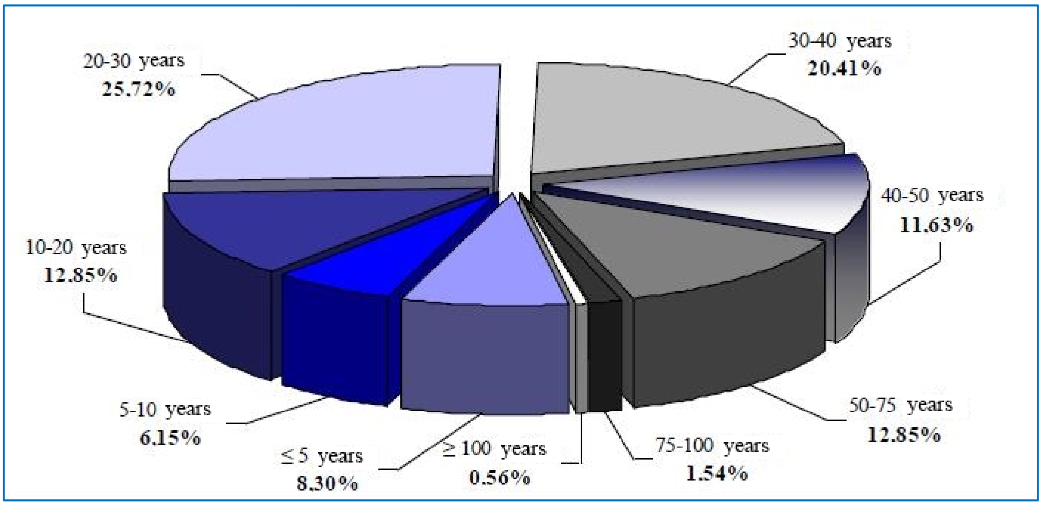


Figure 4. Structure of vessels involved in commercial fishery according to age, 2011.
Source: National Strategic Programme for Fishery Development, Draft, pg. 58

Table 33. Structure of vessels involved in commercial marine fishing by Adriatic counties, 2011

Type of vessels	County						
	Istria	Primorje – Gorski Kotar	Lika-Senj	Zadar	Šibenik-Knin	Split-Dalmatia	Dubrovnik-Neretva
Dredges	5	1	0	0	0	0	0
Trawlers	149	108	10	105	57	120	13
Purse seiners	23	27	0	96	16	53	11
Drift nets	1	0	2	6	10	22	0
Gilnets	532	65	33	9	108	260	27
Hooks and lines	55	24	6	0	32	20	0
Longlines	2	3	2	0	6	38	0
Fish traps	7	30	17	1	2	12	0
Vessels for collecting marine organisms	34	0	0	0	56	41	2
Multi-purpose	182	520	43	424	103	260	339
Other	5	0	0	0	1	0	0
Total	**995**	**778**	**113**	**641**	**391**	**826**	**392**

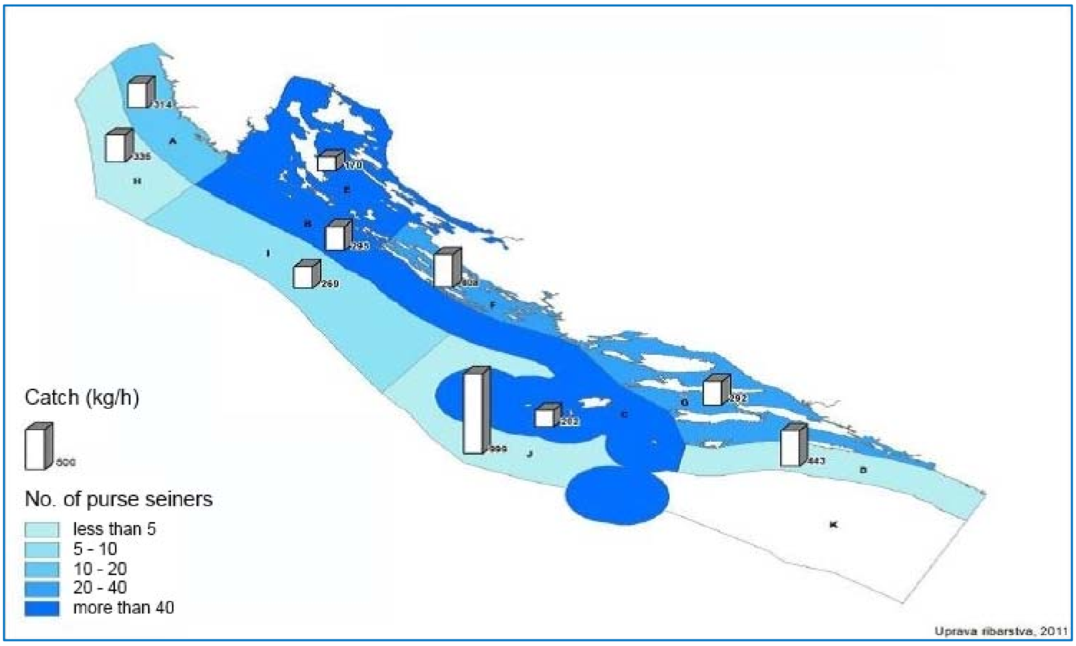
Source: National Strategic Programme for Fishery Development, Draft, pg. 58-

Table 34. Structure of vessels involved in commercial fishing according to type and length in 2011
Source: National Strategic Programme for Fishery Development, Draft, pg. 56

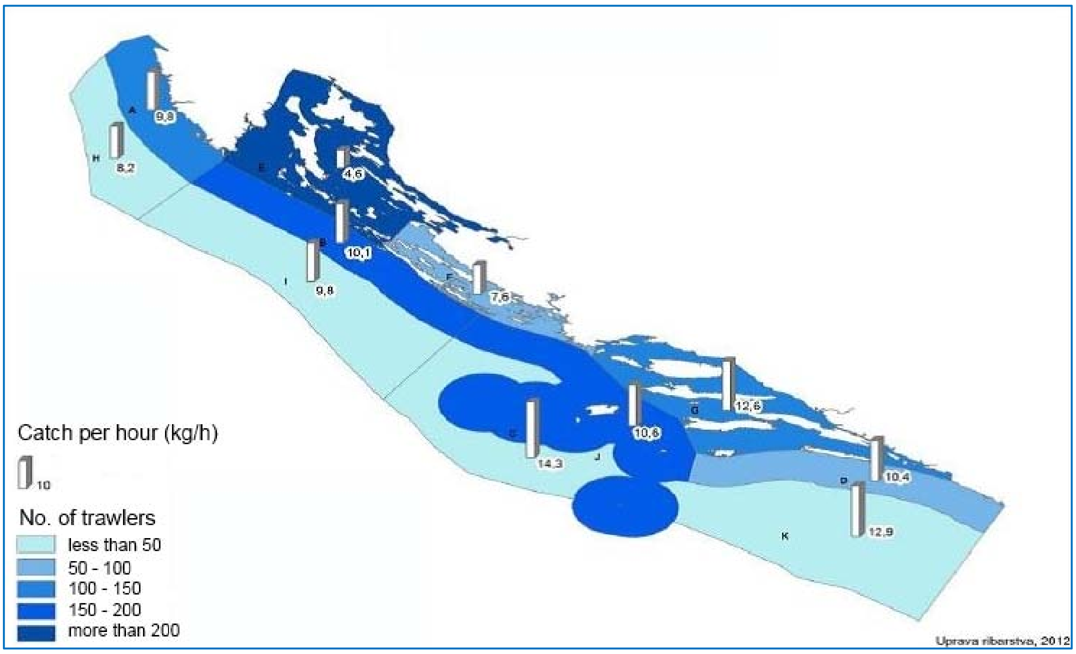
Type of vessels	≥ 12 m	< 12 m	Total
Dredges	2	4	**6**
Trawlers	348	214	**562**
Others*	1	5	**6**
Purse seiners	192	34	**226**
Drift nets	1	40	**41**
Gillnets	25	1,009	**1,034**
Hooks and lines	4	133	**137**
Longlines	1	50	**51**
Fish traps	0	69	**69**
Vessels for collecting marine organisms **	2	131	**133**
Multi-purpose	76	1,795	**1,869**
Total	**652**	**3,484**	**4,136**

* *Referring to the vessels fishing with only one fishing tool, spear, which is not defined by the categories*

** *Referring to the vessels fishing with tools for collecting marine organisms, which is not defined by the categories*



Map 15. Catch by purse seiners in 2011 (kg per hour).
Source: National Strategic Programme for Fishery Development, Draft, pg. 63



Map 16. Catch by trawlers in 2011 (kg per hour).
Source: National Strategic Programme for Fishery Development, Draft, pg. 63

Table 35. Catch of fish and other sea organisms in the period 2000–2011 (in tons)

Year	Oily fish	White fish	Other	Total
2000	17,082	2,365	1,524	**20,971**
2001	13,372	2,149	1,448	**16,969**
2002	18,733	1,624	847	**21,204**
2003	24,369	3,556	1,166	**29,091**
2004	26,381	4,325	1,231	**31,937**
2005	28,621	4,573	1,467	**34,661**
2006	31,646	4,857	1,353	**37,856**
2007	33,041	4,893	2,228	**40,162**
2008	42,688	4,831	1,492	**49,011**
2009	49,433	4,307	1,788	**55,547**
2010	46,703	4,098	1,594	**52,395**
2011	64,306	4,493	1,736	**70,535**

Source: National Strategic Programme for Fishery Development, Draft, pg. 59

Table 36. Catch of selected species of sea organisms by fishing zones in 2011 (in tons)

Zone	Sardine	Anchovy	Mixed small oily fish	Red mullet	Hake	Musky octopus	Scampi	Sole	Other	Total
A	6,134	489	213	91	5	229	1	244	985	**8,391**
B	20,780	4,993	1,126	334	56	62	4	9	611	**28,025**
C	1,823	1,611	141	283	265	74	213	22	927	**5,359**
D	154	865	44	45	55	5	14	5	287	**1,477**
E	8,006	4,973	517	38	259	40	45	16	891	**14,785**
F	3,202	410	110	50	21	10	1	2	418	**4,224**
G	5,847	759	181	208	103	29	2	3	574	**7,706**
H	0	0	1	2	0	2	0	14	7	**26**
I	0	282	0	1	0	1	0	0	140	**424**
J	0	0	0	0	12	0	3	0	97	**112**
K	0	0	0	0	1	0	1	0	4	**6**
Total	**45,946**	**14,382**	**2,333**	**1,102**	**777**	**452**	**284**	**315**	**4,941**	**70,535**

Source: National Strategic Programme for Fishery Development, Draft, pg. 61

According to the CBS, there are 264 landing places, out of which 63 account for 95% of the overall catch. The most important landing places in 2010 for small pelagic fish were Kali, Zadar, Biograd na moru and Pula. The most important landing places for demersal catch were Tribunj, Mali Lošinj and Zadar. It is common knowledge, however, that fishing ports, equipped landing places, trade channels and fish trading control are still to be developed.

Mariculture includes farming demersal and pelagic fish and shells. Sea bass (*Dicentrarchus labrax*), gilt-head bream (*Sparus aurata)* and Atlantic bluefin tuna (*Thunnus thynnus*) dominate the fish farming, whereas the farming of shells concentrates on mussels (*Mytilus galoprovincialis*) and oysters (*Ostrea edulis*). Total annual production is about 11,000 tons, valued approx. 120 million Euros. The most important part of the mariculture production is tuna farming. There are 14 farms mainly in the counties of Zadar and Split-Dalmatia. Tuna farming accounts for about 30% of the total volume of mariculture production. Due to the quotas on tuna catch, the production slowed down during the last few years. Complete tuna yield is being exported, mainly to Japan.

All fish farms are located in semi-closed bays in the sea more than 50 m deep, far enough from the posidonia meadows. As far as shells are concerned, oysters and mussels are grown mostly in the areas of Mali Ston and Malo More along the Pelješac peninsula, and to a lesser extent, along the west coast of Istria and in the Velebit Channel, the sea of Novigrad and the river Krka estuary. In 2012, 257 shell growing locations were recorded. The complete production is sold at the domestic market.

The main problems of this subsector of economy are insufficient capacities, imports of equipment, general increase of production costs, restricted tuna quotas (by ICCAT), damages caused by predators, undeveloped infrastructure at landing places, growing competition at global market, increasing requirements regarding environmental protection and food safety.

Table 37. Mariculture production by species in the 2000–2011 period

Year	Sea bass and gilt-head bream (t)	Mussels (/t)	Oysters (t)	Tuna (t)	Juveniles of sea bass and gilt-head bream (pc.)
2000	2,500	1,200	1,000,000	1,200	4,500,000
2001	2,500	2,000	1,000,000	2,500	4,600,000
2002	2,500	2,400	1,000,000	3,971	4,900,000
2003	2,510	2,800	800,000	4,679	5,500,000
2004	3,000	2,400	800,000	3,777	6,974,000
2005	3,000	2,500	800,000	3,425	5,785,000
2006	3,500	3,500	1,000,000	6,700	15,000,000
2007	3,950	3,000	1,000,000	4,180	15,000,000
2008	4,500	3,000	1,000,000	3,711	20,000,000
2009	5,000	2,000	1,000,000	4,200	20,000,000
2010	5,200	2,000	1,100,000	3,592	15,106,424
2011	4,494	399	327,000	2,312	14,824,990

Source: Ministry of Agriculture – Directorate of Fisheries

Food processing and marketing sector is rather weak in Croatia today (a century ago, a large number of island communities lived of this economic activity). There are only three canneries in this subsector. Their production is based on small pelagic yield. Still, it should be pointed out that the food processing sector reacted to changes in market demand lately, increasing the assortment of products, salted fish for example.

Basically, a big part of demersal stock yield after the sale is intended for export, whereas the pelagic is partly sold to food processing industry, and the other part is for tuna farms.

Main problems this subsector is facing are low value added, low consumption per capita, lack of branding, inadequate and insufficient infrastructure, underdeveloped distribution in the continental Croatia, increasing competition at the global market and illegal trading. On the other hand fish and fish products have been successfully exported and the export-import balance sheet is favourable in value.

Table 38. Fishery products export balance sheet, 2000–2011

Year	Import		Export		Balance	
	Tons	USD	Tona	USD	Tons	USD
2000	25,545	33,098,275	18,247	43,977,357	–7,298	10,879,082
2001	42,631	56,569,965	2l,686	64,080,711	–20,945	7,510,746
2002	56,284	75,898,070	22,370	79,869,814	–33,914	3,971,744
2003	57,316	82,741,215	22,687	114,881,084	–34,629	32,139,869
2004	38,579	70,777,929	23,429	104,010,263	–15,150	33,232,334
2005	53,687	98,416,794	24,424	97,361,226	–29,263	-1,055,568
2006	51,574	105,372,955	29,496	159,847,033	–22,478	54,474,078
2007	47,847	120,613,368	30,603	152,428,359	–17,244	31,814,991
2008	54,055	138,990,532	29,444	149,577,014	–24,611	10,586,482
2009	44,385	102,228,762	32,721	164,115,420	–11,664	61,886,658
2010	41,211	102,400,654	33,950	135,395,280	–7,261	32,994,626
2011	38,417	123,676,657	38,493	178,503,695	–76	54,827,038

Source: National Strategic Programme for Fishery Development, Draft, pg. 50

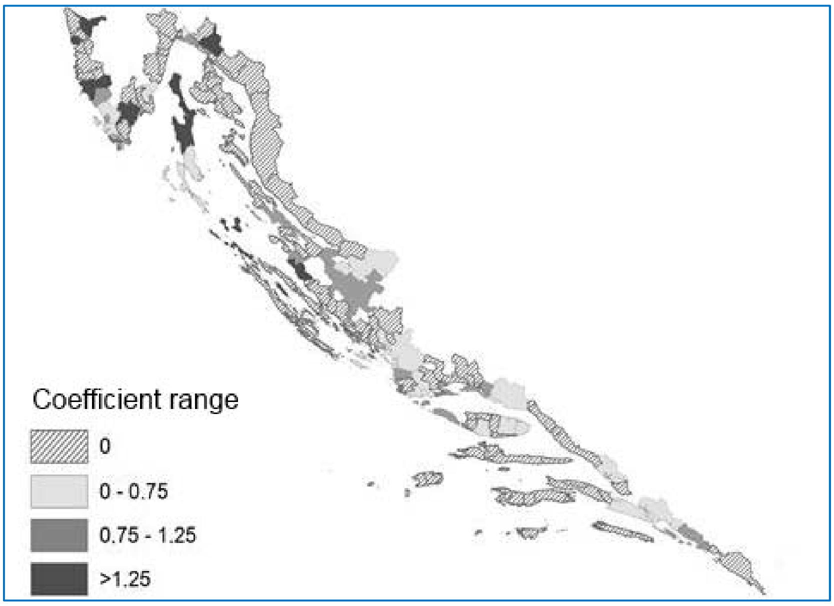
Recreational and sport fishing does not appear in the NEAC as an economic activity. However, its role in the fishery sector has been growing, especially after Croatian accession to the EU, when the positions of non-professional fishermen (some 10,000 persons), and the growing big-game industry in Croatia changed substantially. In 2011, there were over 78,000 permits issued for these activities.

According to the analysis based on roughly estimated economic effects, economic value of recreational and sport fishing, reached some 0.2% of the Croatian GDP in 2012 (expressed in current prices, CBS, 2013). It is estimated that the state budget revenues from sport and recreational fisheries (percentage of the sales of fishing permits, VAT) amounted to over 3.5 million Euros in 2012. Production and trading of vessels, equipment and tools for sport and recreational fisheries provide jobs for over 3,000 people, mainly in the Adriatic Croatia.

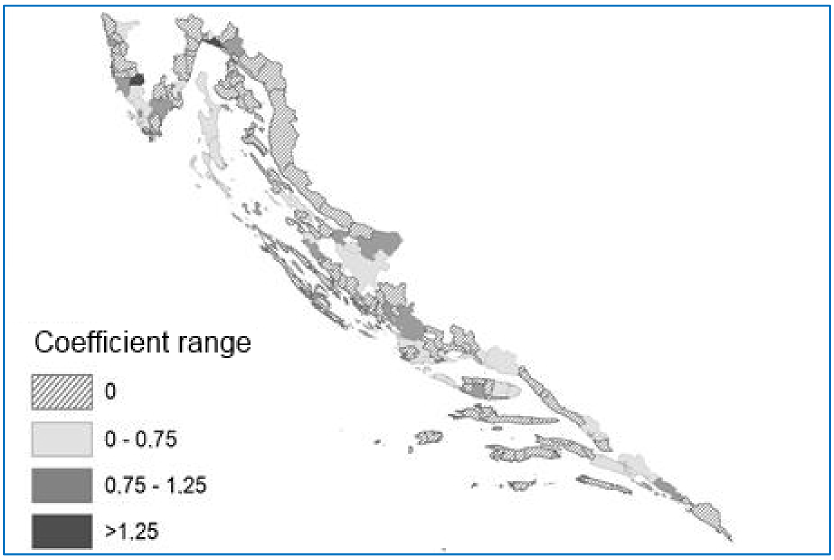
Analysis of the permits issued for sport and recreational fishing has shown that the number of permits for recreational fishing has been growing. The number of sport permits issued to tourists is growing faster in the northern Adriatic, in proportion with the overall growth of tourism, proving that sport fishing has become an important niche in tourist offer.

Mining and quarrying

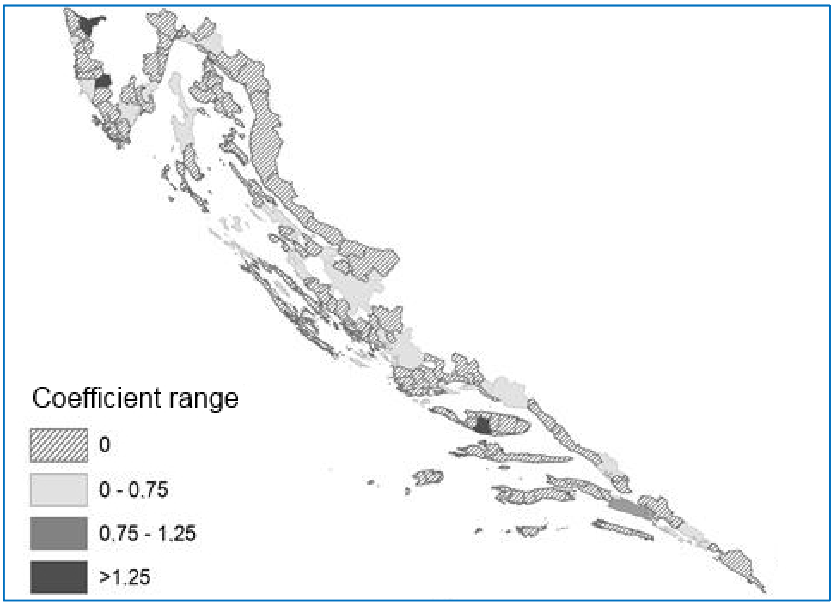
Mining and quarrying in the Coastal Zone boils down to stone quarrying of architectural and/or technical-construction stone, and to a lesser extent to extraction of sand in the shallow sea waters, and mineral ores. Quarrying is environmentally unsound mainly in terms of landscape whereas illegal extraction of sand may cause significant degradation of sea bed flora and fauna. Similar to the agriculture sector, the most successful firms are located in the northern part of the Coastal Zone but there are many more LGUs with no firms in the sector. It should be noted, however, that small scale quarrying is a widespread activity in the Coastal Zone and that entrepreneurs are mainly registered as crafts, which is unfortunately not covered by the available data. The maps thus do not show the full picture. In any case, it has been confirmed that firms and crafts in this sector do not pay much attention to remediation of abandoned quarries.



Map 17. Mining and quarrying – revenues/employment in 2011

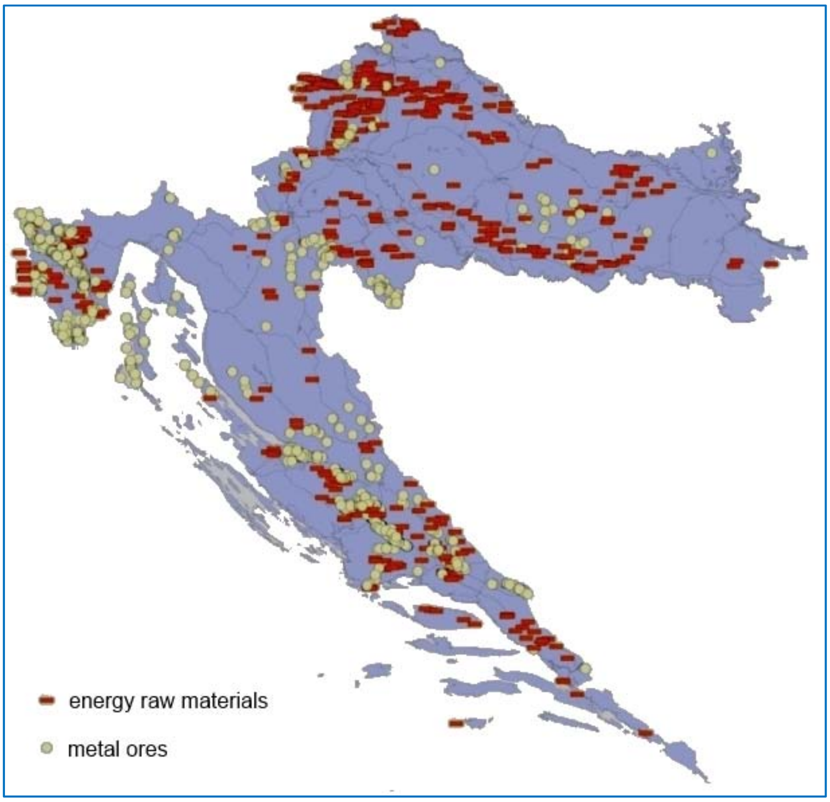


Map 18. Mining and quarrying – wages/employment in 2011



Map 19. Mining and quarrying – environmental expenditures/employment in 2011

The most exploited ore in the Republic of Croatia had been bauxite. During the 20th century, there were ca 10,000 findings of this ore in the karst area (ca 7,000 in Istria and 3,000 in Dalmatia). Bauxite was mined mainly on the surface but exploitation fields were never rehabilitated. Accidents related to the erosion of land have been recorded, especially around Drniš (an area of 355 km^2 with 16 ground, 72 underground and seven combined exploitation fields). In Kalun near Drniš, the exploitation field is 350m deep, one of the deepest in the world.

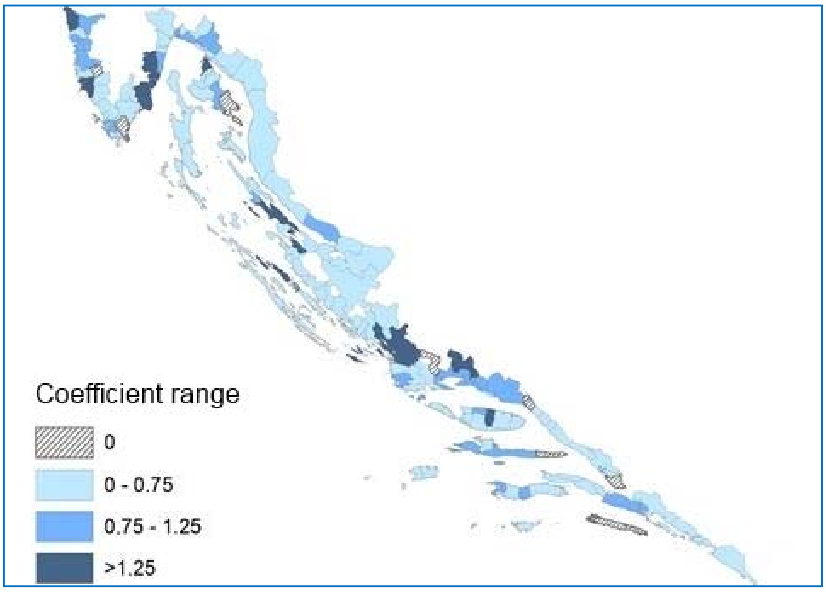


Map 20. Mineral ores in the Republic of Croatia.
Source: Report on the State of Environment, draft, 2014 (period 2009–2012), p. 242

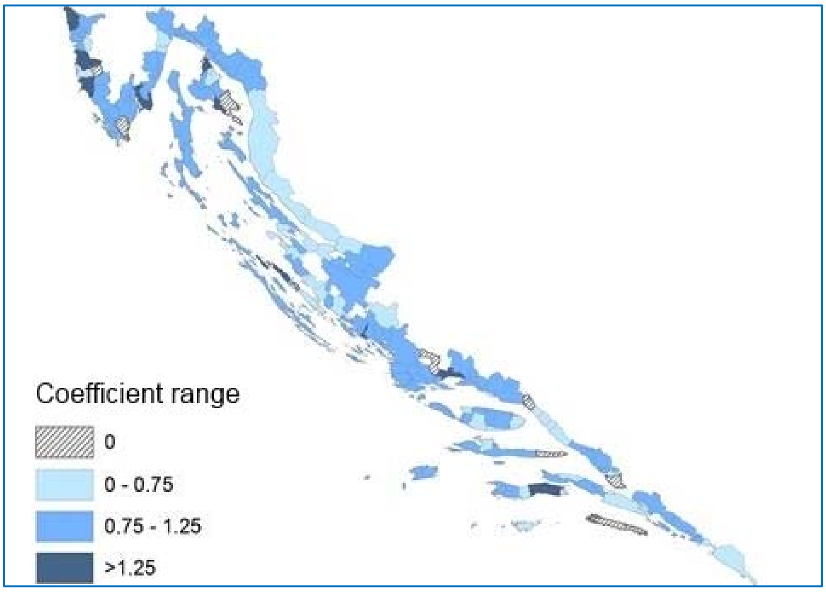
Manufacturing

Unlike in agriculture and quarrying, data on manufacturing reveal a correlation between economic success and environmental care. Successful firms do not operate only in the north but also in middle Dalmatia, whereas LGUs with firms that spend on environment above the average are well spread across the Coastal Zone. There are also LGUs with firms that have not reported environmental expenditures. Data on manufacturing are more representative than data on agriculture, and quarrying as most of the entrepreneurs are registered as firms. Islands appear specific as chemical industry in the northern island of Krk and fish processing in mid Dalmatian islands do well both in terms of business and environmental care.

