Assessment of the status, development and diversification of fisheries-dependent communities

Carboneras Case study report
July 2010
### Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AER</td>
<td>Annual Economic Report of EU Fishing Fleets</td>
</tr>
<tr>
<td>Bmsy</td>
<td>Biomass at Maximum Sustainable Yield</td>
</tr>
<tr>
<td>EFF</td>
<td>European Fisheries Fund</td>
</tr>
<tr>
<td>ERDF</td>
<td>European Regional Development Fund</td>
</tr>
<tr>
<td>CFP</td>
<td>Common Fisheries Policy</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>FTE</td>
<td>Full Time Equivalent</td>
</tr>
<tr>
<td>FIFG</td>
<td>Financial Instrument Fisheries Guidance</td>
</tr>
<tr>
<td>GT</td>
<td>Gross Tons</td>
</tr>
<tr>
<td>HP</td>
<td>Horsepower</td>
</tr>
<tr>
<td>ICCAT</td>
<td>International Commission for the Conservation of Atlantic Tunas</td>
</tr>
<tr>
<td>ICES</td>
<td>International Council for the Exploration of the Sea</td>
</tr>
<tr>
<td>MSY</td>
<td>Maximum Sustainable Yield</td>
</tr>
<tr>
<td>PGI</td>
<td>Protected Geographical Indication</td>
</tr>
<tr>
<td>STECF</td>
<td>Scientific, Technical and Economic Committee for Fisheries</td>
</tr>
</tbody>
</table>

The author acknowledge the important role played by local stakeholders in providing both the quantitative data and the qualitative information presented in this report.

Citation: Calvo, C. (2010). Assessment of the status, development and diversification of fisheries-dependent communities: Carboneras Case Study Report.
Table of Contents

1. INTRODUCTION  
   1.1. General description of the location  
   1.2. Location - Definition  
   1.3. Key geographical characteristics of the community

2. DEMOGRAPHIC ASPECTS  
   2.1. Population and population age structure  
   2.2. Ethnicity and migration

3. ECONOMIC ASPECTS  
   3.1. Importance of economic activities  
   3.2. Employment and unemployment  
   3.3. Infrastructure  
   3.4. Local development plans

4. FISHERIES AND AQUACULTURE SECTOR  
   4.1. Details of the local catching sector  
   4.2. Fish stock status for Carboneras fleet  
   4.1. Fisheries infrastructure  
   4.2. Details of the local processing sub-sector  
   4.3. Details of the local aquaculture sub-sector  
   4.4. Details of the local ancillary sub-sector

5. GOVERNANCE  
   5.1. Key local institutions  
   5.2. Public intervention

6. STAKEHOLDER ANALYSIS

7. QUALITATIVE INTERPRETATION AND ANALYSIS  
   7.1. Key events and drivers of change  
   7.2. Adaptation  
   7.3. The role of public intervention in the past and in the future  
   7.4. Conclusion
Table of Tables

Table 1: Estimates of contribution to GDP generated by the fishing industries (2009, in € million) ..................................................................................................................... 10

Table 2: Fishing employment in Carboneras, 2006. .......................................................... 11

Table 3: Fleet segments in the port of Carboneras, 2009 ...................................................... 18

Table 4: Fleet segment characteristics in the port of Carboneras, 2009 ................................. 18

Table 5: Public investments in Carboneras community ......................................................... 31

Table of Figures

Figure 1: Map showing zones and uses in maritime area in Cabo de Gata-Níjar Natural Park .................................................................................................................. 3

Figure 2: Configuration of the Carboneras coast with beaches, and the famous beach of “Los Muertos”. Source: Web Carboneras municipality ........................................ 4

Figure 3: Non urbanized beach in Carboneras ..................................................................... 4

Figure 4: Changes in the population of Carboneras 1996-2009 ......................................... 5

Figure 5: Net growth population ratio, 1996-2009. ............................................................. 6

Figure 6: Age pyramid for Carboneras from census data .................................................... 7

Figure 7: Contribution of different economic sectors to total number of companies in Carboneras ........................................................................................................... 9