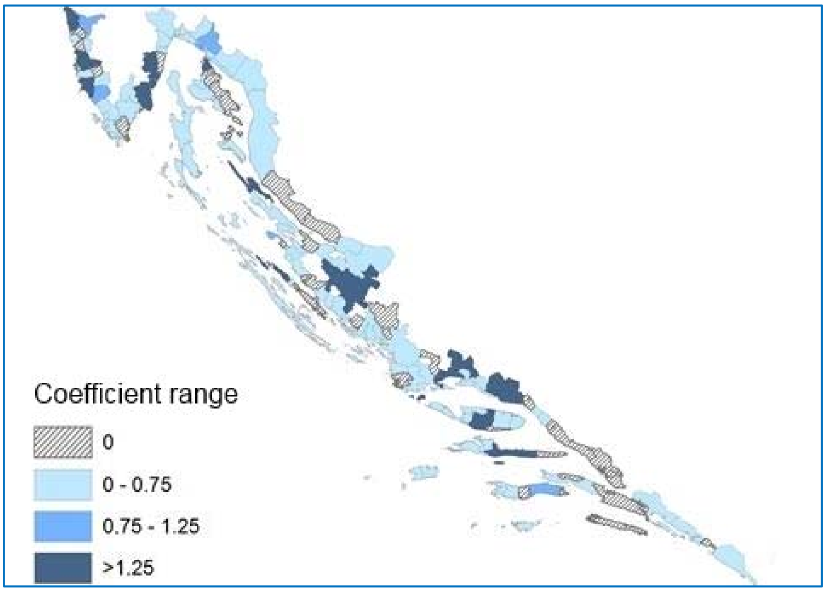
The quality of air has decreased to category II due to industrial pollution in Rijeka (NO_2 PM10) and in the nearby industrial zone in Urinj (H_2S), where Oil refinery Rijeka and Thermal power plant Rijeka are situated. Similar pollution was recorded in Split, Šibenik and Plomin coal fired power plant. Also, the air quality in Rijeka was of category II and III due to the concentrations of H_2S.



Map 21. Manufacturing industry – revenues/employment in 2011



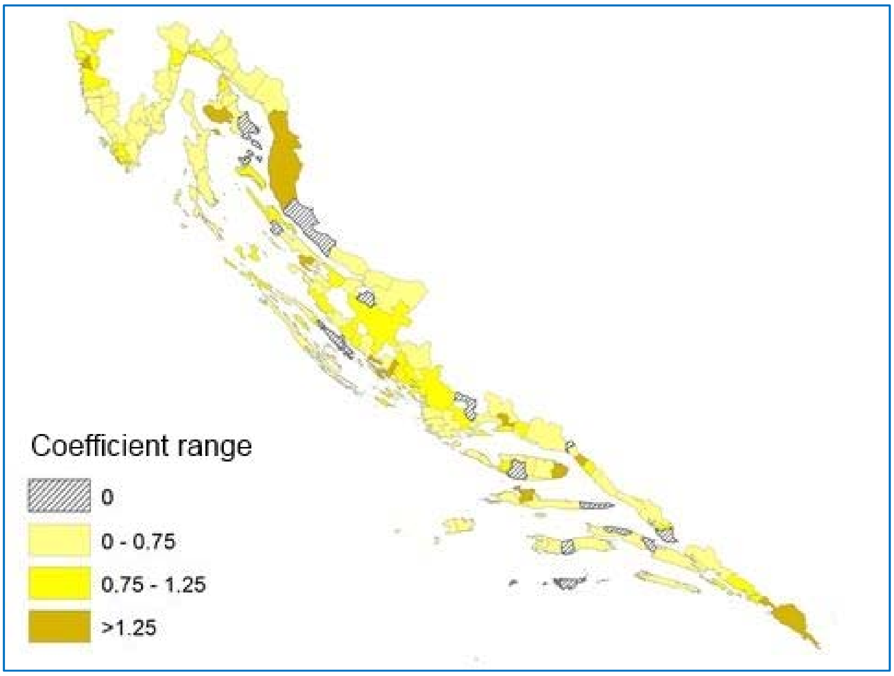
Map 22. Manufacturing industry – wages/employment in 2011



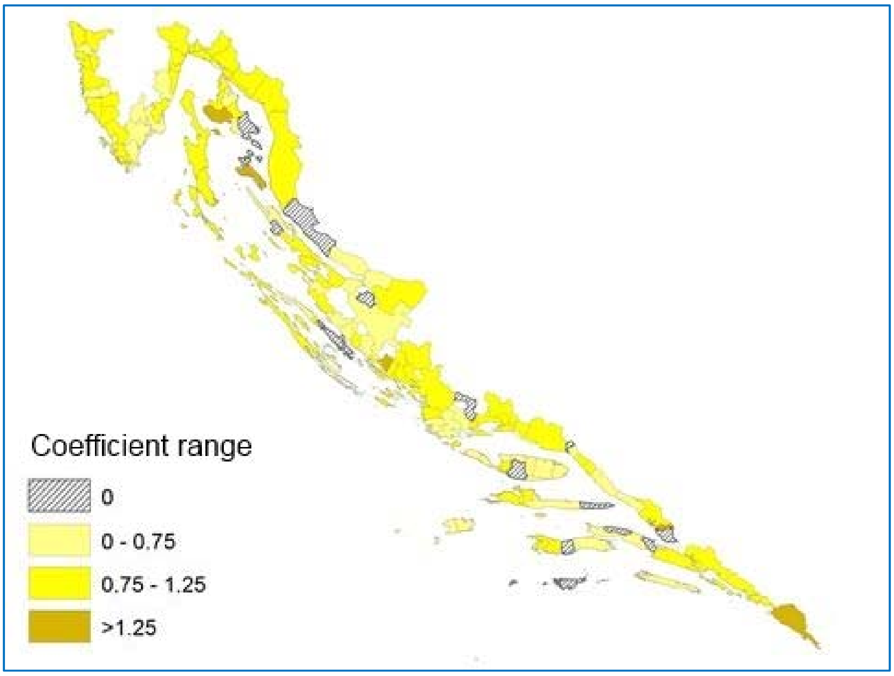
Map 23. Manufacturing industry – environmental expenditures/employment in 2011

Construction

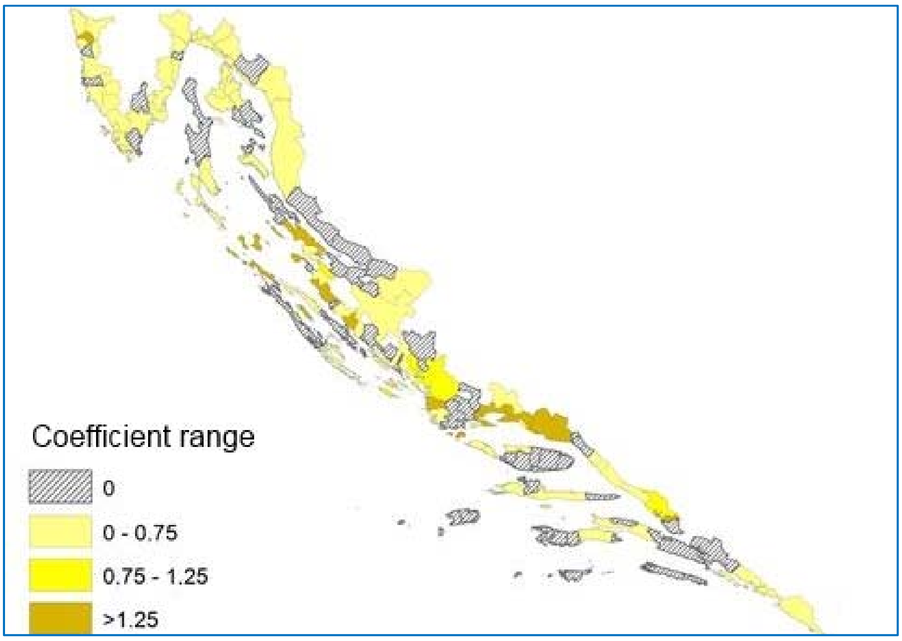
Construction is yet another sector in the Coastal Zone with a lot of crafts that cooperate with larger construction firms. However, the construction boom from the 2010s is over, so that most of the firms (and crafts) have reduced their activities and operate at levels close to the sector average. As construction entrepreneurs registered as crafts tend to be more flexible than firms, LGUs with no registered revenues may only reveal the fact that data are not showing that crafts have been making their way through the crisis better than firms. LGUs with firms that do not spend on environmental protection and/or LGUs with no construction firms at all are numerous and well spread across the Coastal Zone showing nevertheless that there are firms that are still operating with environmental expenditures reduced to zero.



Map 24. Construction – revenues/employment in 2011



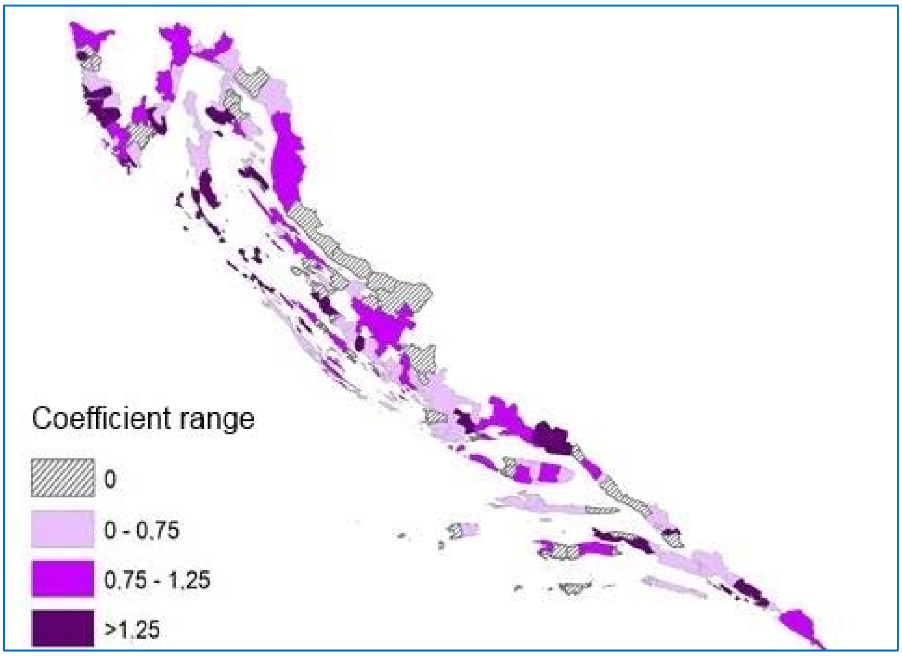
Map 25. Construction – wages/employment in 2011



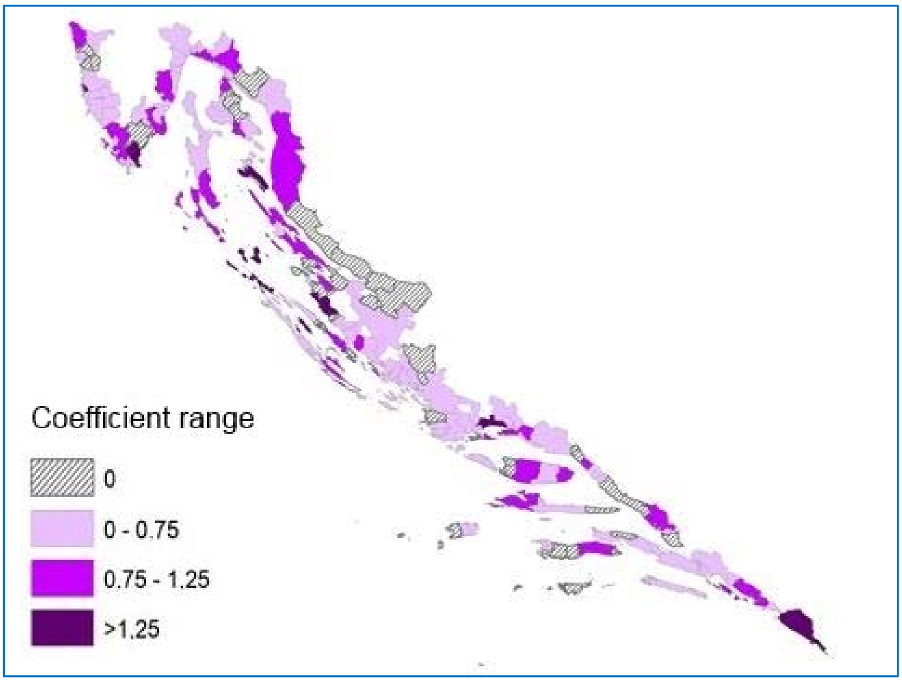
Map 26. Construction – environmental expenditures/employment in 2011

Transportation and storage

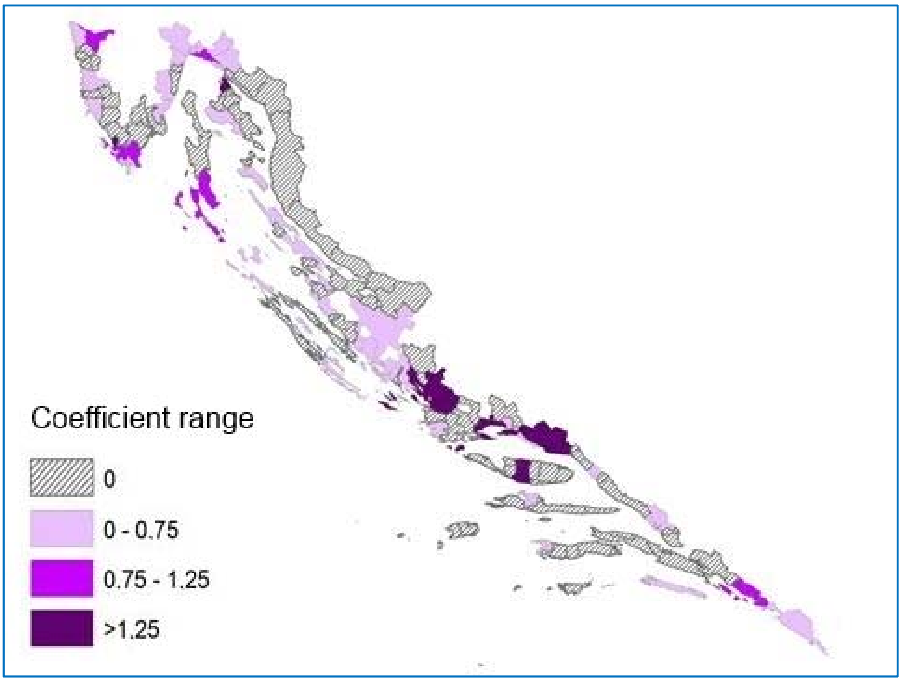
This sector is equally distributed across the Coastal Zone in terms of successful and less successful businesses and the same goes for the distribution of wages. However, LGUs with firms that tend to spend more on environmental protection are concentrated in areas around Split and Šibenik which is not the case with other sectors. It should be noted that there is room for improvement in the storage activities as regulations imposed on transport vehicles are strict and generally obeyed. On the other hand, transport activities significantly increase during the tourist season when private vehicles significantly outnumber vehicles registered in the transport sector. The transport sector should thus be viewed as an activity responsible for environmental pressures not only during the tourist season when it increases, but as one of major sources of air pollution. As far as traffic and its impact on the environment is concerned, air pollution has been recorded in the vicinity of roads in Split, Šibenik and Rijeka (NO_2).



Map 27. Transportation and storage – revenues/employment in 2011



Map 28. Transportation and storage – wages/employment in 2011



Map 29. Transportation and storage – environmental expenditures/employment in 2011

Tourism

Tourism is a sector of particular importance in the Coastal Zone. It is the only sector that has been exhibiting a steady growth even in the midst of crisis that has affected almost every other sector. It successfully recovered after the Homeland War when it was reduced to a minimum, went through certain structural changes and became a significant activity on the Mediterranean scale, successfully competing with other tourist destinations. Accommodation capacities in the Adriatic Croatia make the majority of total registered beds in hotels and camps in the Republic of Croatia. However, the share of beds in the 5 star accommodation objects is lower than the Croatian average. In addition, according to the categorization classes, the major part of the capacities in the Adriatic Croatia are on the 2 and 3 stars level (75.17%), while only 3.94% of beds are in the 5 stars objects.

Official categorization across the Adriatic Croatia shows that most of the beds are located in the north (counties of Istria, Primorje and Gorski Kotar) – 58.72%. The smallest share is in the Šibenik-Knin and Lika-Senj counties. Moreover, the distribution of beds according to the categories, across the counties, points that the County of Istria has the highest share of beds in categories of 2, 3 and 4 stars, while the Dubrovnik-Neretva County leads in the category of 5 stars (58.74% of total capacities in the AC). Second place in the categories of 2 and 3 stars beds holds the County of Primorje and Gorski Kotar. The Zadar County takes the second position in the share of the 4 stars beds in the AC, while the County of Istria is second in the 5 stars accommodation.

From the county's standpoint, the largest share of the lowest category (2 stars) is found in the Split-Dalmatia County, 3 stars in the Primorje-Gorski Kotar, 4 stars in the Lika-Senj and 5 stars in the Dubrovnik-Neretva County. Nevertheless, the data for the Lika-Senj County are somewhat in discrepancy with other counties, since the majority of beds are situated in the 4 stars camps. It appears that the lower quality accommodation (2 and 3 stars) prevails in the counties of Primorje- Gorski Kotar and Split-Dalmatia. The County of Zadar has a favourable accommodation structure, since the majority of beds are of 4 stars. Only 16% of total beds fall in the 2 stars category. In the Šibenik-Knin County half of the registered beds are of 4 stars, and the rest is of 3 stars category.

Table 39. Structure of registered beds in hotels and camps, August 2013

County	2*			3*			4*		
	No. of beds	% of county	% of AC	No. of beds	% of county	% of AC	No. of beds	% of county	% of AC
Istria	21,897	24.04	44.81	28,979	31.82	32.80	38,767	42.56	44.29
Primorje-Gorski Kotar	9,179	19.82	18.78	25,992	56.13	29.42	10,340	22.33	11.81
Lika-Senj	821	11.72	1.68	1,030	14.71	1.17	5,152	73.57	5.89
Zadar	3,393	15.92	6.94	5,119	24.02	5.79	12,420	58.28	14.19
Šibenik-Knin	764	5.17	1.56	6,075	41.12	6.88	7,935	53.71	9.07
Split-Dalmatia	8,218	26.52	16.82	12,971	41.86	14.68	8,607	27.78	9.83
Dubrovnik-Neretva	4,617	20.51	9.45	8,174	36.31	9.25	4,307	19.13	4.92
Adriatic Croatia (AC)	48,871	/	20.89	88,340	/	37.76	87,528	/	37.41
Republic of Croatia (RC)	50,566	/	/	93,943	/	/	93,020	/	/
AC / RC (%)	96.65	/	/	94.04	/	/	94.10	/	/

County	5*			Total	
	No. of beds	% of county	% of AC	No. of beds	% of AC
Istria	1,442	1.58	15.64	91,085	38.93
Primorje-Gorski Kotar	795	1.72	8.62	46,306	19.79
Lika-Senj	-	-	-	7,003	2.99
Zadar	378	1.77	4.10	21,310	9.11
Šibenik-Knin	-	-	-	14,774	6.31
Split-Dalmatia	1,188	3.83	12.89	30,984	13.24
Dubrovnik-Neretva	5,415	24.05	58.74	22,513	9.62
Adriatic Croatia (AC)	9,218	/	3.94	233,975	100.00
Republic of Croatia (RC)	10,648	/	/	248,177	/
AC / RC (%)	86.57	/	/	94.28	/

Source: Ministry of Tourism

A detailed analysis of the types of accommodation capacities across the counties is presented in Table 39 (complete data can be found in Annex, Table XVI). There are two main accommodation types along the AC, camps (43.51% of total beds) and hotels (41.47%). Compared to the Croatian totals, the share of hotel beds is lower (44.47% at Croatian level), while the share of camps is higher (41.31% in Croatia). As the average share of the AC in total beds of the Republic of Croatia is 94.28%, the share of beds in hotel and apart hotels is below average.

The County of Istria, with the share of 38.93% in total beds, keeps the highest shares in all accommodation types in the Adriatic Croatia. As far as hotel beds are concerned, the counties of Primorje-Gorski Kotar, Split-Dalmatia and Dubrovnik-Neretva follow (with 17–20%) while the County of Lika-Senj comes at the very end with only 1.98% share in hotel beds in the Adriatic Croatia. Nearly 42% of total hotel beds are of 3 stars category, 35% of 4, and only 8.71% of 5 stars. More than 50% of the 5 stars hotel beds are located in the Dubrovnik-Neretva County.

Shares of apart hotel beds are somewhat different. The highest share is in Istria. The County of Split-Dalmatia follows with 38.24%, while the counties of Zadar and Šibenik-Knin have about 10% of apart hotel beds. The remaining three counties do not have registered apart hotels.

Tourist apartment beds have a share of 5.12% of total beds in the AC, which is slightly higher than their share at Croatian level (4.84%). Unfortunately, even 44.31% of apartment beds are in the category of 2 stars, 34.54% in the category of 3 stars, and only 21.46% in the category of 4 stars, while there are no registered beds in 5 stars category in this accommodation type in the Adriatic Croatia. The majority of beds are in the County of Istria (over 67%), while their share in the other counties does not exceed 10% per county.

Tourist village beds are also of low category: 42.06% are in the category of 2 stars, 41.34% in the category of 3 stars, 13.26% in the category of 4 stars and only 3.47% in 5 stars category. All 5 stars beds are located in the Dubrovnik-Neretva County. The remaining village beds are mainly in Istria (48.56%), the Split-Dalmatia County (22.96%) and the Zadar County (10.78%). The majority of these beds belong to the categories of 2 and 3 stars (only 338 beds in the Split-Dalmatia County are in 4 stars category).

Camps are mainly located in the north of the Adriatic Croatia: 42.47% of beds are located in Istria, 24.22% in the Primorje-Gorski Kotar County, 11.34% in the Zadar County. The lowest share of camp beds is in the Dubrovnik-Neretva County (2.50% of the AC). As far as quality is concerned, some 20% of beds belong to 2 stars category, 33.17% in 3 stars category, and 46.84% to 4 stars category. Over 50% of the 4 stars camp beds are located in Istria. The lowest quality structure is in the Dubrovnik-Neretva County (62.35% of camp beds are in 2 stars category).

Structure of beds according to accommodation type across counties shows that the counties of Istria, Primorje-Gorski Kotar, Zadar, Šibenik-Knin “keep balance” between beds in hotels and apart hotels on one side, and the beds in camps, on the other. Camp is the prevailing accommodation type in the Lika-Senj County (some 73% of registered beds), while in Split-Dalmatia, and especially Dubrovnik-Neretva counties the share of camps is decreasing, on the behalf of hotels, tourist apartments and villages (resorts). This is quite logical, concerning the existing traffic corridors (more tourists in the north are coming by car, while the air transportation is much more important in the south).

Tourist demand shows positive trends all along the Adriatic Croatia, and Croatia as a whole. However, even though the Adriatic Croatia records some 96% of total beds, the number of arrivals is “only” around 89% of total arrivals to Croatia.

Table 40. Structure of accommodation capacities according to the type of accommodation, as registered in August 2013

County	Hotel			Apart hotel			Tourist Apartment		
	No. of beds	% of county	% of AC	No. of beds	% of county	% of AC	No. of beds	% of county	% of AC
Istria	28,606	31.41	29.48	447	0.49	40.60	8,068	8.86	67.41
Primorje-Gorski Kotar	19,105	41.26	19.69	-	-	-	865	1.87	7.23
Lika-Senj	1,918	27.39	1.98	-	-	-	-	-	-
Zadar	6,765	31.75	6.97	115	0.54	10.45	512	2.40	4.28
Šibenik-Knin	5,203	35.22	5.36	118	0.80	10.72	680	4.60	5.68
Split-Dalmatia	18,095	58.40	18.65	421	1.36	38.24	1,144	3.69	9.56
Dubrovnik-Neretva	17,330	76.98	17.86	-	-	-	700	3.11	5.85
Adriatic Croatia (AC)	97,022	/	41.47	1,101	/	0.47	11,969	/	5.12
Republic of Croatia (RC)	110,357	/	/	1,172	/	/	12,007	/	/
AC / RC (%)	87.92	/	/	93.94	/	/	99.97	/	/

County	Tourist Village			Camp			Total
	No. of beds	% of county	% of AC	No. of beds	% of county	% of AC	
Istria	10,709	11.76	48.56	43,237	47.47	42.47	**91,085**
Primorje-Gorski Kotar	1,678	3.62	7.61	24,658	53.25	24.22	**46,306**
Lika-Senj	-	-	-	5,085	72.61	4.99	**7,003**
Zadar	2,377	11.15	10.78	11,541	54.16	11.34	**21,310**
Šibenik-Knin	292	1.98	1.32	8,481	57.40	8.33	**14,774**
Split-Dalmatia	5,063	16.34	22.96	6,361	20.53	6.25	**30,984**
Dubrovnik-Neretva	1,933	8.86	9.04	2,550	11.33	2.50	**22,513**
Adriatic Croatia (AC)	22,052	/	9.42	101,813	/	43.51	**233,975**
Republic of Croatia (RC)	22,100	/	/	102,514	/	/	**248,177**
AC / RC (%)	99.78	/	/	99.32	/	/	**94.28**

Source: Ministry of Tourism

The use of accommodation capacities, in terms of recorded nights per bed increased in the Adriatic Croatia in 2012 compared to 2011, due to an increase in the number of overnight stays, and changes in the number of recorded beds. The largest increase is recorded in the north, in the counties of Istria, Primorje-Gorski Kotar and Lika-Senj. The County of Dubrovnik-Neretva follows, while in the central part of the coast this increase was not that significant. Only in the counties of Istria and Dubrovnik-Neretva the values of this indicator are significantly higher than the Croatian average.

Table 41. Tourist accommodation capacity and its use in the Coastal Zone in 2011 and 2012

County	Beds		Arrivals (000)		Nights (000)		Nights per bed		Nights per arrival	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Istria	249,440	244,728	2,896	2,985	19,095	19,877	76	81	7	7
Primorje-Gorski Kotar	201,664	167,357	2,360	2,353	11,742	11,974	58	72	5	5
Lika-Senj	33,763	28,482	426	467	1,697	1,824	50	64	4	4
Zadar	113,451	114,024	1,022	1,074	6,481	6,783	57	59	6	6
Šibenik-Knin	65,763	63,562	650	657	3,975	4,139	60	65	6	6
Split-Dalmatia	168,837	164,420	1,778	1,835	10,250	10,517	61	64	6	6
Dubrovnik-Neretva	69,894	65,088	1,047	1,123	4,775	5,188	68	80	5	5
Adriatic Croatia	902,996	847,661	10,179	10,494	58,010	60,304	64	71	6	6
Republic of Croatia (RC)	934,564	880,170	11,456	11,835	60,354	62,743	65	71	5	5
AC/RC (%)	96.62	96.31	88.85	88.67	96.12	96.11	98.46	100.00	120.00	120.00

Source: Tourism in numbers 2012, Croatian Tourist Board, Ministry of Tourism, 2013

Note: Differences in the number of beds, compared to the previous tables, arise from the fact that figures in this table represent all registered beds, while the previous tables listed only beds in hotels and camps

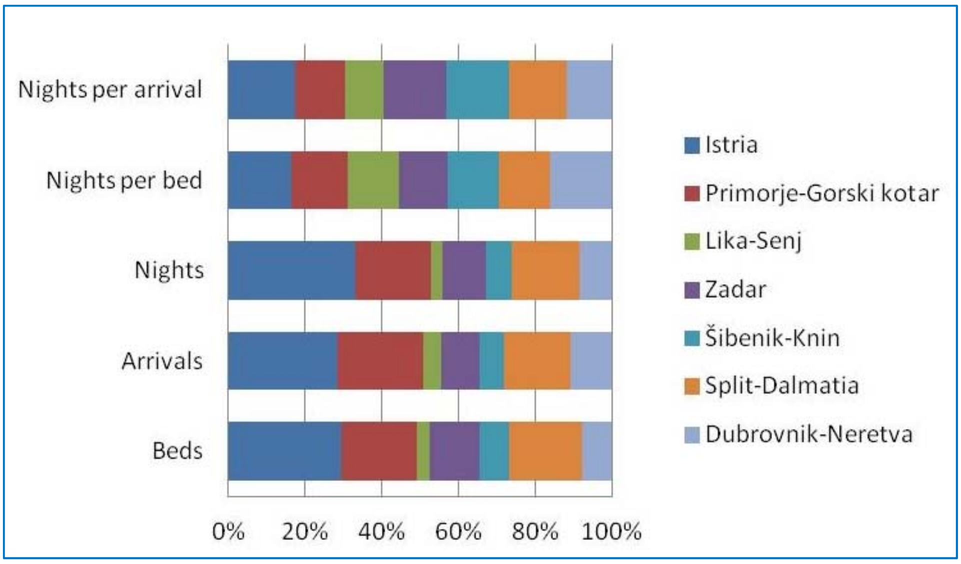


Figure 5. Accommodation capacity and its use in the Coastal Zone in 2012

As far as nights per arrival are concerned, tourists are staying the longest in Istria (7 days) while in Primorje-Gorski Kotar and Dubrovnik-Neretva counties the average stay lasts 5 days. The shortest average stay is noted in the Lika-Senj County (4 days).