Figure 8: Industrial port of Carboneras, showing the location of the cement factory and coal power plant ................................................................................................. 9

Figure 9: Tourist and construction development along the coast of Carboneras .............. 10

Figure 10: Companies by main economic sectors in Carboneras ........................................ 12

Figure 11: Fisheries dependency in Andalucia, 2008 .......................................................... 13

Figure 12: Territorial distribution of fisheries dependency in Andalucia, 2008, (red colour represents largest employment dependency on fisheries) ....................... 13

Figure 13: Carboneras yachting port expansion project ...................................................... 15

Figure 14: Index of fishing decline in Andalucia, 1996-2008 .............................................. 17

Figure 15: Geographical distribution (5x5 degree squares) of the SWO-MED total catches (2000-2008) ........................................................................................................ 20

Figure 15: Local fishing fleet in Carboneras harbour .......................................................... 21

Figure 16: Location and situation of fisheries infrastructure in Carboneras ..................... 24
Figure 19: Production of alevins by Predomar S.L. .........................................................26
Figure 20: Production of alevins by Carmar S.L. ..............................................................26
Figure 21: Production of seabream and seabream by Framar S.L. .................................27
Figure 22: Breakdown FIFG 2000-2006 by measures....................................................30
1. **INTRODUCTION**

1.1. **General description of the location**

Carboneras (NUTS V or LAU II\(^1\)) is a town and municipality in the province of Almeria (NUTS III), in the Andalucia Autonomous Community (NUTS II) of Spain.

Carboneras is a dynamic municipality that has established itself as an industrial centre, building on its traditional economic activities. Key industries include producing energy and cement and a growing level of port activity. The location is also home to the largest desalination plant in Europe. Maritime industries therefore feature strongly in the area and there has been a strong expansion in coastal tourism that has contributed to the development of the local service sector.

1.2. **Location - Definition**

Carboneras is situated on the eastern coast of Almeria, (36º 60' N, 1º 53' W). The municipality of Carboneras has an area of 95 km\(^2\), and an average altitude above mean sea level of 10 m.

1.3. **Key geographical characteristics of the community**

The name of Carboneras has its origins in the charcoal (*carbon* in Spanish) industry that operated in the area. Along the coast around Carboneras there was an abundance of charcoal ovens that were built to convert wood. These ovens were later sold and moved further inland but they provided the area with the name of ‘*Cabezo de la Carbonera*’.

Carboneras has maintained a historical link with the local fisheries, in particular the tuna fisheries. The isolated position made contraband rife, a circumstance taken full advantage of by Muslims to establish connections with Africa, especially during the uprising of 1568. It was an important port during this uprising for the entry of soldiers and arms. The occupation of the coast was carried out through the establishment of towers and observation posts along the shore due to the danger of Berber pirates. The distribution of land to the soldiers, the establishment of a tuna fishery and the improved safety of the zone attracted the population and a permanent village sprang up around Saint Andrew's Castle, which was the name given to the castle built by Felipe II. In 1688 the castle passed over to the Casa de Alba.

Since the beginning of the 18th century, its population was considerably increased, among other factors, by the growing safety of the Spanish coast and control of the Spanish Armada. This increased the security of the area and as a consequence its economic prosperity. Its economy was based on traditional agriculture, fishing, esparto and exploitation of the saltwort plant.

The population grew until the beginning of the 20th century when a steady population fall began due to emigration and decline in local economy, up until the seventies. From this period local economic base diversified, from depending entirely on fishing and traditional agriculture to a more diversified economic structure based on new intensive agriculture of greenhouses, and of the development of the industry of cement and the coastal tourism sector.