Therefore, it can be concluded that tourism in the Adriatic Croatia is mainly seasonal; beds are occupied during the summer season (71 nights on average), and the average stay corresponds to one week vacation type.

The Coastal Zone contributes to a large part to the overall tourism in Croatia. In fact, 10 LGUs that witness the largest number of tourists and overnights are all in the Coastal Zone: Rovinj, Poreč, Medulin, Umag, Tar-Vabriga, Funtana, Pula (County of Istria), Mali Lošinj, Crikvenica (County of Primorje-Gorski Kotar) and Dubrovnik (County of Dubrovnik-Neretva).

Nautical tourism

Nautical tourism plays an increasingly important role in the Croatian tourism. According to the official classification there are "nautical touristic ports" and "marinas" (marinas offer more services than ports). In the period 2003–2012 nautical touristic ports increased their capacity by 30.7%, while the capacity of marinas was increased by 29%. In 2012, there were 98 ports and marinas with 17,454 moorings, occupying 4,049,914 m^2.[12]

Table 42. Capacities of the Croatian ports and marinas

Indicator	2011	2012
Marinas	54	53
Nautical touristic ports	44	45
Sea surface (m^2)	3,293,891	3,266,746
Number of moorings	11,828	17,454
Total length of shore occupied by moorings (m)	63,345	58,634
Total land surface (m^2)	772,938	783,168

Source: Tourism in numbers 2012; Croatian Tourist Board and Ministry of Tourism 2013, p. 38

[12] Report on the State of Environment, 2014, draft, p. 108

Table 43. Number of moorings according to the vessel length

Vessel length	No. of moorings		Structure (%)	
	2011	2012	2011	2012
Less than 6 m	1,074	913	6.3	5.2
6 – 8 m	1,470	1,385	8.6	7.9
8 – 10 m	2,905	2,932	17.0	16.8
10 – 12 m	4,332	4,741	25.4	27.2
12 – 15 m	4,382	4,498	25.7	25.8
15 – 20 m	2,243	2,282	13.1	13.1
More than 20 m	653	703	3.8	4.0
Total	**17,059**	**17,454**	**100.0**	**100.0**

Source: Tourism in numbers 2012; Croatian Tourist Board and Ministry of Tourism 2013, p. 38

Growing interest for nautical services along the coast produced a growing pressure to enlarge the number of ports/marinas and moorings. In addition, there is a growing demand for the accommodation of large vessels, which brings additional pressure in terms of land-take, both in urban and pristine areas.

More than half of categorized marinas are located in the middle Adriatic, 40% in the north, and the rest in the south (only 2 marinas in the Dubrovnik-Neretva County) (Table 44). As far as categories are concerned, 50% of the marinas are in the category 2, 12% in the category 1, 32% in the category 3, and only 6% in the highest category 4. Again, 45% of the marinas in category 1 and 2 are located in the north (counties of Istria and Primorje-Gorski Kotar).

Almost 30% of total capacity of dry docks is located in the Šibenik-Knin County, and over 43% in the two northern counties. More than half of the total moorings of the category 1 are in the north. The rest is in the Šibenik-Knin County. Marinas in the north and south accommodate larger number of vessels on average, while in the central part of the coastal area there are smaller marinas, both in terms of dry docks and moorings.

Table 44. Tourism accommodation capacities (August 2013) – marinas

County	Category 1			Category 2			Category 3		
	No. of marinas	Dry docks	Moorings	No. of marinas	Dry docks	Moorings	No. of marinas	Dry docks	Moorings
Istria	3	400	1,094	6	265	1,307	1	-	210
Primorje-Gorski Kotar	1	50	304	4	550	1,446	3	60	433
Lika-Senj	-	-	-	-	-	-	-	-	-
Zadar	-	-	-	3	300	1,075	3	75	368
Šibenik-Knin	2	230	670	5	432	1,123	5	300	1,130
Split-Dalmatia	-	-	-	5	265	607	4	-	462
Dubrovnik-Neretva	-	-	-	2	200	535	-	-	-
AC = RC	6	680	2,068	25	2,012	6,093	16	435	2,603

County	Category 4			Total		
	No. of marinas	Dry docks	Moorings	No. of marinas	Dry docks	Moorings
Istria	1	50	365	11	715	2,976
Primorje-Gorski Kotar	1	40	160	9	700	2,343
Lika-Senj	-	-	-	-	-	-
Zadar	-	-	-	6	375	1,443
Šibenik-Knin	-	-	-	12	962	2,923
Split-Dalmatia	1	30	355	10	295	1,424
Dubrovnik-Neretva	-	-	-	2	200	535
AC = RC	3	120	880	50	3,247	11,644

Source: Ministry of Tourism

Note: Quality of marinas decreases from category 1 (the best) to category 5 (the lowest category)

The Development Strategy for nautical tourism in the period 2009 – 2019 opted for a moderate development scenario of nautical capacity growth based on the assessment of carrying capacity of locations proposed for new ports. However, only two such assessments (ports of Crikvenica and Jelsa) have been prepared so far.

Cruising is a rather new but growing tourist subsector in Croatia. It has given rise to a lot of social and environmental concerns. In 2011, foreign vessels accomplished 830 cruises in the Republic of Croatia. During these cruises, the total of 1,141,454 passengers arrived. They stayed in the Croatian ports 1,659 days (2 days on the average).

Table 45. Foreign vessels on cruise in the Croatian waters, 2010–2012

	2010	2011	2012
Cruises	855	830	802
Sojourns	1,625	1,659	1,486
Passengers on board	1,093,919	1,141,454	1,154,814

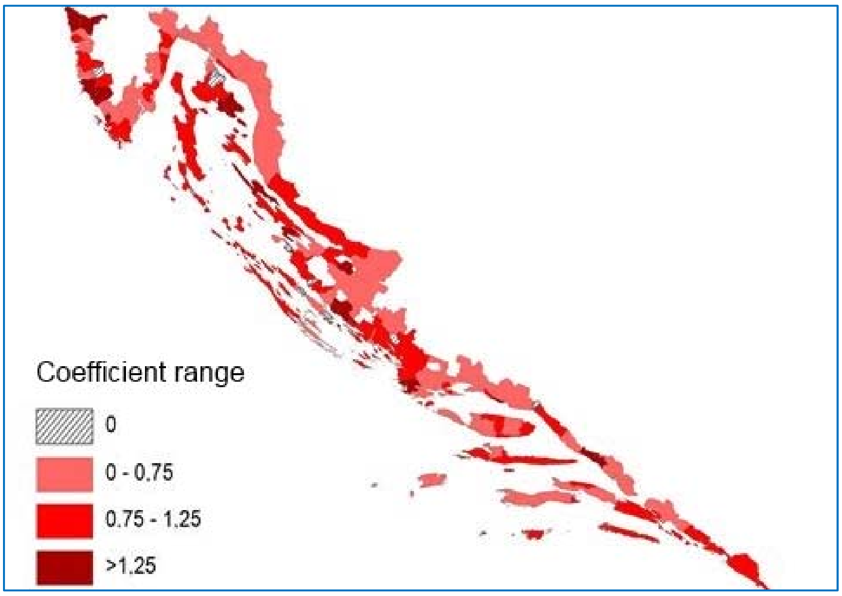
Source: First Release 4.4.6/8., www.dzs.hr; Ministry of Tourism

Being a new tourist subsector, cruising requires some notes. Observation unit is a foreign vessel on a tourist cruise that has entered internal Croatian sea waters. A cruise is a tourist journey that lasts for several days according to a specified itinerary. The number of cruise passengers excludes the crew. A cruise passenger is any person who has arrived on a ship irrespective of age, providing that he/she is not a crew member. The total number of sojourns is the total number of days a ship spends in the Croatian internal sea waters.

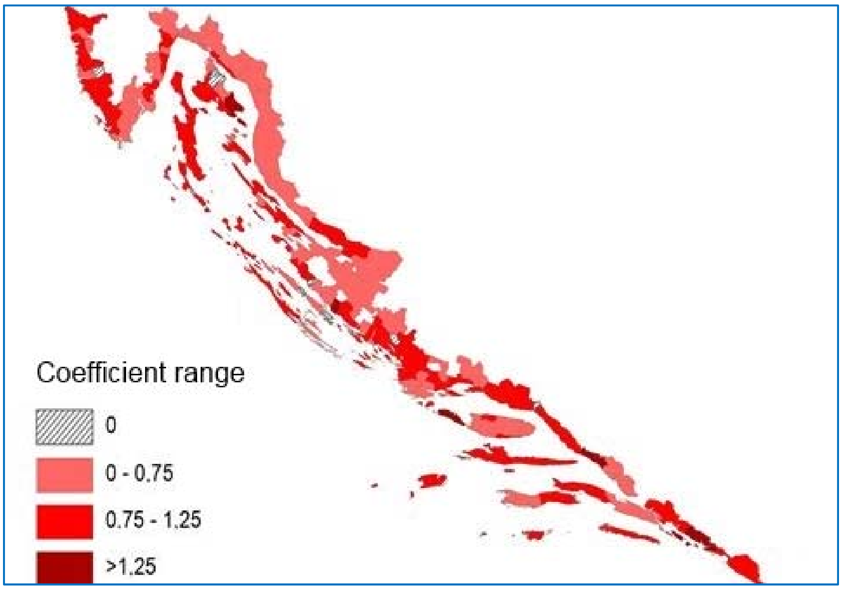
As compared to the 2010 season, the number of cruises decreased by 2.9%, while the number of cruising passengers increased by 4.3%. The total number of passengers' sojourns in Croatia increased by 2.1% in the same period.

Nautical tourism produces additional environmental pressures, especially on the marine environment. It comes from antifouling paints, anchoring, possible introduction of foreign species, disposal of waste waters, solid and liquid waste disposal, air pollution and noise pollution. There is no pollution control at the open sea.

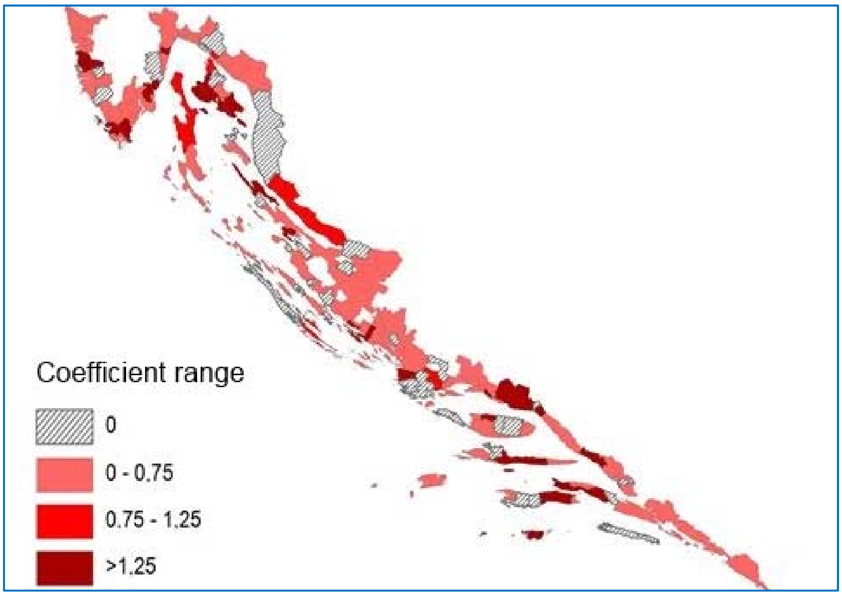
Tourism produces direct and indirect effects across the coastal economy structure and exhibits a multiplier that is particularly felt in transport, retail trade, public services and a couple of other sectors. As there are no recent data required for the input/output analysis, these multipliers can only be speculated on. Reviewed along with the maps already shown for other sectors, the maps below can provide only a basic insight in direct and indirect effects that tourism has on the economy of the Coastal Zone.



Map 30. Tourism (accommodation and food service activities) – revenues/employment in 2011



Map 31. Tourism (accommodation and food service activities) – wages/employment in 2011



Map 32. Tourism (accommodation and food service activities) – environmental expenditures/employment in 2011

In spite of an uneven spatial distribution of accommodation capacities (Table 41), successful and less successful firms are evenly spread across the Coastal Zone, and so are the firms that secure better wages for their employees. The correlation between the revenues of firms and their environmental expenditures is low, however, particularly on the islands. This discrepancy, found also in agriculture, quarrying and construction, calls for a particular policy attention.

Low environmental expenditures in tourism appear as a particular problem in the Coastal Zone as 96% of overnight stays take place in the Adriatic Croatia, most of it in the Coastal Zone. Overnight stays rose by 7% in 2011 whereas the rise in the Continental Croatia was hardly 2%. In addition, 94% of overnight stays take place between April and September. In this period 86% of the revenues are cashed.

On the other hand, the adverse impacts of tourism on the environment in the areas of stationary and nautical tourism are doubtless. It produces additional pressure on communal infrastructure, e.g. water supply (4–5% of total water supply in 2012) and waste production (3.8% of total waste on average in 2012). The greatest share of tourist generated waste in total communal waste has been registered in the County of Istria (18.65%), Primorje-Gorski Kotar (10.13%) while the counties of Zadar, Šibenik-Knin and Dubrovnik-Neretva have a share of 8%. The County of Split-Dalmatia has the lowest share of 5.2% in the total communal waste. Tourism increases noise pollution, air pollution, pressure on protected areas etc.

In spite of pressures, the monitoring of the quality of bathing waters in 2013 showed that the quality of waters at beaches and areas used for bathing is very high (Table 46). In fact, it proved excellent at 95% of the monitored sites, which brings Croatia at the 3rd place among the EU countries as for the quality of bathing waters (after Cyprus and Malta).

Table 46. Monitoring of the quality of bathing waters in the Croatian Coastal Zone in 2013

County	Points of data collection	Number of samples	Results: quality of bathing waters at annual level		Beaches with unsatisfactory status
Istria	203	2,032	Excellent: Good: Unsatisfactory:	99.01% 0.49% 0.49%	AC Stupice – Premantura
Primorje-Gorski Kotar	237	2,433	Excellent: Good: Satisfactory: Unsatisfactory:	94.51% 2.95% 1.27% 1.27%	Slatina-kraj; Kristal; hotel Adriatic
Lika-Senj	40	400	Excellent:	100.00%	-
Zadar	87	879	Excellent: Satisfactory:	98.85% 1.15%	-
Šibenik-Knin	93	930	Excellent: Good: Satisfactory:	96.77% 1.08% 2.15%	-
Split-Dalmatia	144	1,440	Excellent: Good: Satisfactory: Unsatisfactory:	88.89% 6.25% 2.78% 2.08%	Gojača, Kamp i Torac – all in the Kaštela Bay

Source: National report on the yearly and total assessment of sea bathing water quality on the beaches of the Croatian Adriatic in 2013, Ministry of Environmental Protection and Nature, December 2013

Conclusion

Primarily, it is important to point out that certain economic activities have been observed primarily from the economic, and to a lesser extent, from the social aspect. The main reason lies in the time at hand and the available data. The basis for partial identification of social aspects, especially the consequences of endorsement of certain policies, is provided in the part of the study relating to the development of local/regional government units and their fiscal capacities.

The main pressures on the coastal and marine environment are caused by urbanization, tourism and traffic, and to a lesser extent by agriculture. Other economic activities do not generate that much pollution. There are several reasons. Firstly, the privatisation processes ongoing after the Homeland war (1991–1995), and especially the current economic crisis, resulted in a significant decrease of economic activities in the Republic of Croatia, Adriatic Croatia in particular. Secondly, economic activities are concentrated in Zagreb and its surrounding area. Thirdly, the Republic of Croatia ratified numerous legally bounding directives on environmental protection during the EU admission period. Implementation of those directives yielded results (eg. goals of the Kyoto protocol, Joint fisheries and agriculture policies, Marine Strategy Framework Directive, Water Framework Directive, Nitrates Directive, IPPC demands, etc.).

On the other hand, different strategies of sector development, development programs on all levels, big investment projects, that is, consequential changes in physical plans, incorporate environmental issues into their goals and priorities on the basis of mandatory strategic assessments of environmental impact and the assessment of environmental impacts of particular interventions. Still, it should be noted that there are numerous problems in marine and coastal environment usage resulting from former practises, or inefficient managing system, to be exact. The above listed, and many other changes, have yet to prove their efficiency.

Therefore, in the course of revision of the ESA, it is necessary to consider the results and findings connected to the exploration and exploitation of mineral resources in the Adriatic.

2. Counties and Towns/Municipalities of the Coastal Zone

2.1 Composite development index

The Composite Development Index (CDI) is officially calculated[13] for 556 Croatian LGUs as the weighted average deviation from the national average of five basic indicators: unemployment rate, income per capita, population change, budget's revenues of county per capita and educational attainment rate[14]. Population change refers to the change between the two Censuses. Other indicators are calculated on yearly basis. The weights, or the weighting factors are the following: unemployment rate is weighted 30%, incomes per capita 25% and other three indicators 15% each. The weights have been assigned on the basis of expert opinion on their relevance for the development level assessment.

Counties have been divided into four categories in accordance with their relative positions to the national average. The categorization thresholds are presented in Table 47.

Table 47. Categorization criteria for counties

Development category	Index value
Category I	Counties with development index value below 75% of national average
Category II	Counties with development index value between 75% and 100% of national average
Category III	Counties with development index value between 100% and 125% of national average
Category IV	Counties with development index value above 125% of national average

Source: Ministry of Regional Development and EU Funds

CDI has been officially published since 2010 by the ministry in charge of regional development. So far it happened twice, in 2010 and 2013. CDI published in 2010 was based on data of 2006 and Census 2001. The second publication was based on 2010–2012 averages and Census 2011. Counties of the Adriatic Croatia by CDI and development category in 2010 and 2013 are presented in Table 48.

Table 48. Counties of the Adriatic Croatia by CDI and development category in 2010 and 2013

	Development index (%)		Development category	
	2010	2013	2010	2013
Republic of Croatia	100.00	100.00		
County of Istria	156.13	156.80	IV	IV
County of Primorje-Gorski Kotar	142.32	139.21	IV	IV
County of Lika-Senj	55.48	64.82	I	I
County of Zadar	75.59	106.39	II	III
County of Šibenik-Knin	63.30	80.93	I	II
County of Split-Dalmatia	89.09	93.75	II	II
County of Dubrovnik-Neretva	107.93	120.84	III	III

Source: Ministry of Regional Development and EU Funds

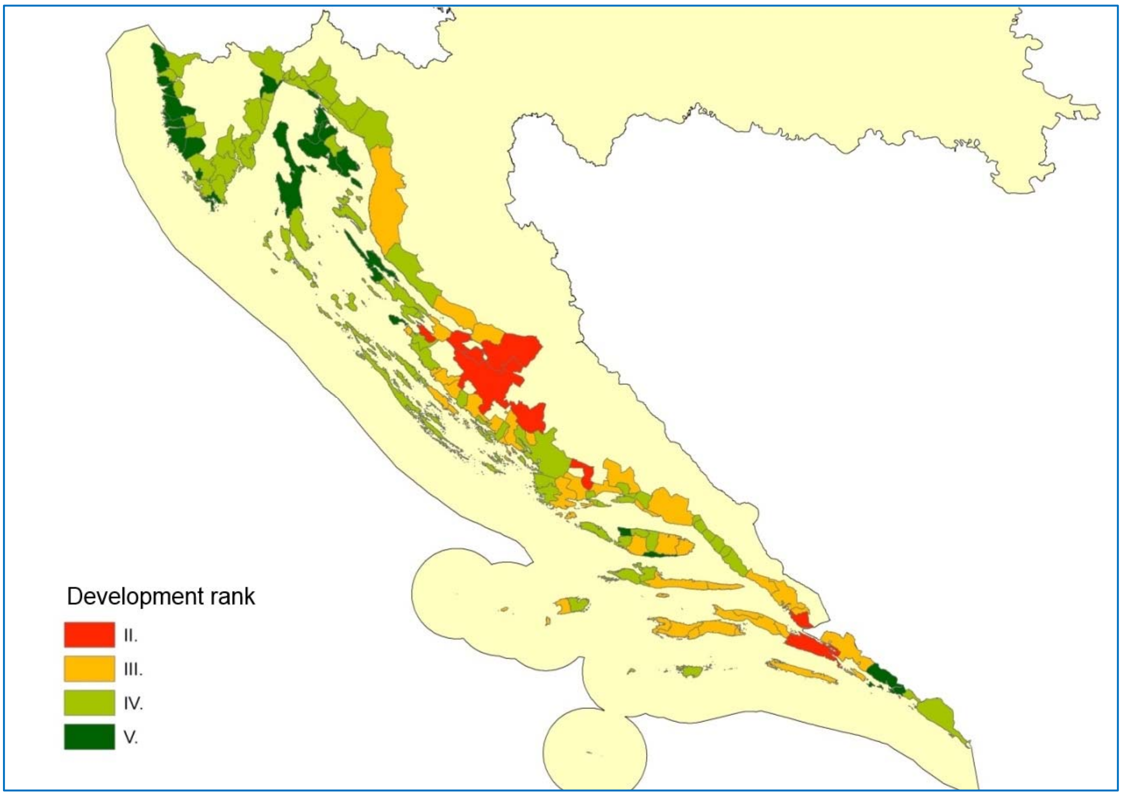
LGUs have been divided into five categories in accordance with their relative positions to the national average. The categorization thresholds are presented in Table 49.

[13] Regulation on the Development Index (Official Gazette 63/2010)
[14] Measured as ratio of population with secondary education and higher in population over 15 years.

Table 49. Categorization criteria for towns and municipalities in 2013

Development category	Index value
Category I	Towns and municipalities with development index value below 50% of national average
Category II	Towns and municipalities with development index value between 50% and 75% of national average
Category III	Towns and municipalities with development index value between 75% and 100% of national average
Category IV	Towns and municipalities with development index value between 100% and 125% of national average
Category V	Towns and municipalities with development index value above 125% of national average

Source: Ministry of Regional Development and EU Funds



Map 33. Development rank of LGUs in the Coastal Zone in 2013.
Source: Ministry of Regional Development and EU Funds

Applied to 139 LGUs of the Coastal Zone the above categorization is reduced to four categories as there are no LGUs with the index value below half of the national average (absolute values for all 139 LGUs are presented in ANNEX). The most undeveloped parts of Croatia are thus outside the Coastal Zone, in which 63% of LGUs fall into categories IV and V.

The Coastal Zone stands as one of the most developed parts of Croatia but the spatial distribution of its LGUs according to the development level is uneven. The most developed LGUs are found in Istria where all towns and municipalities fall into categories IV and V. The cluster of poorest LGUs is found in the hinterland of mid Dalmatia where only islands and LGUs situated on the sea shore fall into III and IV category. The Map 33 confirms common knowledge about the Croatian coast on which LGUs get poorer and poorer as one moves southward. Common knowledge is confirmed if the values of CDI in 2010 are compared with values in 2013. The tables 50 and 51 show that the distribution of LGUs across categories has not changed in three northern counties, whereas it gets somewhat worse in the counties of Split-Dalmatia and Dubrovnik-Neretva.

Table 50. Distribution of LGUs by different development categories across counties, 2010

County	Category				Total
	II	III	IV	V	
County of Istria	0	0	12	11	**23**
County of Primorje-Gorski Kotar	0	0	16	9	**25**
County of Lika-Senj	0	1	1	1	**3**
County of Zadar	5	15	6	0	**26**
County of Šibenik-Knin	1	7	2	0	**10**
County of Split-Dalmatia	1	18	12	3	**34**
County of Dubrovnik-Neretva	0	14	4	0	**18**
Total	**7**	**55**	**53**	**24**	**139**

Source: Ministry of Regional Development and EU Funds

Table 51. Distribution of LGUs by different development categories across counties, 2013

County	Category				Total
	II	III	IV	V	
County of Istria	0	0	13	10	**23**
County of Primorje-Gorski Kotar	0	0	16	9	**25**
County of Lika-Senj	0	1	1	1	**3**
County of Zadar	5	15	9	2	**26**
County of Šibenik-Knin	1	4	5	0	**10**
County of Split-Dalmatia	1	15	16	2	**34**
County of Dubrovnik-Neretva	2	12	3	1	**18**
Total	**9**	**42**	**63**	**25**	**139**

Source: Ministry of Regional Development and EU Funds

2.2 Fiscal capacity

The fiscal capacity of a regional or a local government unit is defined as the ability of the unit to raise revenues from its own sources in order to pay for a standardized basket of public goods and services. Fiscal capacity can also be defined as the ability of a governmental jurisdiction to translate economic activity within its geographic borders into public spending.

Table 52. Fiscal capacities in the Coastal Zone (139 LGUs) in 2011 (HRK per capita)

	Average	Max	Min
Taxes on income and surtax on income tax	1,650	4,160	272
Total revenues without grants	4,211	13,762	1,300
Total revenues	4,748	14,408	1,488
Total expenses	4,866	16,338	1,576
Environmental expenditures	236	2,233	6

Source: Ministry of Finance.

The main measure of fiscal capacity is the amount of income tax revenues collected. An analysis of differences in fiscal capacities across different local levels allows for identification of local units' capability to finance the existing public services.

There are evident disparities among different LGUs in the Coastal Zone measured by different fiscal indicators. Measuring fiscal capacity with different indicators reveals large differences at the level of budget per capita between LGUs in the Coastal Zone.

Total average revenue per capita in the Coastal Zone in 2011 was HRK 4,748. Maximum value of total revenue per capita was HRK 14,408 (Novigrad, County of Istria) and minimum value was HRK 1,488 (Dugi Rat, County of Split-Dalmatia).

Total revenue without grants[15] per capita in 2011 in the Coastal Zone was HRK 4,211; maximum value was HRK 13,762 (Novigrad, County of Istria) and minimum value was HRK 1,300 (Slivno, County of Dubrovnik-Neretva). Data indicate that there are LGUs that generate 10.5 times higher total revenues per capita than LGUs with minimum total revenues per capita.

Total average expenses per capita in 2011 were HRK 4,866. Maximum and minimum values were obtained in the County of Split-Dalmatia; HRK 16,338 in Zadvarje and, HRK 1,576 in Dugi Rat. These data indicate that there are LGUs with total average expenses per capita ten times higher than LGUs with minimum expenses.

Average environmental expenditure per capita according to the functional classification of costs[16] in 2011 was HRK 236. Maximum value was HRK 2,233 (Municipality of Vinodol, County of Primorje-Gorski Kotar) and minimum value was HRK 6 (Vodice, County of Šibenik-Knin). Actually, minimum value was 0 as 22 out of 139 LGUs did not report any environmental expenditure according to functional classification. Six of these are in the County of Zadar, five in the County of Istria, one in the County of Primorje-Gorski Kotar, one in the County of Lika-Senj, two in the County of Šibenik-Knin, six in the County of Split-Dalmatia and one in the County of Dubrovnik-Neretva.

Table 53. Total revenues per capita in the Coastal Zone in 2011 (HRK)

LGU	Max	LGU	Min
Novigrad	14,408	Sveti Filip i Jakov	2,213
Zadvarje	14,071	Podstrana	2,188
Funtana	12,539	Seget	2,086
Kolan	10,310	Smokvica	1,886
Malinska-Dubašnica	10,305	Dugi Rat	1,488

Table 54. Total revenues without grant revenues per capita in the Coastal Zone in 2011 (HRK)

LGU	Max	LGU	Min
Novigrad	13,762	Prgomet	1,612
Funtana	12,285	Skradin	1,514
Kostrena	9,665	Smokvica	1,450
Bale	9,585	Dugi Rat	1,442
Malinska-Dubašnica	9,436	Slivno	1,300

Note: Total revenues without grants mean total revenues from grant revenues and share of income tax revenue for financing decentralized functions.

Table 55. Taxes on income and surtax on income tax in the Coastal Zone in 2011 (HRK)

LGU	Max	LGU	Min
Konavle	4,160	Pirovac	567
Matulji	2,529	Marina	533
Omišalj	2,511	Bibinje	518
Župa dubrovačka	2,503	Vrsti	379
Baška	2,500	Slivno	272

[15] Total revenues without grants are total revenues without grant revenues and share of income tax revenue for financing decentralized functions.

[16] According to COFOG these functions include on the one hand waste management, pollution abatement, protection of biodiversity and landscape, and on the other hand, all outlays relating to housing development, community development, water supply and street lighting (http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Glossary:Classification_of_the_functions_of_government_%28COFOG%29).

Table 56. Total expenses per capita in the Coastal Zone in 2011 (HRK)

LGU	Max	LGU	Min
Zadvarje	16,338	Seget	2,129
Novigrad	13,100	Skradin	2,123
Novalja	11,348	Bilice	1,830
Mljet	11,331	Smokvica	1,736
Sutivan	10.748	Dugi Rat	1.576

Table 57. Environmental expenditures per capita in the Coastal Zone in 2011 (HRK)

LGU	Max	LGU	Min
Vinodolska općina	2,233	Čavle	12
Novalja	2,169	Kraljevica	11
Kolan	2,121	Vir	11
Punat	2,037	Korčula	9
Bale	2.032	Vodice	6

Source: Ministry of Finance

For the sake of better comparison it is useful to observe fiscal indicators on the level of Croatia as a whole. Two important indicators reveal Croatia as a highly centralized country: the share of revenues and costs of the sub-national government in the country's GDP, and the share of revenues and costs of the sub-national government in total government budget revenues and costs.

Table 58. Shares of local government revenues and costs in Croatia

	Local government revenues		Local government costs	
	Share in consolidated general government revenues (%)	Share in GDP (%)	Share in consolidated general government costs (%)	Share in GDP (%)
2000	10.93	5.35	10.04	5.42
2001	8.82	4.12	8.71	4.28
2009	11.00	4.39	10.50	4.20
2010	10.40	3.90	9.80	4.00
2011	10.30	3.80	9.50	3.80

Source: Ministry of Finance

Table 59. Fiscal capacities per capita in Croatia in 2011 (in HRK)

	Average	Minimum	Maximum
Tax revenues			
- counties	411.77	217.77	691.81
- towns	1,631.85	459.62	3,890.35
- municipalities	1,123.42	130.47	5,512.91
Total revenues without grant revenues			
- counties	454.86	246.01	883.87
- towns	3,047.41	706.52	13,754.42
- municipalities	2,321.80	215.25	12,278.37
TOTAL REVENUES			
- counties	1,004.16	814.25	1,179.36
- towns	3,694.72	1,128.32	14,400.31
- municipalities	2,999.42	517.87	14,062.91
TOTAL EXPENSES			
- counties	991.68	802.89	1,235.53
- towns	3,655.34	1,128.39	13,092.63
- municipalities	3,005.73	449.29	29,184.45

The total revenues without grants item means total revenues without grant revenues and the share of the income tax revenue for financing decentralized functions.
Source: Ministry of Finance

In 2011 revenues of all local government units in Croatia totalled HRK 20.5 billion. *Tax* revenues had a 52% share in total revenues of LGUs. The second most important source of total local government units revenues are *grants.* In 2011, the costs of LGUs totalled HRK 21.2 billion. According to the economic classification, *material costs* were the most important category having a 32% share, of total costs. There are pronounced differences on the costs side of the local budgets, related both to the amounts and the structure. The analysis shows that more than 37% of total local costs are generated by towns, 27% by municipalities, 24% by the City of Zagreb and 12% by counties.

2.3 Investments in environmental protection and environmental expenditures

Data on the investments in environment protection and environmental expenditures in Croatia are collected by a reporting method through the Annual Report on Investments in Environmental Protection (INV-OK form) in compliance with the Official Statistics Act. Data refer to counties.

Reporting units encompass all business entities and parts of business entities, or else tradesmen listed in the Registry of Business Subjects and classified by the NKD[17] 2007 under one field of activity, who have invested in environmental protection.

The structure of investments and current costs in the Adriatic Croatia in the last couple of years do not vary significantly. The figures do vary across counties, however, due to particular investments undertaken there. A single investment may considerably increase total environmental investments in the county in a particular year which means that the year before and the year after may provide a false impression of lack of investments and insufficient environmental care in general. A single investment may also change the structure of investments by environmental domain in a particular year. These variations are particularly vivid in the figures on **environmental domains**. Investments in environmental protection and current environmental expenditures are presented by environmental domains in the period of 2008–2011:

- **A** – Protection of ambient air and climate;
- **B** – Wastewater management;
- **C** – Waste management;
- **D** – Protection and remediation of soil, ground waters and surface waters and
- **E** – Noise and vibration abatement, protection of biodiversity and landscape, protection against radiation and other environmental protection activities.

Data on environmental expenditures are collected by environmental domains under the Single European Statistical Classification of Environmental Protection Activities (CEPA), which was adopted in June 1994 and revised in 2000. Tables with the data on environmental investments are presented in the Appendix (Table 4.15).

[17] Nacionalna Klasifikacija Djeatnosti (NACE - **N**omenclature statistique des **a**ctivités économiques dans la **C**ommunauté **e**uropéenne)

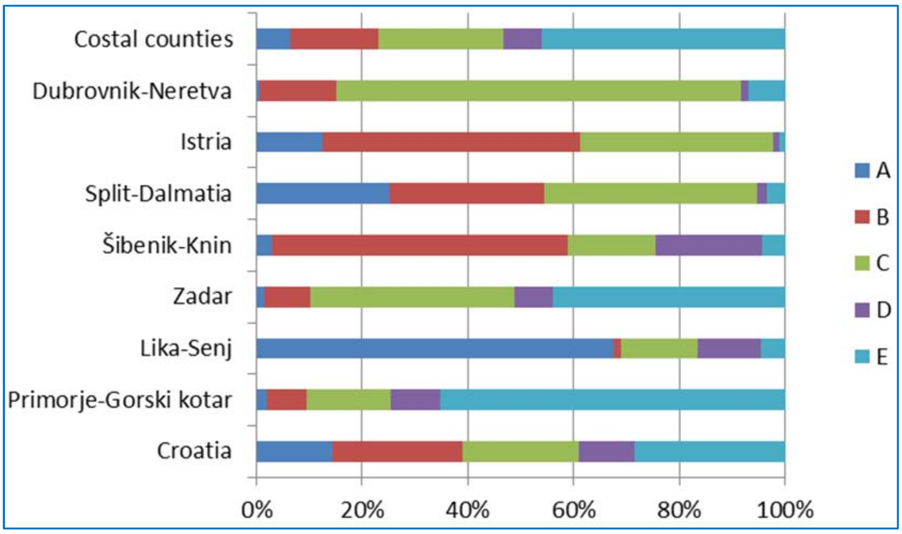


Figure 6. Investments and current costs in environmental protection, by environmental domain, by counties in 2008 (in %)

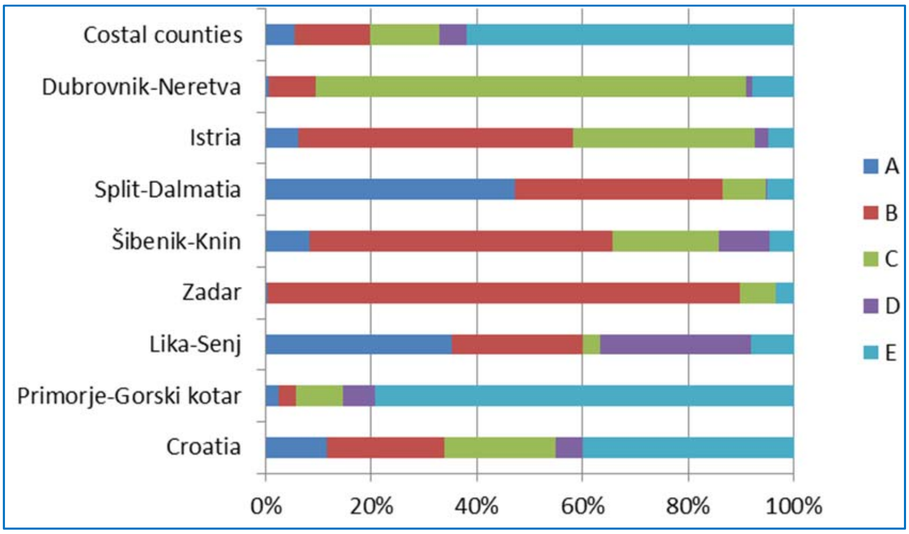


Figure 7. Investments and current costs in environmental protection, by environmental domain, by counties in 2009 (in %)

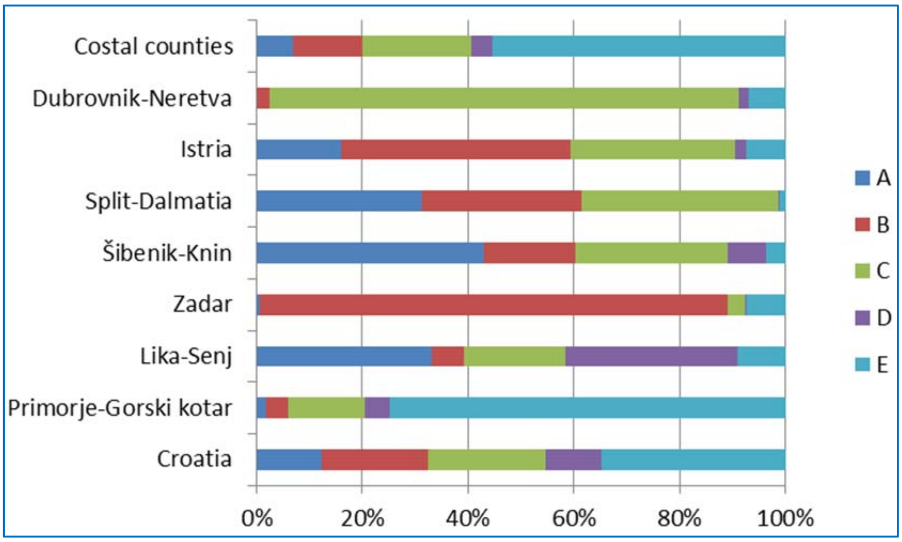


Figure 8. Investments and current costs in environmental protection, by environmental domain, by counties in 2010 (in %)

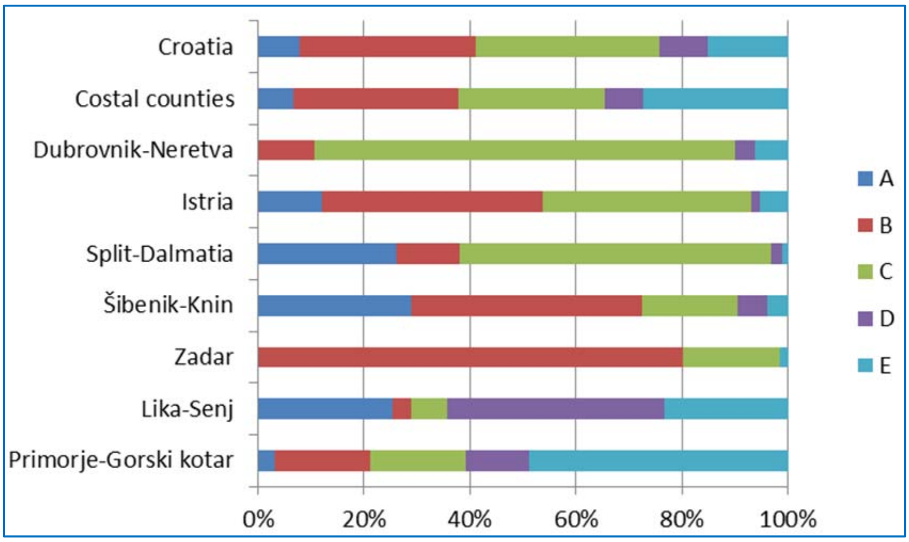


Figure 9. Investments and current costs in environmental protection, by environmental domain, by counties in 2011 (in %)
Source: www.dzs.hr Statistical Yearbook, CBS, 2010, 2011, 2012, 2013

As most of the towns are situated on the coast where most of the activities (tourism in particular) take place (80% of the population of Adriatic Croatia live on 47% of its territory), the data presented may serve as a good proxy for investments and costs in the Coastal Zone, bearing in mind that the costs per capita are calculated with the data from the 2011 Census The tables 60 And 61 show that total environmental investments and current environmental expenditures vary less as the coverage gets wider. The figures on the national level vary less than the figures on the level of Adriatic Croatia which, in turn, vary less than the figures in particular counties.

Table 60. Environmental investments and current costs in the Adriatic Croatia in the period 2008–2011 (in 000 HRK)

	2008	2009	2010	2011	Average
Croatia	3,679,796	3,619,504	3,679,618	4,750,566	3,932,371
Primorje-Gorski Kotar	1,041,868	1,495,528	1,090,976	705,981	1,083,588
Lika-Senj	11,057	4,119	2,540	3,021	5,184
Zadar	8,362	65,250	28,327	192,672	73,653
Šibenik-Knin	28,562	16,897	25,988	29,216	25,166
Split-Dalmatia	158,491	114,277	133,480	110,112	129,090
Istria	215,884	216,975	189,186	247,506	217,388
Dubrovnik-Neretva	46,350	37,210	39,981	48,273	42,954
Coastal counties	1,510,574	1,950,256	1,510,478	1,336,781	1,577,022

Table 61. Environmental investments and current costs per capita in the Adriatic Croatia in the period 2008–2011 (HRK)

	2008	2009	2010	2011	Average
Croatia	859	845	859	1,109	918
Primorje-Gorski Kotar	3,518	5,049	3,683	2,384	3,658
Lika-Senj	217	81	50	59	102
Zadar	49	384	167	1,133	433
Šibenik-Knin	261	154	238	267	230
Split-Dalmatia	348	251	293	242	284
Istria	1,038	1,043	909	1,190	1,045
Dubrovnik-Neretva	378	304	326	394	350
Coastal counties	1,070	1,381	1,070	947	1,117

Source: www.dzs.hr Statistical Yearbook, CBS, 2010, 2011, 2012, 2013

It can be noted that no more than three counties (Split-Dalmatia, Lika-Senj and Primorje-Gorski Kotar) have been reducing their investments in the observed period and that environmental investments and current costs in the Adriatic Croatia have been declining because of that. At the same time overall Croatian investments and costs have risen most probably due to investments and costs in the most developed counties in the continental part of the country and in the City of Zagreb.

Environmental investments and current costs across counties and particularly across environmental domains show a lack of consistent development/environmental policy in the Coastal Zone. The causes could be sought in the overall economic crisis and the corresponding growing importance of tourism as one of the rare growing sectors threatening to put environmental concerns aside, but also in the lack of environmental awareness and ill coordinated development policy efforts. It could be argued that inconsistency of development/environmental policy does not necessarily lead to its overall ineffectiveness as development/environmental investments are not mutually conflicting and can contribute to a better environment even if they are not coordinated well. The overall effects of investments presented above are almost certainly positive so that the only question that remains is could they have been even more effective if they were consistently applied across environmental domains and across the territory of the Adriatic Croatia, and the Coastal Zone in particular. This could be estimated only if time series of environmental monitoring results were checked against the time series of investments and the correlation between the two calculated. Investment statistics are hard to grasp on the LGU level, however, and there are not enough monitoring points in the Coastal Zone so that the environmental significance of some large investments (eg. the County of Zadar in 2011) or of investment declines (eg. the County of Primorje-Gorski Kotar in 2011) remains unclear.

3. DPSI(R) – Drivers, Pressures, State, Impacts, Responses

The socio-economic activities presented above obviously affect the Croatian marine/coastal environment. As the ultimate aim is the identification of ways of how to remediate environmental degradation and establish sustainable development policies in the Coastal Zone, it is convenient to place the activities in a familiar DPSIR framework in which socio-economic activities are seen as **D**rivers that create **P**ressures. The pressures change the **S**tate of the marine/coastal environment which leads to **I**mpacts on human health, welfare and quality of life as well as on marine and coastal ecosystems. This may trigger a policy **R**esponse i.e. actions that feedback on the driving forces, on the pressures or on the state or impacts directly. As Response (policy change, measures…) is not our focus here, DPSIR is reduced to DPSI. Drivers, pressures, state and impacts are organized in the Table 62 to match the analysis of sectors.

Table 62. DPSI in the Coastal Zone

Drivers (economic sectors)	Pressures	Change of the State of the environment	Impacts on humans and the ecosystem
Agriculture (farming, viticulture, fruit growing, cattle) **Demand for local products** (residents, tourists)	Use of pesticides, herbicides and fertilizers over prescribed quantities Overgrazing	Contaminated soil and karstic under-ground waters Contaminated sea water	Human health hazards due to contaminated fruits and vegetables Hazardous concentration of chemicals in herbivores
Fishery	Use of trawl-nets Intensive fishing	Destruction of the sea bed organisms Overfishing	123 out of 442 fish species are endangered (3 extinct)
Mari-culture	Taking sea bays Deposition of unused fish food on the seabed	Visual impediment Local changes in nutrient levels in the sea Introduction of microbial pathogens	Local loss of seabed flora and fauna
Quarrying and aggregate mining	Extracting sand from the sea bed	Unwarranted sedimentation on the sea bed Destruction of the sea bed organisms Changes in turbidity of sea water	Local loss of seabed flora and fauna Local loss of mainland flora and fauna
	Removing soil from large plots of land	Soil contamination Modification of coastal landscape Visual impediment	
Manufacturing	Land take in maritime domain Land take in urban areas Release of air, water and soil contaminants Smothering	Air, water and soil contamination Suspended sedimentation on sea bed and on the ground Contamination of sea water	Human health hazards Local and sub-regional loss of flora and fauna

Drivers (economic sectors)	Pressures	Change of the State of the environment	Impacts on humans and the ecosystem
Construction			
Attractiveness of the Coastal Zone for temporary residents Real estate business profits Large construction land offer Big construction sector in demand for business Favourable loans Inexistence of the land policy instruments for real-estate taxes and land use change	Search for real estate on the coast Extension of construction zones Land use change Disruption of landscape Heavy transport Release of air contaminants Noise Illegal construction on the coast, on a large scale	Visual impediment Contaminated soil and karstic under-ground waters Large areas planned for development resulting in low density scattered development ("eg. sprawl") Large areas planned for development often encompassing environmentally vulnerable zones	Human health hazards Local loss of mainland flora and fauna Scattered development reducing landscape values of the coast Loss of valuable areas for the development of high standard tourism Loss of agricultural and wood areas Insufficient infrastructure capacity Water and soil pollution with different types of waste
Transport			
- cargo shipping	Underwater noise Release of waste in the sea	Changes in turbidity Chemical contamination of the maritime ecosystem	Loss of indigenous species
	Introduction of non-native species	Distortion of the maritime ecosystem equilibrium caused by non-native species	
- road transport	Air pollution Noise	Contamination along roads Loss of animal species	Increased mortality of birds, small mammals
- air transport	Noise	Disruption of birds' air space	Increased mortality of birds
- rail	-	-	-
Transport infrastructure			
- sea ports	Smothering Suspension of sediments Change in turbidity of water Underwater noise	Contamination of sea water in ports Reduction of the local maritime ecosystem	Forced, semi successful adaptation of fish and sea bed organisms
- roads	Congestions in seasonal peaks Significant change of landscape Significant change of landscape	Barrier in the living space of animals along roads	Increased morbidity and mortality of mammals
- airports	Land take Use of chemical cleaners Significant land take	Barrier in the living space of animals along the runaway	Increased morbidity and mortality of mammals Human health hazards
- railways		Contamination of soil and underground waters Barrier in the living space of animals along the railway	Increased morbidity and mortality of mammals
Tourism			
- nautical	Release of biocid paints Underwater noise Congestion in anchorages during seasonal peaks	Contamination of sea and sea bed in anchorages	Local loss of maritime flora and fauna
	Release of solid waste Release of oil in the open sea Underwater noise Light	Contamination of coast line Chemical contamination Noise contamination Light contamination	
- cruisers	Congestion in sea ports during seasonal peaks	Visual impediment	Local loss of maritime flora and fauna
- coastal (land)	Transport bottle necks and overloaded infrastructure in seasonal peaks Social pressures on local population	Air contamination Noise contamination Light contamination	Deterioration of local culture

Drivers (economic sectors)	Pressures	Change of the State of the environment	Impacts on humans and the ecosystem
Energy production			
- hydro	Significant land take Pressure on underground water flows	Change in underground water levels	Local loss of flora and fauna
- thermo	Release of smoke Visual impediment	Air contamination	Human health hazards
- renewable	Wind farms visual impediment Wind farms noise	Disruption of birds' air space by wind farms	Increased mortality of birds
Waste disposal	Widespread illegal landfills	Contamination of soil and underground water flows Air contamination	Human health hazards

In the remainder of this section an insight into environmental pressures on one hand, and total costs for the environment on the other is provided. The analysis is done at the LGU level. A general overview regarding the "balance" of pressures and costs is provided.

Environmental pressures

Environmental pressures are described from two perspectives. Regarding economic activities, pressures are presented via business revenues, for each LGU in the Coastal Zone. An indicator has been defined by relating the ratio business revenues[18] /LGU area in km^2, to the average revenue per km^2 (total business revenues / total area of the Coastal Zone). The population density for each LGU (Census 2011) was used as the second indicator. The two indicators were merged, and the entire Coastal Zone was divided into classes according to the overall pressures intensity. These are shown in Table 63 (calculated values are in Table II of the Appendix).

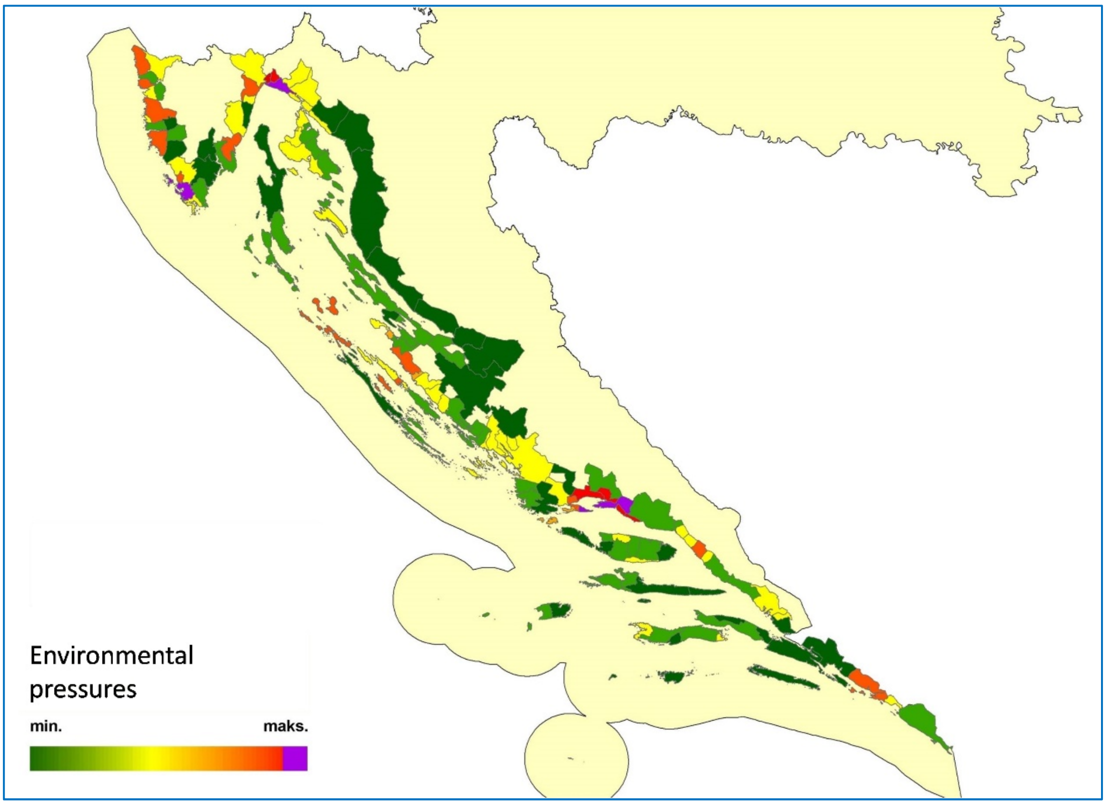
Spatial distribution is shown in Map 34.

Table 63. Environmental pressures in the Coastal Zone – classes of intensity

Business revenues / km^2	Population density					
	0 – 40	40 – 60	60 – 150	150 – 400	400 – 1.000	1.000 –
0 – 0.10	33	6	2			
0.10 – 0.25	16	10	4	1		
0.25 – 0.75	3	8	16	2		
0.75 – 2.00	1	3	5	6		
2.00 – 10.00			2	12	5	
10.00 –					1	3

Note: Numbers in field show the number of towns / municipalities in each category.

[18] Sums of revenues of enterprises for 2011, for each and every town/municipality. Source: Croatian Financial agency – FINA



Map 34. Environmental pressures in the Coastal Zone

Environmental expenditures

Environmental expenditures are calculated as the sum of costs of business entities and of LGUs.

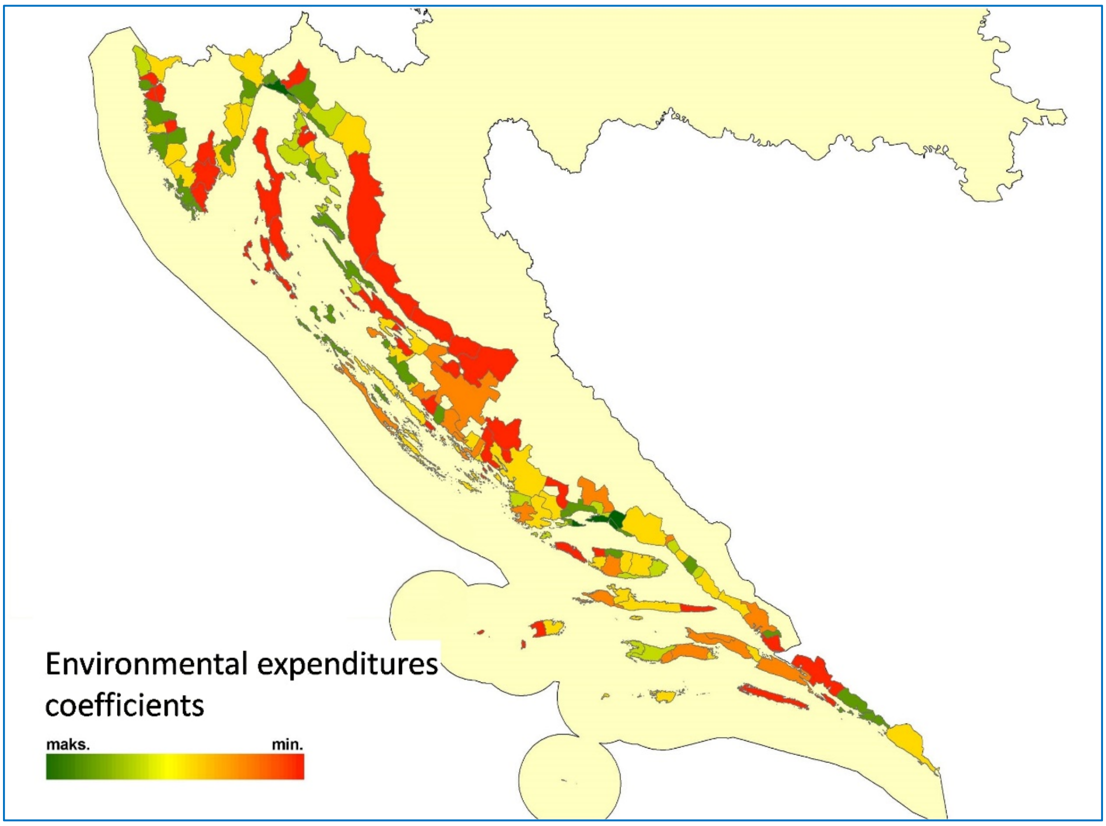
Environmental expenditures paid by the population of the Coastal Zone were considered but no data could be collected. Taking into account that households pay charges mainly to the municipalities, most of their costs are already covered by the environmental expenditures of the LGUs. Environmental expenditures incurred by business entities are calculated from the data obtained from the Croatian financial agency FINA for 2011.

Sum of business entities' costs and budget costs for each LGU were divided by the surface area, and then put into relation to the average total costs for the environment in the Coastal Zone (total costs/Coastal Zone surface area).

All towns/municipalities were divided in classes, as shown in Table 64. The results are presented on the Map 35 (calculated values are in Table III of the Appendix).

Table 64. Classes of environmental expenditures

Class	Total environmental expenditures/ km^2	Coefficient	No of towns/municipalities
0	0.00	0.00	22
1	0.01 – 4,000	0.01 – 0.10	10
2	4,000 – 10,000	0.10 – 0.25	18
3	10,000 – 30,500	0.25 – 0.75	40
4	30,500 – 80,000	0.75 – 2.00	18
5	80,000 – 400,000	2.00 – 10.00	28
6	More than 400,000	10.00 –	3



Map 35. Towns and municipalities according to the total environmental expenditures coefficients

As shown in the two Figures there is a rather strong correlation between pressures and environmental costs. The strongest pressures are recorded in two main agglomerations in the Coastal Zone, Rijeka and Split. Towns and municipalities that follow on the environmental pressures list are subsequently: Pula, Kastav, Viškovo, Solin, Podstrana, Kaštela, Dugi Rat. All of them, except Pula, belong to the agglomerations of Rijeka (Kastav, Viškovo) and Split (Solin, Podstrana, Kaštela, Dugi Rat).

It is also comforting to notice that only 24 towns/municipalities have pressures higher than the Coastal Zone averages for both business revenues and population density (Privlaka, Okrug, Bibinje, Zadar, Makarska, Trogir, Dubrovnik, Fažana, Rovinj, Opatija, Kali, Umag, Novigrad, Labin, Poreč, Viškovo, Podstrana, Solin, Kaštela, Dugi Rat, Kastav, Pula, Split, Rijeka, progressively). Some of them are parts of wider agglomerations of Rijeka and Split. The others are medium-sized central places (e.g. Zadar, Makarska, Dubrovnik) or towns/municipalities with developed tourism or other industry. Only municipalities of Privlaka, Okrug and Bibinje have a stronger pressure of population than that of the economy.

At the end of the list there are Karlobag, Prgomet and Jasenice. Still, as many as 76 towns/municipalities of the Coastal Zone have environmental pressures weaker than the Coastal Zone average. Majority of them are situated in the mountain area (Velebit, Biokovo) and in the islands.

On the other hand, as far as total environmental expenditures are concerned, Rijeka is again on top of the list. It is followed by Podstrana, Split, Opatija, Medulin, Fažana etc. Analysis shows that only 43 towns/municipalities (30.94%) spend more on the environment than the Coastal Zone average. On the other hand, 22 towns/municipalities (15.83%) spend almost nothing on the environment, while total of 94 towns/municipalities (67.63%) spend less than the Coastal Zone average. A more detailed analysis of environmental pressures vs. costs relation in each LGU is presented in the following Tables.

Table 65. Environmental pressures vs. environmental expenditures in the Coastal Zone in 2011 – list of LGUs

Env. Costs Pressures	0	1	2	3	4	5	6
1	Sveti Filip i Jakov Slivno Marčana Sveti Lovreč Barban Šolta Skradin Jasenice Karlobag Cres Dubr. primorje Starigrad (ZD)	Obrovac Prgomet Sućuraj Senj Mljet	Sali Ston Novigrad Benkovac Smokvica Trpanj	Janjina Lastovo Novi Vinod. Jelsa Milna Moš.Draga Vis Povljana Marina Kukljica Pašman Ražanac	Lopar Selca Vinod. općina Bale Pirovac Gradac		
2	Bilice Vrsi Sutivan Dobrinj Komiža Pag	Brtonigla	Ližnjan Tisno Vir Sukošan Korčula Pakoštane Posedarje Rogoznica Klis Orebić Zadrvarje Nerežišća	Lumbarda Vrsar Nin Stari Grad Podgora Murter Vrbnik Pučišća	Kolan Baška	Privlaka Kanfanar	
3	Tar-Variga Vodice Kaštelir M. Lošinj	Tkon Čavle	Hvar Ploče	Postira Omiš Konavle Raša Bibinje Funtana BaškaVoda Tribunj Matulji Seget Vodnjan	Brela Primošten Tučepi Bol Blato Okrug Vela Luka	Novalja Supetar Rab	
4			Buje Kršan	Kraljevica Šibenik Preko	Kostrena Lovran Malinska Krk	Crikvenica ŽupaDubr. Medulin Biograd n/m Punat Opuzen	
5				Kali	Solin Umag Omišalj	Bakar Viškovo Kaštela Dugi Rat Zadar Makarska Trogir Dubrovnik	Fažana Podstrana Rovinj Opatija Novigrad – Citta Nova Labin Poreč
6						Pula Kastav Split	Rijeka

Table 66. Environmental pressures vs. environmental expenditures in the Coastal Zone in 2011 – numbers of LGUs

Env.costs Pressures	0 None	1 Low	2 Medium	3 Fair	4 Considerable	5 High	6 Extra high
1 – Low	12	5	6	12	6		
2 – Medium	6	1	12	8	2	2	
3 – Fair	4	2	2	11	7	3	
4 – Considerable			2	3	4	6	
5 – High				1	3	8	7
6 – Extra high						3	1

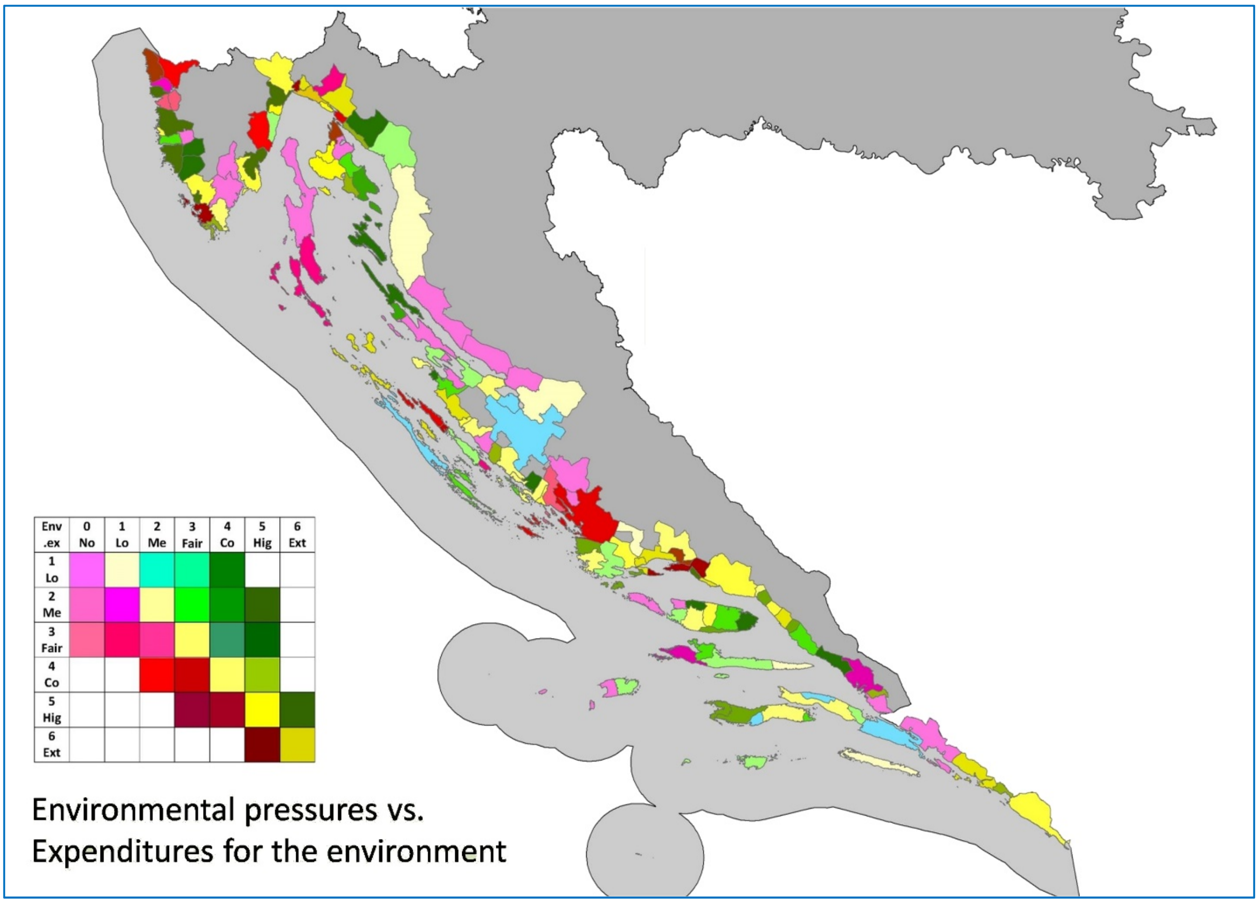
Environmental pressures (intensity, as shown in Table 63) in each LGU were compared to their environmental expenditures coefficients. Diagonal yellow-shaded fields show the LGUs where the intensity of pressures and costs is “in balance“. On the left side, there are towns/municipalities with intensity of environmental expenditures lower than the intensity of environmental pressures (shaded from pink to red). These LGUs should spend more for the environment.

LGUs with environmental expenditures higher than their environmental pressures are located on the right side (shaded in greenish colours).

41 towns/municipalities (29.50%) are situated along the “balance” line. However, 39 towns/ municipalities (28.06%) are paying less than they should. Out of them, 22 are paying almost nothing but environmental pressures there are rather low, especially in terms of industry. Nevertheless, Mali Lošinj and Vodice are regarded as highly attractive touristic destinations, and they should pay more attention to the environment. The same applies to Hvar (tourism) and Ploče (port facilities).

The second group of 13 LGUs (9.35%) has considerable to extra intense environmental pressures (especially from business activities), and their costs are rather low. These LGUs are scattered all along the Coastal Zone but, fortunately, many of them belong to big urban agglomerations of Rijeka and Split (it means less hot spots in the Coastal Zone). Nevertheless, there are LGUs of Buje, Umag, Kršan (County of Istria), Kali and Preko (County of Zadar), Šibenik (County of Šibenik-Knin) that do not spend enough on the environment. On the other hand, there are 59 LGUs (42.45%) that “pay more than they press”. At first glance it may be concluded that the Croatian Coastal Zone is clean, preserved and quite close to a good environmental status. However, majority of these LGUs have very low environmental pressures originating more from population than from economic activities. Some of them have been producing medium and fair environmental pressures; these are mainly tourist destinations or areas of food processing (wine, olive oil, cheese), or simply administrative centres. Still, their environmental expenditures are up to 3.5 times higher than the Coastal Zone average.

There are 13 LGUs exposed to considerable/high environmental pressures, but at the same time their environmental expenditures are significantly higher than the Coastal Zone average (4 to 37 times). This might be correlated with a high level of development (local development index is 4 or 5), except for Podstrana and Opuzen (development index is 3). Spatial distribution is shown on the Map 36.



Map 36. "Environmental balance" (pressures vs. costs) of the CZ towns/municipalities, 2011

4. Growth and Planning

4.1 Economic growth projections

Costs of environmental degradation are to be matched with financial sources which in turn depend on economic growth. This point is important because, inter alia, the ESA is supposed to serve as an input for a corresponding marine and coastal strategy which will have to deal with future environmental costs. Projections of main economic indicators (GDP, GVA, various employment indices) which are to be made in this respect appear as a methodological problem due to recent negative trends (the most recent data on GDP by counties are available for the year 2011):

Table 67. GDP per capita in the Croatian counties in the period 2000 – 2011 (current prices)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Croatia	**40,241**	**43,312**	**46,987**	**51,535**	**55,692**	**60,011**	**65,520**	**71,710**	**77,,420**	**74,186**	**73,277**	**76,755**
Continental Croatia	**40,723**	**44,185**	**48,132**	**52,045**	**55,647**	**60,458**	**66,614**	**72,193**	**78,723**	**75,423**	**74,657**	**78,160**
The City of Zagreb	66,993	74,378	79,708	89,361	97,541	107,814	117,694	127,255	138,195	130,758	135,932	137,558
The County of Zagreb	32,051	30,851	37,296	39,464	42,732	47,156	47,819	53,737	57,735	57,915	53,449	57,885
Krapina-Zagorje	30,446	34,526	35,593	37,763	38,646	44,325	46,777	51,959	52,519	47,311	44,311	46,835
Varaždin	36,837	40,406	45,622	47,974	47,165	49,535	55,616	59,893	66,703	62,821	59,016	61,592
Koprivnica-Križevci	40,929	42,825	45,909	47,619	48,311	51,516	60,701	65,626	67,403	67,349	60,038	63,372
Međimurje	33,088	35,870	40,159	41,604	43,514	44,933	51,816	54,909	63,207	61,665	58,712	62,887
Bjelovar-Bilogora	30,172	32,751	36,256	37,662	39,772	41,558	47,412	47,907	57,091	55,228	50,299	52,501
Virovitica-Podravina	29,687	33,302	35,501	37,907	38,681	39,145	46,545	49,170	51,459	46,909	44,412	47,080
Požega-Slavonija	29,343	31,506	33,220	37,382	39,647	40,820	42,033	46,413	47,117	45,643	45,221	46,692
Brod-Posavina	24,550	26,764	28,758	30,464	32,918	32,764	36,358	38,756	43,678	40,854	39,518	43,726
Osijek-Baranja	31,353	33,336	37,387	38,865	42,495	44,852	49,566	57,594	62,781	61,089	57,343	61,485
Vukovar-Srijem	23,586	25,475	27,906	30,510	32,048	34,640	39,732	41,285	46,362	44,040	41,033	46,220
Karlovac	31,665	38,098	41,422	41,030	41,883	45,491	51,216	57,676	60,612	55,689	54,275	57,310
Sisak-Moslavina	37,852	37,820	38,830	40,477	42,138	46,748	54,388	52,206	59,855	60,866	61,360	61,064
Adriatic Croatia	**39,220**	**41,472**	**44,591**	**50,474**	**55,784**	**59,092**	**63,284**	**70,728**	**74,783**	**71,692**	**70,503**	**73,900**
Primorje-Gorski Kotar	52,068	51,617	53,881	61,624	64,774	72,958	78,923	83,678	92,417	90,257	89,702	94,593
Lika-Senj	33,761	35,546	43,337	54,836	74,439	56,179	59,040	58,701	68,907	66,120	62,752	60,078
Zadar	29,894	33,932	37,292	44,349	46,834	50,161	51,533	59,877	65,965	62,582	59,211	61,721
Šibenik-Knin	28,839	29,961	33,252	38,438	43,108	48,804	49,057	58,314	59,459	52,978	55,627	58,955
Split-Dalmatia	31,902	34,067	36,357	39,975	45,244	47,367	51,976	59,909	61,638	57,913	56,834	60,007
Istria	52,758	58,465	64,198	70,968	77,385	79,767	84,876	92,960	95,132	94,161	92,578	96,576
Dubrovnik-Neretva	36,162	38,864	40,577	45,797	53,237	57,846	62,764	74,179	76,342	73,151	71,122	72,905

Source: CBS Release No.12.1.2, February 14th 2013, February 14th 2014

As shown in the above table the Croatian economy has accumulated a loss of 12% in the period of 2008 – 2013. In the beginning of 2014 it was a macroeconomic experts' opinion that the economy will consolidate in 2014 and start growing slowly in 2015. The expectation was based on the existing structural disproportions which were likely to be overcome in the following couple of years, more exhaustive use of the EU structural funds, steady tourist demand, recently accomplished privatization of ship building sector, and some potential major investments (Framework Plan and Programme of the Offshore Exploration and Production of Hydrocarbons in the Adriatic, construction of the mainland – Pelješac peninsula bridge and similar). Summary of these projections is presented in Table 68.

Three months later the opinion changed as the economy was still revealing negative trends. Most recent data showed that the projected stagnation in 2014 would hardly come true and the experts projected that the economy would skip the stagnation phase and start growing right away in 2015 (Table 69). The credibility of such prognoses has obviously been diminishing so that less and less experts dare to project the point at which the indices will finally get a positive sign.

Table 68. Summary of macroeconomic projections for the 2013–2015 period, produced in January 2014

	2013 – estimate	2014 – projection	2015 – projection
Real GDP (% change)	–0.7	0.0	1.0
Exports of goods and services (constant prices,% change)	–1.8	1.0	2.8
Imports of goods and services (constant prices,% change)	–1.3	–0.1	2.3
Consumer prices (% change, period average)	2.2	1.2	2.1
Exchange rate, HRK/EUR (period average)	7.57	7.62	7.62
Unemployment rate (registered,%, period average)	20.3	20.5	20.0
Real investment (% change)	–0.3	2.6	4.4

Source: Croatian Economic Outlook Quarterly No. 57, the Institute of Economics Zagreb, January 2014

Table 69. Summary of macroeconomic projections for the 2014–2015 period, produced in April 2014

	2014 – projection	2015 – projection
Real GDP (% change)	–0.5	0.7
Exports of goods and services (constant prices,% change)	1.3	2.7
Imports of goods and services (constant prices,% change)	–0.8	2.1
Consumer prices (% change, period average)	0.6	1.8
Exchange rate, HRK/EUR (period average)	7.62	7.62
Unemployment rate (registered,% period average)	20.5	20.5
Real investment (% change)	0.1	3.4

Source: Croatian Economic Outlook quarterly No. 58, The Institute of Economics Zagreb, April 2014.

It should be noted that the Croatian experts are not alone here. The experts of the International Monetary Fund (IMF) apparently have the same methodological problems concerning downward sloping economies. In April 2013 they observed that the Croatian GDP (constant prices) was going down and projected that the decline would accumulate to –0.2% by the end of the year. In 2014 it was expected to grow by 1.5% and continue growing by 2% in 2015[19]. Thirteen months later, in May 2014, IMF experts changed their projections same as their Croatian colleagues: “Growth prospects face another contraction in 2014, followed by a gradual recovery from 2015 on. Staff forecasts another real GDP decline of 0.8 percent in 2014.” [20] The optimism is pushed further into the future. It is projected now that the economy will recover in the course of 2015 and grow by 0.5%.

Experts’ opinions of course, do not stand as official projections and there is no national (or regional) economic policy that would have the above ever changing projections as a goal. On the other hand, population projections provided by the Croatian Bureau of Statistics stand as the best available projections with a remark that Croatia does not have a demographic policy either.

Projections are not the only area with analytical problems. An additional technical problem arises at the very beginning of the discussion about the structure of the economy. Knowing that the activities in the Coastal Zone need to be analysed sector by sector, tourism should be analysed separately. This sector has direct and indirect effects on a range of economical structures on the coast and reveals a multiplier particularly evident in the traffic sector, retail, public services and several other sectors. These economic relations require an intersectoral analysis (input/output analysis). Nevertheless, this analysis is not possible since the last input/output (I/O) table of the CBS was released as back as 2004. The crisis that sunk the Croatian economy in 2008 is still ongoing, and the economy structure has significantly changed in the past six years. Semi-product consumption in the I/O table from 2004 has considerable differences from the actual semi-product consumption in 2014.

[19] International Monetary Fund, World Economic Outlook Database, April 2013
[20] International Monetary Fund Country Report No. 14/124, May 2014

4.2 Land use planning

The only projections made to back up the policy are those found in county physical plans. The county plans become legal documents after adoption at the county level and verification at the national level. Population projections appear in the county plans as a basis for determining the size of future construction areas. Projections made for the Split-Dalmatia County Physical Plan in 2012 may serve as one of many examples found in county physical plans along the Croatian coast.

Table 70. Population projections in chosen towns/municipalities of Split-Dalmatia County

Town/municipality	Census 1981	Census 1991	Census 2001	Census 2011	Increase/ decrease	Prognosis 2015
Imotski	8,911	9,935	10,213	10,902	+6.7%	12,000
Kaštela	24,328	29,168	34,103	38,474	+12.8%	42,000
Split	176,303	200,459	188,694	178,192	–5.6%.	225,500
Jelsa	3,938	3,861	3,656	3,560	–2.6%	4,400
Komiža	1,917	2,255	1,677	1,509	–10.0%	2,500
Milna	1,102	1,118	1,100	1,009	–8.3%	1,500
Supetar	2,815	3,324	3,889	4,096	+5.3%	3,700
Solin	13,980	15,410	19,011	23,985	+26.2%	19,000

Source: Split-Dalmatia County Physical Plan, 2012, p. 88

Projected population rise in the LGUs that have been losing population and projected decline where the population has been rising can be found in most of the counties' physical plans in the Coastal Zone. The projections are presented with no methodological explanations and appear unrealistic and even contradictory, rounding the picture of unreliability of projections of the Croatian economy and the economy of the Coastal Zone in particular.

Considering land as one of the most scarce and important resources of the Coastal Zone, it is necessary to examine the so called land-take indicator. Construction, especially residential housing and tourism-related building, have caused considerable pressures on the available land. Land-take for housing purposes receives a particular attention.

According to the The Law on Spatial Planning and Construction, land-use in urban areas has to be defined, in terms of built-up (developed) and reserved (still undeveloped) land. As far as housing/residential areas are concerned, this implies housing but also social, public, education, recreation, business, commercial and other uses related to the urban services. The land needed for residential areas is estimated according to the population projections which appear unreliable (Table 70). In addition, available data clearly show that the already existing housing capacities satisfy the needs of population in the majority of LGUs and counties in the Coastal Zone (Table 71). In fact, the Spatial Planning Law (Article 47) does not allow extensions of settlement growth areas in the 1 km wide coastal belt[21] until at least 80% of it has been developed. As majority of settlement growth areas is situated within the coastal belt, current buildable land for settlements should remain within the planned boundaries for quite a long time, probably decades. In order to reach the 80% threshold, each municipality should build 20% more housing units on average, which means that approximately 150,000 new housing units have to be built in the Coastal Zone before further extension of the existing buildable lands for settlements can be allowed. Table 71 indicates the capacity of undeveloped parts of settlement growth areas expressed in number of inhabitants (applying the present average density which is 24.2 inh./ha), number of housing units (applying the present average density which is 16.4

[21] The coastal belt was defined before the ratification of the Protocol on ICZM

housing units/ha) and net floor area of housing units per hectare (presently 1,168 m^2/ha). To sum up, there is room for approximately 50% more people or housing units than there are today, all according to a rather low present average densities.

Consequently, the areas marked as undeveloped and reserved for residential housing in the Coastal Zone appear unnecessary. However, according to the actual physical plans, they cover 213.50 km^2 (1.83%) of the Coastal Zone. Any larger construction is not expected in midst of the crisis, but as the demand for residential housing has been rising at a steady rate for decades, a new construction wave by the end of this decade has to be considered. Environmental consequences could be significant in terms of landscape deterioration, overuse of local and regional water resources and waste water discharged in the karstic underground and into the sea.

Comparison of data from the physical plans with data from the CORINE Land Cover, reveals an approximate structure of the land reserved for residential purposes, considering the existing state (shown in Table 72). The potential residential land encompasses agricultural lands (vineyards, olive groves, fruit trees and berry plants, pastures, arable land), as well as valuable natural resources such as forests, water bodies and wetlands. These areas, in terms of actual and potential agricultural production are already scarce and environmentally vulnerable.

Finally, there could be potential economic losses due to the disappearance of agricultural land, and losses in terms of preservation value of land. The only possible gain would be the construction of second homes. The question of their value exceeding the environmental losses remains open.

Table 71. Lands for settlements in the Coastal Zone, capacity of undeveloped lands within settlement boundaries as assigned in current municipal spatial plans

County	Inhabitants 2011	Inhabitants ZOP 2011	Housing units 2011	Housing units m^2 2011	Developed	Undeveloped	Developable land total
Column	1	2	3	4	5	6	7
Dubrovnik-Neretva	122,568	102,284	57,451	4,400,198	3,406	1,993	5,400
Šibenik-Knin	109,375	75,116	69,280	4,667,253	4,233	2,663	6,896
Istria	208,055	168,227	112,816	8,141,243	7,017	6,724	13,741
Lika-Senj	50,927	11,762	20,302	1,216,354	1,086	353	1,439
Primorje-Gorski Kotar	296,195	265,865	176,373	12,416,251	8,852	2,434	11,286
Split-Dalmatia	454,798	359,820	209,243	14,670,069	9,866	3,803	13,669
Zadar	170,017	151,619	124,292	9,284,693	12,473	4,919	17,392
Total	**1,411,935**	**1,134,693**	**769,757**	**54,796,061**	**46,933**	**22,889**	**69,822**

County	Inh per ha developed	Inh capacity	Housing units per ha developed	Housing units capacity	Housing units m^2 per ha developed	Housing units m^2 capacity
Column	8=2/5	9	10=3/5	11	12=4/5	13
Dubrovnik-Neretva	30.0	48,241	16.9	32,692	1,292	2,327,317
Šibenik-Knin	17.7	64,446	16.4	43,674	1,103	3,109,132
Istria	24.0	162,730	16.1	110,280	1,160	7,850,690
Lika-Senj	10.8	8,533	18.7	5,783	1,120	411,685
Primorje-Gorski Kotar	30.0	58,903	19.9	39,918	1,403	2,841,719
Split-Dalmatia	36.5	92,023	21.2	62,363	1,487	4,439,555
Zadar	12.2	119,033	10.0	80,667	744	5,742,606
Total	**24.2**	**553,910**	**16.4**	**375,377**	**1,168**	**26,722,705**

Table 72. Land-take in the Coastal Zone ("undeveloped" areas reserved for housing, according to the existing physical plans)

County	Coastal zone (km^2)	Agricultural areas (km^2)			Artificial areas (km^2)
		Permanent crops	Pastures	Other	
Istria	1,476.11	1.28	1.43	31.59	12.67
Primorje-Gorski Kotar	2,110.93	0.09	0.38	2.99	9.36
Lika-Senj	1,036.20	0.15	0.32	0.71	1.06
Zadar	2,375.70	2.39	5.27	16.07	15.58
Šibenik-Knin	1,037.75	1.24	4.42	9.02	4.50
Split-Dalmatia	2,080.11	1.64	0.47	12.34	9.08
Dubrovnik-Neretva	1,574.71	3.13	0.30	6.04	0.40
Total	**11,691.51**	**9.92**	**13.00**	**78.78**	**56.26**

County	Water bodies (km^2)	Wetlands (km^2)	Total reserved areas (km^2)	% of total coastal zone
Istria	0.85	-	67.24	4.56
Primorje-Gorski Kotar	0.22	-	23.57	1.12
Lika-Senj	0.09	-	3.53	0.34
Zadar	0.99	0.70	48.02	2.02
Šibenik-Knin	0.33	-	26.62	2.57
Split-Dalmatia	0.43	0.01	24.59	1.18
Dubrovnik-Neretva	0.65	0.06	19.93	1.27
Total	**3.18**	**0.14**	**213.50**	**1.83**

Note: According to the CORINE base, and Labels 2 and 3, the items in the Table have the following contents:

- *Permanent crops refer to: Vineyards, Olive groves, Fruit trees*
- *Other agricultural areas encompass heterogeneous agricultural areas (Arable land, Complex cultivation patterns, Land principally occupied by agriculture, with significant areas of natural vegetation)*
- *Artificial surfaces stand for: Green urban areas, Sport and leisure facilities, Discontinuous urban fabric (less than 80% built up land), Industrial or commercial units, Road and rail networks and associated land, Port areas, Airports, Mineral extraction sites, Construction sites*
- *Forests and semi-cultivated areas involve: Broad-leaved forest, Coniferous forest, Mixed forest, Natural grasslands, Sclerophyllous vegetation, Transitional woodland-shrub, Sparsely vegetated areas, Bare rocks*
- *Water bodies refer to: Water courses, Water bodies, Sea and ocean*
- *Wetlands encompass: Salt marshes, Salinas, Inland marshes*

Reservation of land of such proportions for residential housing has created additional problems in the strategic environmental assessment (SEA). The SEA is provided by the Law on Environmental Protection (Official Gazette 80/13), and by the Act on Strategic Assessment of Environmental Impacts of Plans and Programmes (Official Gazette 70/08). The SEA is obligatory for the plans and programmes at national and regional (county) levels regarding agriculture, forestry, fishery, energy, industry, quarrying and mining, transportation, telecommunications, tourism, waste management and water management. The SEA is also obligatory in the preparation of county physical plans.

At national level the SEA is conducted by the Ministry of Environmental and Nature Protection. When sectoral strategies are prepared, the SEA is conducted by the relevant ministry. At the county level, the SEA is conducted by the relevant county office.

Official web page of the Ministry of Environmental and Nature Protection shows that decisions about preparation of the SEA have been made in the context of only a few strategic documents. As far as the county physical plans are concerned, the SEA was conducted in the case of the counties of Primorje – Gorski Kotar, and Dubrovnik-Neretva. Its scope is under discussion in the Šibenik-Knin County due to the ongoing amendments to the county physical plan.

A question arises whether the SEA will be carried out in the total regarding the amendments of physical plans, or will the LGUs and counties continue to treat the areas reserved for housing as separate practices with a limited SEA scope.

5. Cost of Environmental Degradation – Towards an Estimate

It appears that no particular methodology for assessing economic and social aspects of use of environmental resources in Coastal Zones (ESA) has been generally accepted. The joint ESA for maritime **and** costal part of Coastal Zones has not been even performed anywhere, so that there are really no complete references to rely on. In addition, if the assessment is to be done for the purpose of some official strategy or programme of measures which is to be in line with the official environmental policy and/or international obligations, assessors are left on their own, as there are no formal directives (joint methodology) on how to do it.

The closest binding document is the Marine Strategy Framework Directive – MSFD (Directive 2008/56/EC, 17 June 2008) dealing with the marine environment only. Eleven qualitative descriptors of good environmental status (GES) listed in the Annex I of the Directive also refer solely to the marine environment.

The closest methodological document appears to be the Guidance produced by the Working Group on Economic and Social Assessment of the European Commission (DG Environment)[22]. It is legally non-binding but it strongly refers to the MSFD so that the Guidance may serve well for the economic and social assessment (ESA) of the marine environment, particularly if it is performed as a step in the process of creating an environmental policy and corresponding programs of measures.

The MSFD and the Guidance produced on its basis are thus the best available starting points in creating a methodology of ESA in a Coastal Zone that comprises of sea and coastal belt i.e. when both marine and coastal environment are to be assessed. Three approaches are elaborated in the Guidelines leaving enough room for EU member countries to decide which one is the most appropriate i.e. which could be used best for the assessment of a particular marine environment. All three, the ecosystem approach, the thematic approach and the cost-based approach, appear general and widely applicable, and thus seem appropriate for assessing the marine and coastal environment as well.

5.1 Ecosystem approach

It is suggested in the Guidelines that good environmental status (GES) should be defined, and the existing environmental status assessed in a Business as Usual (BAU) scenario. This will enable the assessor to capture the difference between the scenario that leads to GES and BAU scenario in qualitative and, if possible, quantitative terms.

The BAU scenario is constructed under the assumption that the development/environmental policy (it is assumed that economic development policy implies environmental care) in the Coastal Zone will not change in near future. As the MSFD sets the goal of achieving GES in 2020, near future may appear too near so the scenario is expected to cover the period till 2030. The BAU does not imply that policies will not get more efficient and that development will continue on the existing, perhaps insufficient, level of

[22] EU Commission, DG Environment, Working Group on Economic and Social Assessment: Economic and Social Analysis for the Initial Assessment for the Marine Strategy Framework Directive: a Guidance Document, 21 December 2010

environmental protection. There are already enough legalized standards to be met and new measures to be introduced on the basis of EU directives and international agreements so that it should be assumed that the development policy will imply better and better care of the coastal and marine environment under the BAU.

It follows therefore that the BAU scenario does not necessarily imply that the development will not be environmentally sound and that GES will not be achieved by 2020. Should projections show that this is possible, and even probable, the policy recommendations will be straightforward as policy makers will have to continue implementing the existing polices. The 2020 goals, however, are set so that the BAU scenario is expected to picture a development which will not lead to GES in due time, meaning that development/environmental policy will have to improve. In a growing, or at least stagnant, economy this part of the analysis does not reveal conceptual problems, as the analyst deals with the usual projection techniques and usually has enough data. If the time series of data are long enough the scenario may not turn out environmentally sound but it will be credible.

The analysis then has to proceed with a scenario in which an improved development/ environmental policy secures good environmental status in due time. Such a status can easily be pictured in terms of the following 11 descriptors[23]:

(1) Biological diversity is maintained.
(2) Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystems.
(3) Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a healthy stock.
(4) All elements of the marine food webs occur at normal abundance and diversity capacity.
(5) Human-induced eutrophication is minimised, especially the adverse effects thereof.
(6) Sea-floor integrity is at a level that ensures that the ecosystems are safeguarded.
(7) Permanent alterations of hydrographical conditions do not adversely affect marine ecosystems.
(8) Concentrations of contaminants are at levels not giving rise to pollution effects.
(9) Contaminants in fish and other seafood for human consumption do not exceed levels established by Community legislation or other relevant standards.
(10) Properties and quantities of marine litter do not cause harm to the coastal and marine environment.
(11) Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment.

These descriptors are listed in the MSFD as qualitative statements. The ideal assessment method defines a set of environmental services (ESS) as the basis to estimate individual ESS provided by the marine environment in ideal conditions of the GES and to estimate them under current conditions. In the case of ESA of both marine and coastal environment, one has to add a couple of descriptors in order to capture the status of coastal environment as well.

The difference between higher (providing for the GES) and current, lower level of environmental services (not providing for the GES) is shown in Figure 10. It points at sectors and activities that use ESS in an unsound way and cause environmental degradation. The descriptors rely on either expert judgements or on a set of particular indicators, but the starting point is always the value of the overall environmental service, preferably broken down to values of particular services. In principle, once the

[23] Marine Strategy Framework Directive ANNEX I (Directive 20089/56/EC)

value of an environmental service has been estimated, it is easy to estimate how much of it has been lost due to degradation i.e. to what extent the decline in indicator as shown in Figure 10 is worth in money terms. What does appear as a problem is the lack of data so that the ESS approach has not been utilized in the actual ESA studies produced so far. It was confirmed that ESA reports produced in Germany, the Netherlands and the UK did not use the ESS approach[24]. Given the very limited data on the functions of ESS in the Croatian marine/coastal context, it is unclear how it could be used in Croatia.

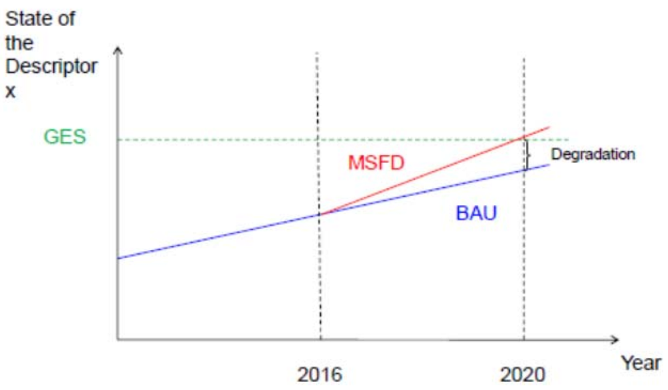


Figure 10. Environmental improvements under different development/environmental policies.
Source: Economic and Social Analysis for the Initial Assessment for the Marine Strategy Framework Directive: A giudance document, a non-legally binding document; Working Group on Economic and Social Assessment, 21 December 2010.

5.2 Thematic approach

Estimation of the costs of environmental degradation based on the thematic approach also relies on the desirable GES status. It begins with the identification of sectors influencing the environment and focuses on specific topics (environmental pressures) within the particular sectors. In the second step, the existing state of environment should be compared with the GES, and then the consequences originating from the existing differences (degradation) should be evaluated.

Basically, the two approaches bear the same idea, expressed in the difference between the existing state (or the BAU scenario) and the GES; the difference lies in the way the discrepancy and its consequences are going to be expressed and evaluated (either through the eco system services, or benefits lost in economy and society).

If there are enough data to calculate the values of a long set of indicators that are to back 11+ descriptors, it is possible (not easy though) to estimate investments needed to reach the GES. If, for instance, the concentration of SO_2 in the air is taken as one of the indicators that will be used to back the descriptor that describes the good status of air, and if it appears that there are more than 250 micrograms of SO_2/m^3 i.e. that the maximum allowed concentration has been exceeded, it is possible (again, not easy) to estimate the investment needed to secure environmentally sound continuation of production responsible for the SO_2 emissions. As SO_2 is not the only contaminant, the list of indicators required to back the descriptor may be quite long.

[24] The UK study lays out the ESS approach and collects some data related to cultural and recreational benefits of reduced fish stocks, presence of litter on beaches, deterioration of sea bed and its impacts on divers and declines in sea birds. However, it recognizes that these are only a few of the categories of ESS that are important and notes many difficulties in the valuation.

During a monitored period the economic activities are supposed to continue under the existing policies. Moreover, they are expected to gradually improve from an environmental point of view as in the ESA based on the ESS approach. It is not expected, however, that improvements will secure the GES till 2020 (BAU – blue line in the graph). The GES will be secured if the policies foster the production to successfully grow and meet all additional environmental standards that are, or will be, introduced. In this way the GES may be achieved in due time (red line in the graph).

The red line scenario thus implies that additional (presumably higher or much higher) environmental standards will be met and assumes that all the corresponding investments and additional costs will be incurred. This pictures the development of the Coastal Zone economy which implies a more efficient development /environmental policy and secures the GES by 2020 and further. The social part of the scenario is not given an equal ponder, however. It is suggested that the social assessment of environmental degradation be absolved by including economic indicators that directly or indirectly refer to both economic and social side of the picture (income after tax, unemployment, and similar). As no social descriptors are proposed, these indicators alone are supposed to show whether the social component of the ESA has been acceptable; if income and employment are increasing and if unemployment is decreasing the social situation in the Coastal Zone is satisfactory. On the other hand it can be argued that this has nothing to do with the environment as GES could also be achieved if the economy grew steadily and environmentally friendly even if it is not friendly to the poor and unemployed.

The methodology thus boils down to two estimates and two projections:

- Estimate of the current levels, features and trends of economic activities in the Coastal Zone by means of usual key indicators (GDP, employment, environmental investments, costs of environmental protection…);
- Projections of economic activities till 2020 or even 2030 based on trends in the Coastal Zone and in the wider region, expected structural shifts, possible forthcoming comparative advantages etc., and gradually improving development/environmental policy (BAU);
- Projections of economic activities till 2020 or even 2030 based on trends and expectations and significantly improving development/environmental policy targeted on the GES in 2020;
- Estimate of additional environmental expenditures required to ensure that the GES targets are met if economic activities are consistent with the GES.

Provided that both projections are credible, the difference between the projected environmental expenditures under the BAU and the costs required to get to the GES can be viewed as the overall cost of upgrading the marine and coastal environment so that the GES indicators are met. At the same time the difference can be viewed as a proxy for the costs of degradation. If the GES is not met the amount of money that should have been invested in order to meet it but it was not, can be viewed as policy makers' and entrepreneurs' implicit valuation of environment and even of reduced ESS. On the other hand, if we believe that the benefits of the GES exceed the costs, which is most often the case, the costs of upgrading the marine and coastal environment (which should have been carried out, but wasn't) will appear as an underestimate. In any case the problems accumulate because the current negative trends of GDP of the Croatian economy and rising unemployment cannot be meaningfully used in projecting economic performance in the near future, let alone in the long run. Besides, the existing level of environmental policy implementation does not provide a basis for projecting economic recovery coupled with an efficient environmental policy. In such circumstances a BAU scenario that implies gradually improving development/environmental policy cannot be based on any credible assumptions. The scenario that implies significantly improving development/environmental policy is even less credible making the difference between the two hardly credible at all. The cost of environmental degradation, which is the most important ESA result, can be based only upon experts' opinions and expectations. A standard methodology used in the conditions of economic growth is not applicable here.

5.3 Cost based approach

Cost based approach relies on the idea that the efforts and means invested in the prevention of environmental degradation will result in the benefits provided by the environment in the future. In other words, the prevention costs can be treated as the lowest level of degradation costs, that is, the cost that would otherwise be higher.

The starting point is not the value of environmental services (cost based approach does not rely on the GES) but the costs related to making the activities in the Coastal Zone environmentally sound. How to achieve the GES is thus approached via existing costs of environmental protection and the existing environmental standards (indicators). This is why all relevant existing environmental legislations need to be identified, along with the existing environmental protection costs on all levels.

5.4 Croatian case – costs of degradation of the marine and coastal environment

5.4.1 Cost based approach

Estimation of costs of degradation of the Croatian marine and coastal environment faced a number of methodological and practical problems. Eventually, the cost-based approach was made due to several reasons:

- Firstly, the ecosystem and thematic approaches could not be implemented due to a simple fact that the GES for the coastal environment has not been defined yet;
- Secondly, although the links between the human activities and their impacts on the environment are known, they have not been specified enough to allow for quantification. Consequently, the impacts of diminished environmental services on human activities could not be quantified either;
- Thirdly, no reliable projections of economic growth could be made even in the short run.

The cost-based approach was applied in such a manner that the costs of existing and/or planned measures and activities for environmental protection have been identified (not entirely however, as it is almost impossible to break down some figures from national to the Coastal Zone level).

This primarily refers to the government costs, but also, to a certain extent, to the costs occurred at the county levels. Table 73 presents the costs referring to the MSFD and to the ICZM Protocol. In this way, the costs related to the activities in the sea are coupled with costs related to the activities on the coast and in islands (bearing in mind that these are certainly not total costs, but only those for which there is data in authorised institutions).

Table 73. Costs of degradation (in 000 Euros)

Action	Source	Amount Spent	Additional Amount Planned	Note
Rehabilitation of landfills	Counties' offices Primorje-Gorski Kotar			
	▪ Sović Laz	143.55		Total costs until the end of 2013 (project documentation)
	▪ Sorinj	270.27	4,435.00	Total costs until June 2014 (project documentation); estimate of total investment according to the list of expenses
	Istria	9,906.79	11,670.80	Total costs until June 1st 2014; Planned funds for the final rehabilitation according to incomplete projections
	Šibenik-Knin	8,823.60	18,933.33	Costs for the landfills Bikarac and Šljukine njive; Estimated value of the rehabilitation costs for the remaining landfills
Waste management centres	The Environmental Protection and Energy Efficiency Fund; Counties' government offices			
	CGO Kaštijun (Istria)	11,029.33	35,000.00	Total estimated value of the project; expenses reached until June 1st 2014
	CGO Marinščina (Primorje-Gorski Kotar)		36,500.00	Total estimated value of the project; Co-financing IPA III – OP environment secured 87,807.661 euro
	CGO Bikarac (Šibenik-Knin)		20,000.00	Total estimated value of the project
	CGO Biljane Donje (Zadar)		57,000.00	Total estimated value of the project
	CGO Lučino Razdolje (Dubrovnik-Neretva)		28,000.00	Total estimated value of the project
	CGO Lećevica (Split-Dalmatia)		59,000.00	Total estimated value of the project
Renewable energy sources	Government offices of the County Primorje-Gorski Kotar	13.00	110.67	Budget for 2014 (123,600 euro in total)
Prevention of Forest Fires	Counties' government offices			
	County of Primorje-Gorski Kotar	20.00		January-June 2014
	County of Šibenik-Knin	7,567.50		Cost of fire department interventions 2010-2012.
Road maintenance	Government offices of the County of Primorje-Gorski Kotar	10.20		Planned for 2014

Action	Source	Amount Spent	Additional Amount Planned	Note
Implementation of a single information system (comprising all environmental elements in coastal and marine environment – the GIS base)	Environment Protection Agency		900.00	Estimated total costs for the period of three years (2014–2016)
Perennial programme for water regulation and protection facilities, as well as melioration facilities	Croatian Waters			
	Protection from harmful effects of water		183,547.87	Total investment value for the Adriatic basin project; out of which for the period 2013–2017 79,238.990 Euros were planned, and the remaining sum for the period 2018–2022
	Irrigation		222,237.96	Estimated total costs for all Adriatic counties; out of which 86,059.340 euro was planned for the period 2013–2017, and the remaining sum for the period 2018–2022
Water Information System	Croatian Waters		2,666.70	Estimated costs of completion
			300.00	Estimated cost of maintenance
Waste water collection and treatment	Croatian Waters	17,756.00	26,533.00	Data for 2011
Bathing waters quality monitoring	Ministry of Environmental protection and nature; Environment Protection Agency; Counties' budgets	559.29		Data for 2011
Vessels for marine emergency and sea cleaning	Ministry of Environmental protection and nature	380.00		Overhead expenses for 10 ships; data for 2010
MSFD implementation	Ministry of Environmental protection and nature	43.39		Draft of the document "Initial assessment of the marine environment state and pressures"; data for 2011
New marine monitoring system	Ministry of Environmental protection and nature	3,350.00		Development, equipment; creating an integrated informational platform; data for 2011
Fisheries operational programme 2007–2013	Ministry of Agriculture-Directorate of fisheries			Stake in co-financing for all priority axis: - EFF 75% - RC 25%
	Measures to adjust the Croatian fisheries fleet		6,010.00	
	Mariculture, freshwater fishing and the processing and trading of fish and other fishery products		5,010.00	
	Technical assistance		580.00	

Action	Source	Amount Spent	Additional Amount Planned	Note
Costs of implementation of the Intervention plan for accidental marine pollution for the County Dubrovnik-Neretva concerning the pollution of sea and the coastal zone by debris from November 21st till December 8th 2010	County of Dubrovnik-Neretva County operational centre for the implementation of Intervention plan for accidental marine pollution	105,900.94		Each year a certain amount is spent for the rehabilitation of sea and Coastal Zone polluted by debris; in the County Dubrovnik-Neretva, in the area of Dubrovačko primorje LGU in 2014 this amounted to nearly 13,350.00 euro
The costs of coast guard independently monitoring the sea	Ministry of Defence of the RC Coast guard of the RC	525.00 807.66 641.34		In 2011 In 2012 In 2013

Note: The calculations were based on the exchange rate 1 Euro = 7.5 HRK

It is necessary to stress that the analysis status of the marine environment, according to the defined descriptors, revealed that the status of the Eastern Adriatic environment is rather satisfactory. Therefore the costs of the activities necessary to maintain this status were taken into the account. Nevertheless, there are some open issues, referring to the new requirements imposed by the EU legislation (monitoring of mammals, heavy metals in sediment, underwater noise, marine litter etc…). Monitoring system that would cover these issues has yet to be established, and the costs cannot be estimated at the moment. Moreover, there are some actions and, consequently, costs, that have to be created and incurred at regional level, together with other countries that share common stocks with the Republic of Croatia (e.g. fish stocks, GSA17). These are still to be defined and therefore are not included in the table below.

The observed insufficiency of data collection system and consequential lack of data lead to the conclusion that cost-based approach should be replaced with thematic approach, at least in the medium term period (some guidelines towards this end are given in Recommendations). Ultimately, the ecosystem approach should be applied, but it has to be introduced gradually, along with improvements of data collection system.

5.4.2 Towards the thematic approach

During the analysis of human activities and economic sectors, it became quite evident that development/environmental measures are insufficient in some quite pressing areas, and also that some of the existing practices have to be changed. The two examples are thus presented below, not in order to evaluate precisely the costs of degradation but to shed some light on the problems. This will, hopefully, support future efforts towards implementation of the thematic approach when evaluating the costs of environmental degradation.

Example 1. Extensive water use in touristic sector

According to some standards in the Mediterranean region, acceptable maximum use of water per tourist overnight ranges from 270 to 320 litres[25]. The analysis of some randomly chosen hotels of 4 stars

[25] International Tourism Partnership

category in the counties of Split-Dalmatia and Istria has indicated that the use reaches 1,000 litres per overnight. Therefore, it can be stated that the water consumption is unreasonably high, and that the water resources are not used in a responsible manner. Expressed in monetary terms, the figure reaches over 1 million euro only in the Split-Dalmatia County in 2013.

Obviously, this is not a pure cost of degradation, but it calls for the implementation of some additional measures and instruments in the tourism accommodation sector.

Therefore, in future estimations of the costs of degradation, monetary value of the total extra spent water in tourism accommodation sector could be taken as the cost if thematic approach is applied. On the other hand, if the estimation continues to be based on the cost approach, the costs of the implementation of new measures and standards with the purpose of reducing water use in tourist sector should be taken into account.

Example 2. Land-take for housing vs. vineyards and olive groves

In the previous chapter (Table 72) the loss of land (land-take) planned for residential areas was calculated. It was shown that it could result in loss of permanent crops, more precisely in 311 ha of vineyards, and 452 ha of olive groves.

Building the estimate on the data on average annual production in the Coastal Zone (see chapter on Agriculture), this would imply an annual loss of production of wine and olive oil valued ca 2 million euro. Consequently, some changes in the physical planning practices and some new standards need to be defined and implemented.

Again, if the thematic approach is applied, the costs could be expressed in the value of production lost. This could also lead to further elaboration, and possible inclination towards the ecosystem approach, namely contingent evaluation (all values lost would be calculated then – value of land, value of trees, income lost etc.). If the cost-based approach was applied, the costs implementation of new measures and standards should be taken into account.

In the remainder the focus is moved to recommendations that should be taken in account in building of an information system that could facilitate future efforts in estimating the costs of environmental degradation. Such a system could be used in the course of strategy preparation, implementation, and monitoring and evaluation, as well.

6. Recommendations

Recommendations provided in this chapter are based on several requirements. First of all, they should serve as inputs in the course of creating a joint marine and coastal strategy for the Republic of Croatia. However, in order for the methodological approach proposed for marine strategies to be applied in the joint strategy as well, three requirements have to be fulfilled regarding the coastal part of the strategy: making an initial assessment of the existing environmental status, choosing the descriptor for the GES, and setting the goals for each descriptor. Finally, common policy measures and monitoring of the marine and coastal environment need to be created.

6.1 Territorial coverage

Throughout the making of the socio-economic analysis and from different standpoints, defining the search area resulting from the demand for joint strategy has been a repeated problem.

Namely, as can be seen in the beginning of this document, the sea and the Coastal Zone are a subject of numerous directives, protocols and state legislations, and each defines the area of implementation from a different standpoint, which is logical. But, consequently, inconsistencies arise when the requirements of several documents need to be merged with the purpose of management, as it was the case with this study. Thus certain LGUs are not in the scope of the study, although, for example, the criteria of some other regulations include all the surrounding LGUs. This will result in problems extremely important for the functioning of management system and implementation of certain policies.

Therefore, the revision of criteria for defining the scope of implementation of the ICZM Protocol is advised. Coverage based on the level of counties, that is, consequently, the Adriatic region as a whole, is suggested. Even more so, because the majority (in number and intensity) of environmental pressures on the sea, and especially the Coastal Zone, cannot be resolved – development wise – if the total area of Adriatic counties is not developing as well.

6.2 Database

Insufficiency of the required data and inefficiency of the existing ways of collecting data for interdisciplinary analyses have been observed as the main obstacle to the assessment of cost of environmental degradation. The existing ways of collecting data are inefficient because of environmental expenditures as well. The majority of data is available only on yearly basis, for both the county and state levels. The data for local budgets and entrepreneurs are available on county/town level, as well as the value of development index for LGUs. Availability is not without delay. Very few data (employment records, water infrastructure) are published by the end of the year when they were collected. Fiscal information is available with a minimum delay of one year, whereas the counties' GDP and GVA have a delay of three years, etc.

Availability implicates not publishing data (particularly financial) of some public sector institutions.

It has also been observed that the obstacle could be overcome as forthcoming activities of institutions in charge of data collection and formation of data bases appear well coordinated and harmonized with the EU requirements.

Based on the Law on Official Statistics (Official Gazette 103/03, 75/09, 59/12 and 12/13), Central Bureau of Statistics in cooperation with other suppliers of official statistical data prepares the Programme of Statistical Activities. Bodies authorized to perform activities of official statistics are: the Environmental Protection Agency, the Croatian Agency for Postal and Electronic Communications, the Croatian National Institute of Public Health, the Ministry of Finance, the Ministry of Agriculture and the Ministry of the Interior. The programme of Statistical Activities is prepared for a period equivalent to the period defined by the EU Statistical Programme. It defines development goals of official statistics, main results to be arrived at and disseminated, the most important infrastructure and development activities, responsible suppliers of official statistics and the administrative source of data. The starting point for the development of the Programme of Statistical Activities is the Strategy for the Development of Official Statistics in the period 2013–2022. Starting point in preparing the Programme is user needs, as well as EU requirements stated in Statistical Requirements Compendium.

As the Programme is formulated in accordance with the users' needs, it can be amended to include additional users' requirements. Amendments to the Programme shall be carried out in accordance with the provisions of the Law on Official Statistics. In order to implement the Programme, the Annual implementation plan is prepared.

The Programme of Statistical Activities for the period 2013–2020 was accepted on May 24, 2013.

There are couple of themes in the chapters 4 and 5 of the Programme relevant for integrated coastal zone management in general and for the implementation of the Marine and Coastal Strategy in particular:

- **4.08 – Statistics of rural and coastal areas and islands**; the main expected result: "Establishing a collection system for data on coastal areas and islands – data sets on population, economic data, transport, tourism and agricultural data" and "Collection of data from statistical research and compilation of available data from administrative sources"
- **5.03 – Environmental statistics**;
- **5.05 – Geographical and local information**; the main expected result: "Entering Eurostat Geographic Information System – GISCO; a GIS-supported database of official statistics will be developed for the whole of Croatia, graphic and statistical data will be connected in the field of demography, manufacturing and energy, construction, tourism, trade, agriculture, forestry, fisheries and others; work with databases of different registers maintained by CBS will be integrated. The Inspire Directive[26] will be applied and set of data that could be included in the NIPP[27] will be identified; it contains a set of measures, standards, specifications and services aimed at establishing a framework of e-government to ensure efficient management, exchange and use of georeferenced spatial data;
- **5.09 – Environmental and climate change accounts** which include the following modules: monetary accounts for environment and natural and hybrid accounts for the environment; main expected results: "Costs for environmental protection and revenues from activities related to environmental protection, taxes for environmental data for environmental goods and services sector" and "Data for the air emissions accounts and environmental – wide material flow accounts". Annual Implementation Plan of Statistical Activities for 2014 (OG 21/14) determines no less than 300 statistical studies, 194 of which will be made on the basis of direct data collection. Besides, 62

[26] DIRECTIVE 2007/2/EC of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)
[27] Nacionalna infrastruktura prostornih podataka (National Infrastructure of Spatial Dana)

statistical research projects based on administrative sources or methods of monitoring and 44 development activities will be performed.

Following activities are planned in the field “Multi-domain statistics” in 2014:

- participation in IPA 2011 programme on Water statistics;
- pilot-study for development of environmental accounts within European statistical system (ESS) financed by Eurostat grant 2013; module “Environmental expenditures”, project will be continued in 2015; module “Environmental goods and services”, project will be continued in 2015; module “Energy statistics” – methodology for compilation of reporting tables to Eurostat for physical flows of energy;
- further development of Spatial statistical register of Central Bureau of Statistics.

Activities performed by the CBS in the last couple of years, and the achieved level of coordination with the corresponding institutions, have been quite promising. CBS appears quite able for an additional effort aimed at establishment of data bases required for the formulation of ICZM policy in the Coastal Zone and monitoring the policy results.

6.3 GES and descriptors for the coastal area

Eleven descriptors, as defined by the MSFD, cover only the marine environment. Their role in the formation of environmental policy may not be unavoidable, but they are crucial for monitoring the effectiveness of policy measures.

Additional descriptors are thus needed to cover the assessment of environmental status of coastal zones and islands and allow for the assessment of effects of the development/environmental policy on the entire marine and Coastal Zone, as well as on the socio-economic development. Potentially possible qualitative descriptors of good coastal and insular environmental status are compared with descriptors as defined by the MSFD in the Table 74.

Descriptors are defined as individual goals to be reached in order to achieve the GES. They are all necessary as failing to reach some of the individual goals means that the GES has not been achieved. Extended to cover economic and social development aspects, the descriptors could serve as individual goals that are to be reached in order to achieve a Good Economic/Social Status as well, and provide grounds for evaluation of an integrated economic and environmental policy. Some possible socio-economic descriptors are:

- DESCRIPTOR: The economy in the Coastal Zone has reached full employment.
- DESCRIPTOR: The structure of the Coastal Zone economy is balanced in a way that resources are used sustainably and that competition in land use is brought to a minimum (land take is balanced).
- DESCRIPTOR: Energy supply is based on renewable resources to the maximum extent.

Such descriptors can be based on a set of indicators derived from the data already being collected, and on data that will be collected and processed as planned by the Programme of Statistical Activities of the Central Bureau of Statistics.

Table 74. Qualitative descriptors for monitoring and evaluation of the Marine and Coastal Strategy

Marine environment	Coastal and insular environment
Biological diversity is maintained.	Biological diversity is maintained and enhanced. The quality and occurrence of coastal habitats and the distribution and abundance of coastal species are in line with the prevailing hydrographic, geographic and climatic conditions.
Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystems.	Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystem
Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a healthy stock.	
All elements of the marine food webs occur at normal abundance and diversity capacity.	All elements of the coastal food webs occur at normal abundance and diversity capacity.
Human-induced eutrophication is minimised, especially the adverse effects thereof.	
Sea-floor integrity is at a level that ensures that the ecosystems are safeguarded.	
Permanent alterations of hydrographical conditions do not adversely affect marine ecosystems.	Permanent alterations of conditions do not adversely affect coastal ecosystems.
Concentrations of contaminants are at levels not giving rise to pollution effects.	Concentrations of contaminants in the soil and in ground and underground water flows are at levels not giving rise to pollution effects.
Contaminants in fish and other seafood for human consumption do not exceed levels established by Community legislation or other relevant standards.	Contaminants cause no significant impact on coastal ecosystems and human health.
Properties and quantities of marine litter do not cause harm to the coastal and marine environment.	Properties and quantities of litter do not cause harm to the karstic ground and underground environment. Marine and coastal litter do not adversely affect coastal environment.
Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment.	Introduction of energy, including noise, is at levels that do not adversely affect the coastal and insular environment.
	The natural dynamics of coastal areas is maintained and coastal ecosystems and landscapes are preserved.

6.4 Monitoring

The existing monitoring and observation system in the Coastal Zone should be improved and harmonised with the demands of MSFD in order to enable policy makers and other stakeholders to track changes in both marine and coastal environment. Apart from identification and harmonization of data (as described in 6.2), the sources and procedures of data collection need to be identified. It is particularly important to identify the data and descriptor monitoring procedures related to social aspects. Furthermore, a financial framework for implementation needs to be established, as well as authority of certain institutions in implementing the monitoring of certain components of the monitoring and observation system.

For the needs of economic, social, as well as environmental analysis, the necessary data from all sectors – public, private and civilian need to be provided.

Moreover, a joint information system needs to be developed. Its aim is not only to store and organize the collected data (especially the demand to publish and collect the existing data, in public sector in particular), but also to enable simulations of the consequences of potential decisions, programmes, measures and policies on the environment (coastal and marine), economic activities and society. The information system should be shared between all relevant institutions. Relevant data need to be accessible to the general public.

6.5 Good management status – GMS

In the ICZM framework, it is crucial to achieve a satisfactory level of integration of different activities in the management process, and of different stakeholders involved in the process. In addition, marine and coastal descriptors should be drawn and corresponding indicators and monitoring requirements defined. This will result in a set of tools for the monitoring and assessing the functionality of management system (institutions, success and efficiency of measures, etc.), both in terms environmental protection (regarding marine and coastal environment) and the sustainable development of the Coastal Zone.

6.6 Possible methodological improvements – towards formulation of measures and their impacts

In Chapter 3 the “balance” between environmental pressures (urbanization and economic activities) and environmental expenditures was assessed. The main idea was to get an insight into the costs and benefits to/from the environment in the LGUs involved in the implementation and preparation of the marine and coastal strategy. This analysis was limited due to data inaccessibility.

Based on the proposed monitoring system (including social and economic data and indicators), this approach could be further developed. Its main role could be seen in the framework of elaboration of measures for the preservation and improvement of marine and coastal environment. It could provide information on “disbalance” and pinpoint the LGUs where additional measures need to be undertaken. It could provide information on “affordability” of measures regarding the households, LGU budget and local economy. In addition, it could be applied to both individual short-term measures and medium-term sets of measures (in terms of additional costs). These data, along with the data on LGUs’ fiscal capacities, could lead to the conclusions on the exemptions and derogations as well.

This analysis did not consider possible climate change costs. Namely, such an analysis is being run as a part of a “MedPartnership” project. Its results will be taken into consideration in the next phases of preparation of the marine and coastal strategy, as well as for the future improvement of the suggested method.

Last, but not least, the state of the marine and costal environment in the Coastal Zone is fairly satisfactory. There have already been significant efforts, and to maintain this state more needs to be made in the future, bearing in mind the future development in certain economic sectors and the needs of inhabitants of the Coastal Zone. These efforts relate to all government levels – from local to state, and to civil society and enterprises as well. International cooperation is needed, considering the transboundary resources and effects.

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Appendix

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Gross value added, for Republic of Croatia, statistical regions at level 2 and counties, according to NKD 2007 activities, 2009 (Current prices, million HRK)

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Table I:

Gross value added, for Republic of Croatia, statistical regions at level 2 and counties, according to NKD 2007 activities, 2009 (Current prices, million HRK)

	A	B, C, D, E	C	F	G, H, I	J
Republic of Croatia	**14,409**	**55,191**	**43,877**	**22,449**	**56,585**	**14,316**
Adriatic Croatia	**2,657**	**15,286**	**12,052**	**9,166**	**22,067**	**3,485**
County of Primorje-Gorski Kotar	274	5,581	4,751	1,855	5,731	968
County of Lika-Senj	378	226	135	462	514	79
County of Zadar	682	783	504	1,036	1,897	291
County of Šibenik-Knin	158	861	676	456	1,126	206
County of Split-Dalmatia	429	3,274	2,601	2,518	5,477	1,064
County of Istria	431	4,069	3,129	1,804	4,738	537
County of Dubrovnik-Neretva	305	491	255	1,036	2,584	340

	K	L	M, N	O, P, Q	R, S, T	Total
Republic of Croatia	**19,231**	**29,524**	**20,458**	**43,057**	**7,372**	**282,592**
Adriatic Croatia	**4,206**	**12,476**	**5,771**	**12,834**	**2,620**	**90,568**
County of Primorje-Gorski Kotar	951	2,884	1,604	3,152	617	23,617
County of Lika-Senj	61	445	60	542	68	2,834
County of Zadar	530	1,786	621	1,563	273	9,461
County of Šibenik-Knin	257	1,082	293	526	228	5,194
County of Split-Dalmatia	1,330	3,483	1,607	4,051	807	24,040
County of Istria	726	1,825	996	1,836	438	17,401
County of Dubrovnik-Neretva	351	971	591	1,165	189	8,023

Legend:

A	Agriculture, forestry and fishing
B, C, D, E	Mining and quarrying, Manufacturing, Electricity, gas, steam and air conditioning suply
C	Manufacturing
F	Construction
G, H, I	Wholesale and retail trade; repair of motor vehicles and motorcycles, Transportation and storage, Accommodation and food service activities
J	Information and communication
K	Financial and insurance sector
L	Real estate sector
M, N	Professional, scientific and technical activities, Administrative and support service activities
O, P, Q	Public administration and defence; Mandatory social security, Education, Health care and social services
R, S, T	Arts, entertainment and recreation. Other service activities. Activities of households as emplyers

Table II:

Gross value added, for Republic of Croatia, statistical regions at level 2 and counties, according to NKD 2007 activities, 2010 (Current prices, million HRK)

	A	B, C, D, E	C	F	G, H, I	J
Republic of Croatia	**13,648.5**	**55,935.1**	**44,130.7**	**18,594.3**	**55,746.4**	**14,059.7**
Adriatic Croatia	**2,696.8**	**16,121.3**	**12,763.2**	**8,126.8**	**20,733.1**	**2,669.3**
County of Primorje-Gorski Kotar	284.0	6,201.5	5,522.9	1,873.0	5,251.0	717.4
County of Lika-Senj	341.5	194.9	99.4	457.2	457.8	45.5
County of Zadar	738.5	758.3	463.6	793.1	1,713.8	192.6
County of Šibenik-Knin	148.6	889.1	680.3	398.1	1,060.5	111.1
County of Split-Dalmatia	483.3	3,046.9	2,268.2	2,288.3	5,170.5	910.1
County of Istria	390.0	4,605.3	3,543.7	1,346.4	4,424.3	479.3
County of Dubrovnik-Neretva	310.8	425.3	185.1	970.7	2,655.1	213.5

	K	L	M, N	O, P, Q	R, S, T	Total
Republic of Croatia	**19,302.9**	**29,305.3**	**20,196.7**	**42,990.1**	**7,273.7**	**277,052.7**
Adriatic Croatia	**3,988.4**	**12,679.9**	**5,823.1**	**13,052.4**	**2,661.2**	**88,552.3**
County of Primorje-Gorski Kotar	841.5	2,962.0	1,483.9	3,069.9	623.4	23,307.6
County of Lika-Senj	56.1	429.1	64.1	517.5	69.4	2,633.0
County of Zadar	476.9	1,800.1	620.5	1,559.4	289.8	8,943.0
County of Šibenik-Knin	262.2	1,089.4	289.1	917.8	210.7	5,376.5
County of Split-Dalmatia	1,370.6	3,546.0	1,728.7	4,086.5	854.2	23,485.1
County of Istria	669.4	1,867.2	1,054.5	1,768.6	422.6	17,027.7
County of Dubrovnik-Neretva	311.6	986.1	582.3	1,132.8	191.1	7,779.4

Legend:

A	Agriculture, forestry and fishing
B, C, D, E	Mining and quarrying, Manufacturing, Electricity, gas, steam and air conditioning suply
C	Manufacturing
F	Construction
G, H, I	Wholesale and retail trade; repair of motor vehicles and motorcycles, Transportation and storage, Accommodation and food service activities
J	Information and communication
K	Financial and insurance sector
L	Real estate sector
M, N	Professional, scientific and technical activities, Administrative and support service activities
O, P, Q	Public administration and defence; Mandatory social security, Education, Health care and social services
R, S, T	Arts, entertainment and recreation. Other service activities. Activities of households as emplyers

Table III.

Five basic indicators for calculation of the Composite Development Index on the LGU

Local government unit	County	Net income *per capita* 2006.	LGU's revenues *per capita* 2006.	Unemployment rate 2006	Population change 2001/1991	Education attainment rate in 2001
Bakar	Primorje-Gorski kotar	24,227.38	6,557.04	12.50%	103.60	65.70%
Bale	Istria	28,859.75	5,989.82	4.90%	99.15	43.40%
Barban	Istria	24,594.50	1,424.42	7.20%	93.70	51.30%
Baška	Primorje-Gorski kotar	26,598.53	8,979.73	7.20%	108.45	66.30%
Baška Voda	Split-Dalmatia	16,772.29	3,545.90	10.50%	132.17	67.80%
Benkovac	Zadar	15,714.56	1,861.54	16.40%	37.83	42.00%
Bibinje	Zadar	15,041.96	897.39	22.00%	105.14	55.30%
Bilice	Šibenik-Knin	17,922.30	1,955.79	17.00%	133.72	62.30%
Biograd na moru	Zadar	21,712.16	3,760.56	10.80%	99.91	65.90%
Blato	Dubrovnik-Neretva	20,784.03	2,013.15	15.90%	91.33	53.60%
Bol	Split-Dalmatia	20,740.87	9,119.99	10.80%	110.68	65.60%
Brela	Split-Dalmatia	18,176.01	3,362.60	10.50%	106.47	66.20%
Brtonigla	Istria	19,398.49	4,082.33	4.30%	112.45	43.70%
Buje	Istria	20,994.59	2,625.73	3.60%	98.91	58.40%
Cres	Primorje-Gorski kotar	22,952.41	4,984.23	4.20%	99.93	57.80%
Crikvenica	Primorje-Gorski kotar	23,111.38	5,153.45	11.80%	109.51	72.20%
Čavle	Primorje-Gorski kotar	24,427.95	1,675.56	12.60%	104.93	65.50%
Dobrinj	Primorje-Gorski kotar	25,468.39	10,814.77	4.90%	102.16	57.50%
Dubrovačko primorje	Dubrovnik-Neretva	22,288.16	1,332.23	11.50%	94.83	44.50%
Dubrovnik	Dubrovnik-Neretva	25,101.13	5,019.87	11.20%	95.07	74.40%
Dugi Rat	Split-Dalmatia	17,360.77	889.69	18.00%	112.65	66.10%
Fažana	Istria	29,234.09	5,896.40	6.90%	113.59	71.70%
Funtana - Fontane	Istria				0.00	
Gradac	Split-Dalmatia	13,509.38	1,546.13	13.30%	136.85	69.40%
Hvar	Split-Dalmatia	22,333.63	5,431.72	8.20%	100.56	68.80%
Janjina	Dubrovnik-Neretva	12,654.07	2,707.65	21.30%	101.03	47.50%
Jasenice	Zadar	22,211.26	1,583.78	18.80%	74.61	48.00%
Jelsa	Split-Dalmatia	18,606.51	2,940.48	11.80%	95.13	56.90%
Kali	Zadar	21,690.47	2,881.03	8.70%	79.78	48.50%
Kanfanar	Istria	28,058.19	6,084.24	5.20%	92.50	50.30%
Karlobag	Lika-Senj	16,598.39	3,816.84	19.40%	100.10	44.50%
Kastav	Primorje-Gorski kotar	29,384.32	2,900.49	9.60%	149.79	74.80%
Kaštela	Split-Dalmatia	19,716.21	2,427.50	20.40%	117.40	64.50%
Kaštelir - Labinci	Istria	21,295.12	3,624.71	4.90%	102.78	49.90%
Klis	Split-Dalmatia	17,817.00	1,763.00	15.40%	103.30	55.70%
Kolan	Zadar	18,236.15	5,452.98	0.00%	103.77	55.30%
Komiža	Split-Dalmatia	18,718.42	1,530.44	19.20%	75.08	47.60%
Konavle	Dubrovnik-Neretva	25,581.43	4,032.90	10.20%	92.14	59.60%
Korčula	Dubrovnik-Neretva	19,647.46	2,517.53	12.60%	95.72	65.50%
Kostrena	Primorje-Gorski kotar	28,237.05	8,822.09	11.10%	105.90	75.20%
Kraljevica	Primorje-Gorski kotar	24,871.77	2,426.55	8.90%	101.60	71.20%
Krk	Primorje-Gorski kotar	27,582.10	6,656.87	4.60%	111.15	66.30%
Kršan	Istria	20,775.55	5,100.73	9.90%	93.62	51.80%
Kukljica	Zadar	21,482.28	2,680.03	9.70%	76.38	41.20%
Labin	Istria	24,972.24	3,467.12	9.90%	95.24	63.30%
Lastovo	Dubrovnik-Neretva	21,521.82	1,697.46	15.00%	71.17	56.10%
Ližnjan	Istria	26,561.52	3,856.23	5.30%	124.08	66.90%
Lopar	Istria				0.00	
Lovran	Primorje-Gorski kotar	25,374.87	3,772.30	11.50%	91.45	73.50%
Lumbarda	Dubrovnik-Neretva	17,343.40	3,033.31	16.70%	111.98	69.60%
Makarska	Split-Dalmatia	21,843.70	3,939.91	10.80%	115.27	72.70%
Mali Lošinj	Primorje-Gorski kotar	22,837.21	4,878.47	6.30%	95.68	67.10%

Local government unit	County	Net income *per capita* 2006.	LGU's revenues *per capita* 2006.	Unemployment rate 2006	Population change 2001/1991	Education attainment rate in 2001
Malinska-Dubašnica	Primorje-Gorski kotar	25,901.41	10,230.68	5.80%	126.84	69.50%
Marčana	Istria	25,399.68	2,895.33	5.90%	104.96	56.90%
Marina	Split-Dalmatia	15,706.55	2,534.65	21.20%	108.42	43.10%
Matulji	Primorje-Gorski kotar	26,612.08	2,365.96	10.60%	105.00	70.10%
Medulin	Istria	28,779.53	8,257.68	5.70%	177.58	77.20%
Milna	Split-Dalmatia	20,032.64	3,972.19	12.20%	98.84	49.40%
Mljet	Dubrovnik-Neretva	19,722.26	2,493.48	7.00%	92.08	41.40%
Mošćenička Draga	Primorje-Gorski kotar	22,699.95	2,746.69	8.40%	95.76	66.40%
Murter	Šibenik-Knin	15,804.27	3,685.44	9.60%	104.32	60.10%
Nerežišća	Split-Dalmatia	18,331.04	2,981.81	9.90%	86.67	37.90%
Nin	Zadar	19,614.70	3,701.49	19.90%	77.92	48.50%
Novalja	Lika-Senj	17,759.47	8,879.09	13.30%	106.24	56.20%
Novi Vinodolski	Primorje-Gorski kotar	22,693.48	6,553.03	12.30%	108.68	66.20%
Novigrad	Zadar	16,404.17	745.69	13.30%	82.81	40.60%
Novigrad (Istra)	Istria	23,768.02	9,664.80	5.90%	122.78	58.80%
Obrovac	Zadar	18,849.94	1,787.12	31.50%	37.75	51.70%
Okrug	Split-Dalmatia	18,130.62	5,730.94	21.90%	184.39	65.70%
Omiš	Split-Dalmatia	18,021.48	1,862.10	20.30%	100.03	58.10%
Omišalj	Primorje-Gorski kotar	29,363.66	7,220.62	7.00%	111.09	73.20%
Opatija	Primorje-Gorski kotar	27,675.11	6,330.36	9.10%	94.74	77.10%
Opuzen	Dubrovnik-Neretva	15,516.08	1,327.59	25.30%	99.00	59.90%
Orebić	Dubrovnik-Neretva	14,677.94	2,215.23	11.00%	109.23	60.60%
Pag	Zadar	16,707.61	4,020.35	14.80%	107.41	57.90%
Pakoštane	Zadar	13,853.91	2,793.07	12.10%	90.63	46.70%
Pašman	Zadar	17,900.66	2,257.17	10.10%	98.78	46.10%
Pirovac	Šibenik-Knin	15,688.00	2,815.16	19.90%	104.37	54.00%
Ploče	Dubrovnik-Neretva	19,362.85	1,127.02	19.60%	96.84	64.90%
Podgora	Split-Dalmatia	17,188.73	2,507.91	10.40%	101.15	65.10%
Podstrana	Split-Dalmatia	17,745.63	1,616.12	18.80%	140.61	69.50%
Poreč	Istria	26,894.96	6,477.47	5.20%	119.57	68.10%
Posedarje	Zadar	16,107.09	1,103.26	15.80%	88.71	44.30%
Postira	Split-Dalmatia	19,632.18	2,393.36	9.00%	105.02	50.80%
Povljana	Zadar	16,525.78	14,045.57	17.60%	105.75	44.50%
Preko	Zadar	20,942.23	2,772.37	10.50%	85.17	46.50%
Prgomet	Split-Dalmatia	17,895.40	711.37	20.40%	74.40	27.20%
Primošten	Šibenik-Knin	19,104.95	4,256.52	14.60%	103.21	55.80%
Privlaka (Zadar)	Zadar	16,153.61	1,298.46	29.10%	108.43	50.60%
Pučišća	Split-Dalmatia	19,273.37	1,799.97	8.60%	93.86	49.10%
Pula	Istria	26,969.60	3,887.51	7.50%	94.47	71.60%
Punat	Primorje-Gorski kotar	27,160.63	6,348.78	5.70%	104.92	68.60%
Rab	Primorje-Gorski kotar	21,807.04	3,905.36	10.10%	103.60	67.00%
Raša	Istria	22,884.22	2,849.04	9.10%	86.13	50.20%
Ražanac	Zadar	13,150.54	1,079.00	18.30%	83.76	42.60%
Rijeka	Primorje-Gorski kotar	25,404.85	4,203.43	13.00%	88.56	72.50%
Rogoznica	Šibenik-Knin	17,947.61	4,095.47	14.30%	113.05	48.50%
Rovinj	Istria	28,623.88	7,122.63	5.90%	105.36	67.10%
Sali	Zadar	21,097.81	2,150.26	13.50%	64.09	42.20%
Seget	Split-Dalmatia	17,587.05	1,826.56	19.50%	108.60	57.70%
Selca	Split-Dalmatia	15,963.25	1,502.15	10.00%	86.37	51.10%
Senj	Lika-Senj	19,785.53	1,433.10	18.60%	88.95	55.60%
Skradin	Šibenik-Knin	16,348.34	830.82	23.20%	51.13	34.40%
Slivno	Dubrovnik-Neretva	9,662.10	1,249.72	20.80%	114.48	50.20%
Smokvica	Dubrovnik-Neretva	13,928.43	1,026.86	12.90%	91.38	48.90%
Solin	Split-Dalmatia	24,699.14	3,802.99	16.10%	123.67	66.80%
Split	Split-Dalmatia	23,381.63	3,231.25	18.80%	94.68	75.90%
Stari Grad	Split-Dalmatia	19,281.77	3,707.82	11.60%	99.03	58.70%
Starigrad	Zadar	17,781.70	2,598.89	18.00%	91.51	48.70%

Local government unit	County	Net income *per capita* 2006.	LGU's revenues *per capita* 2006.	Unemployment rate 2006	Population change 2001/1991	Education attainment rate in 2001
Ston	Dubrovnik-Neretva	15,133.92	1,553.63	15.70%	93.72	46.60%
Sućuraj	Split-Dalmatia	15,757.93	3,044.83	10.00%	87.92	43.30%
Sukošan	Zadar	16,912.19	1,665.09	18.60%	101.74	54.10%
Supetar	Split-Dalmatia	22,654.10	4,449.28	9.10%	117.81	66.30%
Sutivan	Split-Dalmatia	21,503.91	9,881.18	10.20%	119.50	62.70%
Sveti Filip i Jakov	Zadar	16,795.86	1,661.82	12.50%	98.63	50.80%
Sveti Lovreč	Istria	16,392.99	3,262.28	5.30%	103.89	46.10%
Šibenik	Šibenik-Knin	22,094.93	2,187.28	14.50%	93.36	66.40%
Šolta	Split-Dalmatia	25,307.23	5,163.55	17.70%	105.32	50.90%
Tar-Vabriga	Istria				0.00	
Tisno	Šibenik-Knin	16,393.91	3,669.27	15.30%	98.64	53.50%
Trogir	Split-Dalmatia	20,764.88	3,282.39	18.60%	114.31	67.00%
Trpanj	Dubrovnik-Neretva	14,264.99	1,954.13	10.80%	100.57	54.30%
Tučepi	Split-Dalmatia	21,249.40	3,203.63	11.20%	100.68	65.00%
Tribunj	Šibenik-Knin				0.00	
Umag	Istria	26,610.13	7,024.38	4.30%	104.73	65.90%
Vela Luka	Dubrovnik-Neretva	17,769.25	1,673.01	15.90%	99.84	59.10%
Vinodolska općina	Primorje-Gorski kotar	23,262.54	2,804.14	13.20%	100.56	63.60%
Vir	Zadar	19,319.99	8,714.44	18.40%	188.72	54.50%
Vis	Split-Dalmatia	21,015.82	2,899.21	13.60%	94.11	55.60%
Viškovo	Primorje-Gorski kotar	31,699.84	4,977.00	9.70%	129.82	71.60%
Vodice	Šibenik-Knin	17,549.99	4,683.18	18.40%	107.60	60.40%
Vodnjan	Istria	22,369.80	4,506.37	8.20%	102.62	55.00%
Vrbnik	Primorje-Gorski kotar	24,324.14	3,910.60	6.10%	95.58	55.00%
Vrsar	Istria	28,486.47	8,136.72	5.80%	118.61	66.10%
Vrsi	Zadar				0.00	
Zadar	Zadar	22,613.98	3,429.36	14.90%	91.80	71.50%
Zadvarje	Split-Dalmatia	21,306.73	3,936.77	27.60%	96.58	54.70%
Župa dubrovačka	Dubrovnik-Neretva	27,072.61	2,456.20	8.80%	103.67	68.00%
Coastal zone (average)		**20.868,25**	**3,794.54**	**12.60%**	**102.28**	**58.20%**
Republic of Croatia (average)		**21.161,45**	**3,168.59**	**18.50%**	**92.89**	**45.50%**

Table IV.

Business revenues/km^2 and population density in the Coastal Zone in 2011
(LGUs ranked according to population density)

County	Local Government Unit	Business revenues 2011/km^2	Population density
Primorje-Gorski Kotar	Rijeka	48.69	2,969.75
Split-Dalmatia	Split	29.02	2,239.09
Istria	Pula	13.66	1,078.65
Primorje-Gorski Kotar	Kastav	11.87	918.71
Primorje-Gorski Kotar	Viškovo	4.96	777.32
Split-Dalmatia	Podstrana	3.38	775.75
Split-Dalmatia	Solin	7.58	681.92
Split-Dalmatia	Kaštela	3.72	665.56
Split-Dalmatia	Dugi Rat	2.26	631.25
Zadar	Zadar	3.32	392.99
Primorje-Gorski Kotar	Crikvenica	1.42	390.27
Dubrovnik-Neretva	Župa Dubrovačka	1.32	369.85
Split-Dalmatia	Makarska	2.71	368.22
Split-Dalmatia	Okrug	0.38	353.30
Primorje-Gorski Kotar	Kostrena	1.20	347.61
Split-Dalmatia	Trogir	4.51	336.80
Dubrovnik-Neretva	Dubrovnik	3.55	298.24
Zadar	Bibinje	0.34	285.01
Istria	Fažana	2.76	262.30
Primorje-Gorski Kotar	Kraljevica	1.87	259.63
Primorje-Gorski Kotar	Lovran	1.08	199.83
Zadar	Privlaka	0.17	197.94
Istria	Medulin	1.01	191.85
Istria	Rovinj	4.50	185.24
Primorje-Gorski Kotar	Opatija	2.66	177.20
Zadar	Kali	4.53	171.80
Istria	Umag	2.31	166.47
Istria	Novigrad	2.77	161.63
Istria	Labin	2.70	161.16
Istria	Poreč	2.63	150.11
Zadar	Biograd na Moru	1.70	149.72
Split-Dalmatia	Supetar	0.71	141.25
Zadar	Vir	0.20	135.84
Dubrovnik-Neretva	Opuzen	0.77	135.67
Istria	Funtana	0.69	117.74
Šibenik-Knin	Šibenik	0.98	114.41
Dubrovnik-Neretva	Lumbarda	0.16	113.66
Zadar	Kukljica	0.07	107.69
Split-Dalmatia	Baška Voda	0.51	107.53
Primorje-Gorski Kotar	Rab	0.68	105.28
Šibenik-Knin	Tribunj	0.25	99.04
Dubrovnik-Neretva	Vela Luka	0.36	96.35
Šibenik-Knin	Vodice	0.44	96.05
Zadar	Sveti Filip i Jakov	0.06	92.22
Šibenik-Knin	Bilice	0.15	89.96
Split-Dalmatia	Tučepi	0.53	87.23
Primorje-Gorski Kotar	Čavle	0.29	85.18
Primorje-Gorski Kotar	Omišalj	2.35	81.55
Zadar	Sukošan	0.23	81.23
Dubrovnik-Neretva	Ploče	0.35	77.97
Split-Dalmatia	Bol	0.72	74.54
Istria	Tar-Vabriga	0.43	73.56
Primorje-Gorski Kotar	Malinska-Dubašnica	0.89	71.95

County	Local Government Unit	Business revenues 2011/km^2	Population density
Zadar	Preko	1.33	70.08
Primorje-Gorski Kotar	Bakar	2.05	65.82
Primorje-Gorski Kotar	Matulji	0.65	63.85
Split-Dalmatia	Seget	0.32	62.04
Split-Dalmatia	Brela	0.37	61.08
Istria	Vodnjan – Dignano	0.36	61.07
Istria	Vrsar – Orsera	0.20	59.10
Primorje-Gorski Kotar	Krk	0.90	58.25
Istria	Ližnjan – Lisignano	0.15	57.59
Primorje-Gorski Kotar	Punat	0.80	57.50
Split-Dalmatia	Hvar	0.37	56.26
Split-Dalmatia	Omiš	0.62	55.74
Zadar	Vrsi	0.21	55.10
Dubrovnik-Neretva	Blato	0.32	53.74
Zadar	Nin	0.17	51.92
Istria	Buje – Buie	0.78	51.68
Split-Dalmatia	Stari Grad	0.19	50.75
Dubrovnik-Neretva	Korčula	0.18	50.15
Zadar	Tkon	0.28	49.91
Zadar	Pakoštane	0.22	49.53
Istria	Brtonigla	0.13	48.57
Šibenik-Knin	Primošten	0.28	47.98
Šibenik-Knin	Pirovac	0.08	47.65
Primorje-Gorski Kotar	Lopar	0.09	47.56
Zadar	Posedarje	0.12	46.73
Zadar	Novigrad	0.07	46.28
Split-Dalmatia	Gradac	0.10	45.75
Šibenik-Knin	Tisno	0.15	45.41
Zadar	Pašman	0.06	43.44
Zadar	Ražanac	0.03	42.12
Istria	Kaštelir – Labinci	0.31	41.26
Dubrovnik-Neretva	Konavle	0.42	40.82
Istria	Raša	0.59	40.21
Lika-Senj	Novalja	0.29	39.26
Split-Dalmatia	Marina	0.07	38.69
Dubrovnik-Neretva	Slivno	0.02	37.84
Split-Dalmatia	Sutivan	0.11	37.33
Split-Dalmatia	Vis	0.09	36.92
Primorje-Gorski Kotar	Dobrinj	0.11	36.73
Primorje-Gorski Kotar	Mali Lošinj	0.39	35.97
Šibenik-Knin	Rogoznica	0.13	33.77
Primorje-Gorski Kotar	Mošćenička Draga	0.04	33.54
Split-Dalmatia	Selca	0.10	33.40
Split-Dalmatia	Podgora	0.11	32.78
Istria	Marčana	0.03	32.47
Istria	Sveti Lovreč	0.06	31.84
Split-Dalmatia	Klis	0.13	31.81
Dubrovnik-Neretva	Orebić	0.14	31.32
Split-Dalmatia	Postira	0.46	30.79
Split-Dalmatia	Komiža	0.11	30.16
Istria	Barban	0.10	30.13
Zadar	Pag	0.19	29.25
Zadar	Kolan	0.15	28.42
Split-Dalmatia	Šolta	0.07	28.28
Split-Dalmatia	Milna	0.08	27.94
Šibenik-Knin	Murter-Kornati	0.17	26.13
Istria	Kanfanar	0.17	25.77
Split-Dalmatia	Jelsa	0.09	25.46

County	Local Government Unit	Business revenues 2011/km^2	Population density
Primorje-Gorski Kotar	Vrbnik	0.11	24.17
Istria	Kršan	1.21	24.08
Primorje-Gorski Kotar	Municipality of Vinodol	0.03	23.21
Split-Dalmatia	Zadvarje	0.16	21.72
Zadar	Benkovac	0.07	21.43
Split-Dalmatia	Pučišća	0.12	21.24
Dubrovnik-Neretva	Smokvica	0.07	21.00
Zadar	Povljana	0.05	20.34
Šibenik-Knin	Skradin	0.02	20.34
Dubrovnik-Neretva	Trpanj	0.04	20.24
Primorje-Gorski Kotar	Novi Vinodolski	0.09	19.64
Dubrovnik-Neretva	Janjina	0.03	18.27
Primorje-Gorski Kotar	Baška	0.14	16.85
Dubrovnik-Neretva	Lastovo	0.04	15.04
Dubrovnik-Neretva	Ston	0.04	14.21
Istria	Bale	0.06	13.76
Zadar	Sali	0.06	13.30
Zadar	Obrovac	0.02	12.27
Zadar	Jasenice	0.00	11.49
Zadar	Starigrad	0.03	10.96
Dubrovnik-Neretva	Dubrovačko primorje	0.03	10.94
Split-Dalmatia	Nerežišća	0.13	10.91
Dubrovnik-Neretva	Mljet	0.04	10.88
Lika-Senj	Senj	0.04	10.83
Split-Dalmatia	Sućuraj	0.01	10.25
Primorje-Gorski Kotar	Cres	0.08	9.79
Split-Dalmatia	Prgomet	0.00	8.92
Lika-Senj	Karlobag	0.01	3.29

Sources: Business revenues: (Croatian financial agency – FINA), Population: CBS. Census 2011

Table V.

Total environmental expenditures (business and local budget) per km2 / Average total environmental expenditures in Coastal Zone in 2011

County	Town/municipality	Business costs	Budget costs	Total costs (Tc)	Tc / km^2	Coefficient
Istria	Bale	35,054	2,294,326	2,329,380	28,384.8	0.7
Istria	Barban	11,213	0	11,213	124.4	0.0
Istria	Brtonigla	104,391	0	104,391	3,155.2	0.1
Istria	Kanfanar	2,650,116	2,893,393	5,543,509	92,880.3	2.3
Istria	Kršan	1,030,580	912,400	1,942,980	15,820.1	0.4
Istria	Labin	6,871,257	8,515,320	15,386,577	211,881.0	5.2
Istria	Novigrad - Istra	382,024	6,448,469	6,830,493	255,083.6	6.3
Istria	Poreč	14,910,381	4,519,367	19,429,748	174,691.3	4.3
Istria	Pula	11,697,065	1,045,001	12,742,066	237,932.7	5.9
Istria	Raša	1,151,606	1,037,628	2,189,234	27,535.1	0.7
Istria	Rovinj	3,865,667	12,177,291	16,042,958	206,843.8	5.1
Istria	Vrsar	14,725	727,966	742,691	20,397.7	0.5
Istria	Sveti Lovreč	12,769	14,771	27,540	862.2	0.0
Istria	Umag	3,257,735	2,849,089	6,106,824	74,782.4	1.8
Istria	Kaštelir - Labinci	15,028	0	15,028	425.0	0.0
Istria	Fažana	203,222	3,740,786	3,944,008	289,855.3	7.2
Istria	Funtana	9,420	208,096	217,516	27,717.0	0.7
Istria	Vodnjan	126,941	1,069,861	1,196,802	11,895.9	0.3
Istria	Buje	649,835	866,471	1,516,306	15,283.7	0.4
Istria	Marčana	50,437	0	50,437	384.4	0.0
Istria	Medulin	41,106	10,187,393	10,228,499	299,505.7	7.4
Istria	Tar - Vabriga	28,151	276	28,427	1,047.7	0.0
Istria	Ližnjan	104,916	131,419	236,335	3,475.9	0.1
Primorje-Gorski kotar	Cres	360,405	209,100	569,505	1,953.9	0.0
Primorje-Gorski kotar	Omišalj	1,007,225	1,766,550	2,773,775	75,728.8	1.9
Primorje-Gorski kotar	Krk	1,016,502	3,768,604	4,785,106	44,650.3	1.1
Primorje-Gorski kotar	Punat	644,632	3,978,761	4,623,393	136,130.4	3.4
Primorje-Gorski kotar	Vrbnik	452	919,883	920,335	17,516.5	0.4
Primorje-Gorski kotar	Baška	762,049	2,281,053	3,043,102	30,733.2	0.8
Primorje-Gorski kotar	Mali Lošinj	176,135	0	176,135	785.2	0.0
Primorje-Gorski kotar	Rab	902,356	8,455,612	9,357,968	123,247.7	3.0
Primorje-Gorski kotar	Dobrinj	5,706	83,517	89,223	1,619.8	0.0
Primorje-Gorski kotar	Malinska-Dubašnica	1,562,410	1,257,776	2,820,186	64,576.5	1.6
Primorje-Gorski kotar	Lopar	228,477	1,334,332	1,562,809	59,600.1	1.5
Primorje-Gorski kotar	Vinodolska općina	7,209	7,921,444	7,928,653	51,868.6	1.3
Primorje-Gorski kotar	Čavle	96,924	84,004	180,928	2,136.0	0.1
Primorje-Gorski kotar	Viškovo	866,565	699,653	1,566,218	83,991.4	2.1
Primorje-Gorski kotar	Kastav	434,890	2,051,747	2,486,637	218,154.0	5.4
Primorje-Gorski kotar	Matulji	441,115	1,734,280	2,175,395	12,321.2	0.3
Primorje-Gorski kotar	Bakar	15,794,312	208,459	16,002,771	127,610.9	3.1
Primorje-Gorski kotar	Kostrena	73,074	1,268,708	1,341,782	111,608.9	2.8
Primorje-Gorski kotar	Mošćenička Draga	2,982	736,545	739,527	16,149.1	0.4
Primorje-Gorski kotar	Novi Vinodolski	176,100	2,681,314	2,857,414	10,937.7	0.3
Primorje-Gorski kotar	Kraljevica	416,016	51,972	467,988	26,598.5	0.7
Primorje-Gorski kotar	Crikvenica	1,739,821	1,009,955	2,749,776	95,876.2	2.4
Primorje-Gorski kotar	Lovran	393,722	259,083	652,805	32,162.7	0.8
Primorje-Gorski kotar	Rijeka	41,176,552	24,225,110	65,401,662	1,508,730.7	37.2
Primorje-Gorski kotar	Opatija	4,688,271	16,372,345	21,060,616	317,365.5	7.8
Lika-Senj	Karlobag	45,722	0	45,722	162.8	0.0
Lika-Senj	Senj	216,001	1,618,469	1,834,470	2,772.1	0.1
Zadar	Zadar	7,116,564	12,806,606	19,923,170	104,279.8	2.6
Zadar	Starigrad	132,522	0	132,522	774.5	0.0
Zadar	Povljana	28,633	837,791	866,424	22,454.4	0.6
Zadar	Ražanac	110	854,864	854,974	12,417.4	0.3

County	Town/municipality	Business costs	Budget costs	Total costs (Tc)	Tc / km^2	Coefficient
Zadar	Vir	107,132	33,994	141,126	6,322.8	0.2
Zadar	Jasenice	1	0	1	0.0	0.0
Zadar	Privlaka	1	1,736,609	1,736,610	154,287.6	3.8
Zadar	Posedarje	22,730	321,111	343,841	4,447.5	0.1
Zadar	Obrovac	49,948	1,320,503	1,370,451	3,880.6	0.1
Zadar	Preko	1,570,640	0	1,570,640	28,567.2	0.7
Zadar	Sali	137,804	414,561	552,365	4,353.6	0.1
Zadar	Novigrad	3,777	199,856	203,633	3,971.6	0.1
Zadar	Benkovac	1,187,663	1,446,376	2,634,039	5,124.7	0.1
Zadar	Sukošan	69,060	468,209	537,269	9,516.5	0.2
Zadar	Kali	256,704	0	256,704	26,631.2	0.7
Zadar	Kukljica	1,056	166,578	167,634	24,866.0	0.6
Zadar	Sveti Filip i Jakov	46,178	0	46,178	962.2	0.0
Zadar	Pašman	495	630,524	631,019	13,084.4	0.3
Zadar	Biograd na Moru	126,158	3,663,948	3,790,106	102,654.1	2.5
Zadar	Pakoštane	169,581	457,138	626,719	7,443.7	0.2
Zadar	Tkon	2,275	47,275	49,550	3,284.3	0.1
Zadar	Bibinje	71,990	112,194	184,184	13,061.5	0.3
Šibenik-Knin	Rogoznica	6,189	550,317	556,506	8,172.0	0.2
Šibenik-Knin	Primošten	2,099,669	1,260,499	3,360,168	57,231.1	1.4
Šibenik-Knin	Bilice	5,749	0	5,749	223.7	0.0
Šibenik-Knin	Skradin	218,322	0	218,322	1,166.7	0.0
Šibenik-Knin	Tisno	426,407	80,000	506,407	7,562.8	0.2
Šibenik-Knin	Murter	382,697	788,880	1,171,577	14,955.3	0.4
Šibenik-Knin	Pirovac	2,461	1,187,295	1,189,756	30,188.9	0.7
Šibenik-Knin	Vodice	91,706	55,896	147,602	1,592.6	0.0
Šibenik-Knin	Tribunj	67,113	175,457	242,570	15,742.6	0.4
Split-Dalmatia	Prgomet	0	284,299	284,299	3,679.9	0.1
Split-Dalmatia	Klis	298,274	524,544	822,818	5,523.2	0.1
Split-Dalmatia	Marina	14,582	1,638,241	1,652,823	13,911.6	0.3
Split-Dalmatia	Kaštela	5,456,480	5,885,597	11,342,077	196,205.2	4.8
Split-Dalmatia	Solin	1,643,393	885,415	2,528,808	71,896.7	1.8
Split-Dalmatia	Split	26,993,797	3,394,378	30,388,175	381,845.4	9.4
Split-Dalmatia	Šolta	22,622	0	22,622	381.9	0.0
Split-Dalmatia	Sutivan	549	0	549	24.8	0.0
Split-Dalmatia	Supetar	1,740,000	2,758,212	4,498,212	155,124.6	3.8
Split-Dalmatia	Postira	598,143	474,752	1,072,895	21,260.5	0.5
Split-Dalmatia	Pučišća	848,916	756,229	1,605,145	15,574.0	0.4
Split-Dalmatia	Selca	1,841,819	270,725	2,112,544	39,117.3	1.0
Split-Dalmatia	Milna	2,781	390,278	393,059	10,882.8	0.3
Split-Dalmatia	Stari Grad	14,775	913,627	928,402	17,542.3	0.4
Split-Dalmatia	Hvar	147,273	387,234	534,507	7,093.8	0.2
Split-Dalmatia	Jelsa	764,411	1,092,350	1,856,761	13,277.6	0.3
Split-Dalmatia	Sućuraj	205	95,145	95,350	2,110.3	0.1
Split-Dalmatia	Vis	66,068	515,133	581,201	11,175.3	0.3
Split-Dalmatia	Nerežišća	237,144	93,237	330,381	4,171.6	0.1
Split-Dalmatia	Seget	1,222,491	971,230	2,193,721	27,988.8	0.7
Split-Dalmatia	Omiš	7,255,547	0	7,255,547	27,193.6	0.7
Split-Dalmatia	Podstrana	981,010	4,140,001	5,121,011	436,408.2	10.8
Split-Dalmatia	Dugi Rat	1,571,927	0	1,571,927	139,933.9	3.5
Split-Dalmatia	Zadvarje	0	105,440	105,440	7,922.7	0.2
Split-Dalmatia	Brela	1,015,780	0	1,015,780	37,764.2	0.9
Split-Dalmatia	Baška Voda	132,217	488,726	620,943	24,476.6	0.6
Split-Dalmatia	Makarska	479,193	4,879,434	5,358,627	141,102.6	3.5
Split-Dalmatia	Tučepi	343,877	527,345	871,222	39,622.1	1.0
Split-Dalmatia	Podgora	149,778	753,299	903,077	11,776.2	0.3
Split-Dalmatia	Gradac	315,443	1,824,604	2,140,047	29,596.7	0.7
Split-Dalmatia	Okrug	102,901	638,856	741,757	75,785.1	1.9
Split-Dalmatia	Bol	472,193	845,001	1,317,194	59,684.1	1.5

County	Town/municipality	Business costs	Budget costs	Total costs (Tc)	Tc / km^2	Coefficient
Dubrovnik-Neretva	Blato	687,465	4,555,062	5,242,527	78,637.7	1.9
Dubrovnik-Neretva	Dubrovnik	3,141,076	17,195,319	20,336,395	142,239.0	3.5
Dubrovnik-Neretva	Konavle	662,822	5,411,670	6,074,492	28,930.1	0.7
Dubrovnik-Neretva	Korčula	611,362	51,660	663,022	5,901.2	0.1
Dubrovnik-Neretva	Mljet	238,753	140,000	378,753	3,812.2	0.1
Dubrovnik-Neretva	Opuzen	336,206	1,733,812	2,070,018	86,039.1	2.1
Dubrovnik-Neretva	Orebić	254,591	595,098	849,689	6,488.6	0.2
Dubrovnik-Neretva	Ploče	200,965	332,965	533,930	4,120.9	0.1
Dubrovnik-Neretva	Slivno	4,056	27,491	31,547	597.8	0.0
Dubrovnik-Neretva	Smokvica	0	357,066	357,066	8,168.8	0.2
Dubrovnik-Neretva	Ston	41,072	1,649,433	1,690,505	9,968.4	0.2
Dubrovnik-Neretva	Vela Luka	106,543	1,395,716	1,502,259	35,048.1	0.9
Dubrovnik-Neretva	Dubrovačko primorje	14,161	140,523	154,684	783.2	0.0
Dubrovnik-Neretva	Janjina	1	433,500	433,501	14,372.7	0.4
Dubrovnik-Neretva	Lumbarda	11,909	250,080	261,989	24,327.9	0.6
Dubrovnik-Neretva	Trpanj	16,409	339,504	355,913	9,909.5	0.2
Dubrovnik-Neretva	Župa dubrovačka	181,564	3,962,350	4,143,914	181,160.1	4.5
Dubrovnik-Neretva	Lastovo	1,219,575	0	1,219,575	23,160.1	0.6
Zadar	Pag	89,191	49,022	138,213	1,023.5	0.0
Zadar	Nin	62,957	754,132	817,089	15,415.8	0.4
Zadar	Vrsi	8,266	0	8,266	225.5	0.0
Zadar	Kolan	19,151	1,741,198	1,760,349	60,933.4	1.5
Lika-Senj	Novalja	953,515	7,965,182	8,918,697	95,363.1	2.4
Šibenik-Knin	Šibenik	4,020,527	7,717,174	11,737,701	28,960.0	0.7
Split-Dalmatia	Trogir	3,972,139	856,381	4,828,520	122,641.5	3.0
Split-Dalmatia	Komiža	30,765	0	30,765	614.9	0.0

Sources: Business costs: (Croatian financial agency – FINA), Budget costs: The Ministry of Finance

Table VI.

Investments in environmental protection in the Adriatic Croatia, by counties in 2008 (in 000 HRK)

	Total investment (000 HRK)	End of pipe* investments (000 HRK)	Investments in integrated technologies** (000 HRK)	Total environmental investment *per capita* (HRK)
Croatia	**2,316,500**	**1,944,490**	**372,010**	**540.62**
Primorje-Gorski kotar	829,955	789,441	40,554	2,802.06
Lika-Senj	8,992	8,962	30	176.57
Zadar	670	560	110	3.94
Šibenik-Knin	12,631	11,361	270	115.48
Split-Dalmatia	70,240	55,531	14,709	154.44
Istria	97,668	42,223	55,445	469.43
Dubrovnik-Neretva	9,026	8,262	764	73.64

Notes:

* *End-of-pipe investments comprise methods, practices, technologies, processes or equipment designed to collect and remove the pollution and pollutants (e.g. air emissions, effluents of solid waste) after their creation. They are also purposed to treat and dispose the pollutants and to minor and measure the level of pollution (mainly end-of-pipe methods, techniques or equipment, for e.g. air emissions filters, wastewater treatment plants, waste collection and treatment activities).*

** *Investments in integrated technologies include the investments in new or adaptation of existing methods, practices, technologies, processes or equipment designed to prevent or reduce the amount of pollution created at the source, thereby reducing the environmental impacts associated with the release of pollutants and/or polluting activities (as the part of production process – called integrated). Pollution prevention could involve different types of activities e.g.: equipment or technology modification, choice of new improved technology, reformulation or redesign of products, substitution of raw materials to cleaner inputs and/or renewables change in environmental management.*

Table VII.

Current costs for environmental protection, by counties in 2008 (in 000 HRK)

	Total current exp. (000 HRK)	Internal current exp.* (000 HRK)	External current exp.** (000 HRK)	Total current costs for environmental protection per capita (HRK)
Croatia	**1,363,296**	**630,402**	**732,894**	**318.16**
Primorje-Gorski kotar	211,913	147,148	64,765	715.45
Lika-Senj	2,065	459	1,606	40.55
Zadar	7,692	20	7,672	45.24
Šibenik-Knin	15,931	2,208	13,723	145.65
Split-Dalmatia	88,251	64,424	23,827	194.04
Istria	118,216	96,250	21,966	568.20
Dubrovnik-Neretva	37,324	30,118	7,206	304.52

Source: Statistical Yearbook 2010.

Notes:

* *Internal current costs are allocated for the operation of end-of-pipe environmental equipment: material, energy, maintenance, personnel costs (only for the personnel in charge of environmental protection) and other internal current costs (training activities, information, general administration for the environment protection).*

** *External current costs include payments to third parties for environmental protection services from public sector or specialised producers, that can be public or private (for external fees/purchases for waste collection or wastewater treatment, and for others – for example soil and groundwater decontaminationcosts).*

Table VIII.

Investments and current costs in environmental protection, by environmental domain, by counties in 2008 (in 000 HRK)

	Protection of ambient air and climate	Wastewater management	Waste management	Protection and remediation of soil, ground waters and surface waters	Other environmental protection	Total
Croatia	**527,211**	**903,558**	**812,362**	**389,372**	**1,047,293**	**3,679,796**
Primorje-Gorski kotar	21,140	77,324	167,171	96,067	680,166	1,041,868
Lika-Senj	7,462	150	1,624	1,311	510	11,057
Zadar	122	722	3,238	600	3,680	8,362
Šibenik-Knin	844	15,945	4,783	5,730	1,260	28,562
Split-Dalmatia	40,008	46,361	63,763	3,044	5,315	158,491
Istria	26,827	105,555	78,863	2,459	2,180	215,884
Dubrovnik-Neretva	223	6,765	35,513	624	3,225	46,350
Coastal counties	96,626	252,822	354,955	109,835	696,336	1,510,574

Table IX.

Investments in environmental protection, by counties in the Adriatic Croatia, by counties in 2009 (in 000 HRK)

	Total investment (000 HRK)	End of pipe investments (000 HRK)	Investments in integrated technologies (000 HRK)	Total environmental investment *per capita* (HRK)
Croatia	**2,130,107**	**1,817,963**	**312,144**	**497.12**
Primorje-Gorski kotar	1,261,578	1,220,871	40,707	4259.28
Lika-Senj	2,895	2,895	0	56.85
Zadar	50,950	49,946	1,004	299.68
Šibenik-Knin	5,862	4,909	953	53.60
Split-Dalmatia	50,713	26,319	24,394	111.51
Istria	83,001	62,804	20,197	398.94
Dubrovnik-Neretva	2,459	1,739	720	20.06

Table X.

Current costs for environmental protection in the Adriatic Croatia, by counties in 2009 (in 000 HRK)

	Total current exp. (000 HRK)	Internal current exp.* (000 HRK)	External current exp.** (000 HRK)	Total current costs for environmental protection *per capita* (HRK)
Croatia	**1,489,397**	**629,454**	**859,943**	**347.59**
Primorje-Gorski kotar	233,950	152,554	81,396	789.85
Lika-Senj	1,224	194	1,030	24.03
Zadar	14,300	8,805	5,495	84.11
Šibenik-Knin	11,035	2,726	8,309	100.89
Split-Dalmatia	63,564	19,937	43,627	139.76
Istria	133,974	103,744	30,230	643.94
Dubrovnik-Neretva	34,751	28,887	5,864	283.52

Source: Statistical Yearbook 2011

Table XI.

Investments and current costs in environmental protection, by environmental domain in the Adriatic Croatia, by counties (in 000 HRK) in 2009

	Protection of ambientair and climate	Wastewater management	Waste management	Protection and remediation ofsoil, ground waters and surface waters	Other environmental protection	Total
Croatia	**418,562**	**807,967**	**760,704**	**184,491**	**1,447,780**	**3,619,504**
Primorje-Gorski kotar	35,946	48,465	132,945	93,187	1,184,985	1,495,528
Lika-Senj	1,448	1,027	130	1,179	335	4,119
Zadar	241	58,358	4,383	92	2,176	65,250
Šibenik-Knin	1,403	9,701	3,401	1,603	789	16,897
Split-Dalmatia	53,900	44,918	9,330	316	5,813	114,277
Istria	13,434	112,715	74,591	5,975	10,260	216,975
Dubrovnik-Neretva	192	3,362	30,286	472	2,898	37,210
Coastal counties	106,564	278,546	255,066	102,824	1,207,256	1,950,256

Table XII.

Investments in environmental protection in the Adriatic Croatia, by counties 2010 (in 000 HRK)

	Total investment (000 HRK)	End of pipe investments (000 HRK)	Investments in integrated technologies (000 HRK)	Total environmental investment *per capita* (HRK)
Croatia	**2,232,283**	**1,420,769**	**811,514**	**520.97**
Primorje-Gorski kotar	881,590	856,132	25,458	2,976.38
Lika-Senj	1,747	1,747	0	34.30
Zadar	14,553	14,553	0	85.60
Šibenik-Knin	13,811	5,088	8,723	126.27
Split-Dalmatia	44,072	27,012	17,060	96.90
Istria	53,803	25,004	28,799	258.60
Dubrovnik-Neretva	3,434	3,170	264	28.02

Source: CBS – Statistical Yearbook 2012

Table XIII.

Current costs for environmental protection in the Adriatic Croatia, by counties in 2010 (in 000 HRK)

	Total current exp. (000 HRK)	Internal current exp.* (000 HRK)	External current exp.** (000 HRK)	Total current costs for environmental protection *per capita* (HRK)
Croatia	**1,447,335**	**594,170**	**853,165**	**337.78**
Primorje-Gorski kotar	209,386	135,662	73,724	706.92
Lika-Senj	793	235	558	15.57
Zadar	13,774	9,979	3,795	81.02
Šibenik-Knin	12,177	4,257	7,920	111.33
Split-Dalmatia	89,408	62,728	26,680	196.59
Istria	135,383	99,834	35,549	650.71
Dubrovnik-Neretva	36,547	30,129	6,418	298.18

Source: Statistical Yearbook 2012

Table XIV.

Investments in environmental protection in the Adriatic Croatia, by environmental domain, by counties in 2010 (in %)

	Protection of ambient air and climate	Wastewater management	Waste management	Protection and remediation of soil, ground waters and surface waters	Other environmental protection*
Croatia	**16.79**	**15.65**	**7.62**	**11.88**	**48.06**
Primorje-Gorski kotar	0.85	2.38	3.92	3.65	89.21
Lika-Senj	32.34	0.52	23.64	41.67	1.83
Zadar	0.00	100.00	0.00	0.00	0.00
Šibenik-Knin	69.64	11.65	17.23	1.48	0.00
Split-Dalmatia	66.96	14.40	17.44	0.00	1.20
Istria	36.13	53.17	9.06	0.36	1.28
Dubrovnik-Neretva	0.00	0.00	92.31	0.00	7.69

Source: Statistical Yearbook 2012

**Noise and vibration abatement, protection of biodiversity and landscape, protection against radiation and other environmental protection activities.*

Table XV.

Investments in environmental protection in the Adriatic Croatia, by counties in 2011 (in 000 HRK)

	Total investment (000 HRK)	End of pipe investments (000 HRK)	Investments in integrated technologies (000 HRK)	Total environmental investment *per capita* (HRK)
Croatia	**2,829,231**	**1,940,720**	**888,511**	**660.28**
Primorje-Gorski kotar	486,722	409,171	77,551	1,643.25
Lika-Senj	1,376	1,376	0	27.02
Zadar	141,781	141,781	0	833.92
Šibenik-Knin	14,317	6,819	7,498	130.90
Split-Dalmatia	21,589	12,121	9,468	47.47
Istria	73,553	67,212	6,341	353.53
Dubrovnik-Neretva	8,405	8,405	0	68.57

Source: CBS – Statistical Yearbook 2013

Table XVI.

Current costs for environmental protection in the Adriatic Croatia, by counties in 2011 (in 000 HRK)

	Total current exp. (000 HRK)	Internal current exp.* (000 HRK)	External current exp.** (000 HRK)	Total current costs for environmental protection *per capita* (HRK)
Croatia	**1,921,335**	**756,323**	**1,165,012**	**448.40**
Primorje-Gorski kotar	219,259	145,614	73,645	740.25
Lika-Senj	1,645	167	1,478	32.30
Zadar	50,891	45,181	5,710	299.33
Šibenik-Knin	14,899	5,958	8,941	136.22
Split-Dalmatia	88,523	66,509	22,014	194.64
Istria	173,953	133,560	40,393	836.09
Dubrovnik-Neretva	39,868	32,125	7,743	325.27

Source: Statistical Yearbook 2013

Table XVII:

Investments and current costs in environmental protection in the Adriatic Croatia, by environmental domain, by counties in 2011 (in 000 HRK)

	Protection of ambientair and climate	Wastewater management	Waste management	Protection and remediation of soil, ground waters and surface waters	Other environmental protection*	Total
Primorje-Gorski kotar	22,143	127,060	127,981	84,233	344,564	705,981
Lika-Senj	770	105	206	1,233	707	3,021
Zadar	205	154,125	35,508	64	2,770	192,672
Šibenik-Knin	8,453	12,691	5,276	1,695	1,101	29,216
Split-Dalmatia	28,740	13,266	64,696	2,212	1,198	110,112
Istria	29,723	103,565	97,250	4,141	12,827	247,506
Dubrovnik-Neretva	79	5,097	38,311	1,774	3,012	48,273
Coastal counties	**90,113**	**415,909**	**369,228**	**95,352**	**366,179**	**1,336,781**

Table XVIII.

Tourist Accommodation Capacities (beds in hotels and camps) as on August 2013

Type of Accommodation/ County	Categorisation (No of stars) 2	3	4	5	Total
Hotel					
Istria	4,623	11,987	10,554	1,442	28,606
Primorje-Gorski kotar	3,029	8,455	6,826	795	19,105
Lika-Senj	536	1,030	352	-	1,918
Zadar	227	2,654	3,506	378	6,765
Šibenik-Knin	82	2,411	2,710	-	5,203
Split-Dalmatia	3,697	6,929	6,281	1,188	18,095
Dubrovnik-Neretva	1,783	6,987	3,911	4,649	17,330
Adriatic Croatia (AC)	13,977	40,453	34,140	8,452	97,022
Republic of Croatia (RC)	15,537	45,671	39,267	9,882	110,357
AC/RC (%)	89.96	88.86	86.94	85.53	87.92
Aparthotel					
Istria	-	447	-	-	447
Primorje-Gorski kotar	-	-	-	-	-
Lika-Senj	-	-	-	-	-
Zadar	-	115	-	-	115
Šibenik-Knin	-	118	-	-	118
Split-Dalmatia	-	173	248	-	421
Dubrovnik-Neretva	-	-	-	-	-
Adriatic Croatia (AC)	-	853	248	-	1,101
Republic of Croatia (RC)	-	898	274	-	1,172
AC/RC (%)	-	94.99	90.51	-	93.94
Tourist Apartments					
Istria	4,158	2,143	1,767	-	8,068
Primorje-Gorski kotar	226	133	506	-	865
Lika-Senj	-	-	-	-	-
Zadar	340	150	22	-	512
Šibenik-Knin	-	528	152	-	680
Split-Dalmatia	160	900	84	-	1,144
Dubrovnik-Neretva	420	280	-	-	700
Adriatic Croatia (AC)	5,304	4,134	2,531	-	11,969
Republic of Croatia (RC)	5,304	4,134	2,596	-	12,007
AC/RC (%)	100.00	100.00	97.50	-	99.97
Tourist village					
Istria	4,187	4,160	2,362	-	10,709
Primorje-Gorski kotar	416	1,038	224	-	1,678
Lika-Senj	-	-	-	-	-
Zadar	693	1,684	-	-	2,377
Šibenik-Knin	292	-	-	-	292
Split-Dalmatia	2,826	1,899	338	-	5,063
Dubrovnik-Neretva	824	343	-	766	1,933
Adriatic Croatia (AC)	9,283	9,124	2,924	766	22,052
Republic of Croatia (RC)	9,238	9,160	2,936	766	22,100
AC/RC (%)	100.00	99.61	99.59	100.00	99.78
Camp					
Istria	8,911	10,242	24,084	-	43,237
Primorje-Gorski kotar	5,508	16,366	2,784	-	24,658
Lika-Senj	285	-	4,800	-	5,085
Zadar	2,133	516	8,892	-	11,541
Šibenik-Knin	390	3,018	5,073	-	8,481
Split-Dalmatia	1,535	3,070	1,656	-	6,361
Dubrovnik-Neretva	1,590	564	396	-	2,550
Adriatic Croatia (AC)	**20,352**	**33,776**	**47,685**	**-**	**101,813**
Republic of Croatia (RC)	**20,487**	**34,080**	**47,947**	**-**	**102,514**
AC/RC (%)	**99.34**	**99.11**	**99.45**	**-**	**99.32**

Source: Ministry of Tourism