---

\(^1\) LAU II stands for Local Administrative Units according to Eurostat territorial nomenclature.
The sunny climatic conditions in Carboneras favoured the development of coastal tourism sector in this area all year round. In fact, Carboneras has a borderline arid/semi-arid climate with Mediterranean influences. It has the sunniest, warmest and driest climate in Europe. Carboneras enjoys about 3000 hours of sunshine annually with around 320 sunny days a year on average (six hours of sun in January and 12 hours in August). It has an average annual temperature of around 20 °C and on average only 25-30 wet days a year. During the winter, daily maximum temperatures tend to stay around 16–22°C. At night, the temperature rarely drops below 8 °C. Precipitation falls in short heavy bursts. During the warmest month - August, the sky is clear and sunny and no rainfall occurs, in fact annual average rainfall is 200 l/m² year.

The typical daily temperatures range from 30–36°C and occasionally climb higher to around 40°C. The minimum temperatures stay well above 20°C. The sea temperature stays around 17°C during the winter and 27°C during the summer.

Carboneras landscape is made up of dry, semi desert, volcanic land, including the Cabo de Gata-Nijar Natural Park. This is the first protected Andalusian natural space comprised of land and sea which includes unique scenery, such as the only mountains of volcanic origin on the peninsula; the coast with its dunes, beaches and saltworks; and lastly the mile of protected coastal waters hosting a high marine biodiversity due to the convergence of different currents form Mediterranean Sea and Atlantic Ocean around Cabo de Gata.

It is worth mentioning the tourism attraction exerted by Cabo de Gata-Nijar Natural Park. This is the first marine-terrestrial Natural Park of Andalucia, and the marine-terrestrial park of greater surface and ecological relevance of all European Western Mediterranean. This natural park has an extension of 34,000 ha, to which there is to add a marine strip of one mile in width, covering 4,613 ha. The marine reserve is an area with legal protection against fishing or development. In fact, the marine reserve was established in 1995 to protect commercially important marine for the local artisanal fleets. Only small scale artisanal fishing vessels have access to the reserves on the condition that they use traditional fishing methods.

Around 78% of Carboneras territory is inside ‘Cabo de Gata-Nijar’ Natural Park. This privileged location, together with the climatic conditions have contributed to the location development of coastal tourism, based on the stunning landscapes and beaches of Cabo de Gata and the warm and sunny climatic conditions with around 320 sunny days on yearly average.

2 Orden Ministerial, 3 de julio de 1995 (B.O.E. núm. 165 de 12 de julio)
Figure 1: Map showing zones and uses in maritime area in Cabo de Gata-Níjar Natural Park

Source: MAPA

This territory has also habitats under a number of environmental protection measures. For example, the figure of Special Protection Area for birds (1989), Wetland of International Importance for the habitat “Salinas del Cabo de Gata”, Biosphere Reserve since 1997, and declaration in 2001 of Specially Protected Area Mediterranean Importance.

The coastline of Carboneras has a straight configuration, interrupted only by the Cape of Cabo de Gata. There are 17 km of sandy beaches, both urban and non urban, which attract an important influx of tourists all year round. One of the most famous beaches for its landscape and natural state of conservation is the beach of “Los Muertos” in the Cabo de Gata Natural Park.
Figure 2: Configuration of the Carboneras coast with beaches, and the famous beach of “Los Muertos”. Source: Web Carboneras municipality

Figure 3: Non urbanized beach in Carboneras.
2. DEMOGRAPHIC ASPECTS

2.1. Population and population age structure

The Instituto Español de Estadística (INE) provides figures for the municipality of Carboneras. The total population of Carboneras was 7,964 in 2009, (4,122 men and 3,842 women).

In the period between 1996 and 2009, Carboneras increased its population by 28%, a growth rate higher than the average for the province of Almeria and more than many other Spanish fishing communities, for example Costa da Morte or Viveiro. This positive evolution is due not only to the general positive demographic growth ratios registered in the Almeria province but also to immigration into the Carboneras community.

Source: own elaboration based on data from Instituto Español de Estadística.

Figure 4: Changes in the population of Carboneras 1996-2009
Despite of this very positive demographic evolution, there is a progressive ageing of the local population, as in most municipalities of Spain, as people live longer and birth rates decrease.

The population pyramid (Figure 6 below) illustrates the age structure of Almeria province, which includes the situation in Carboneras. This shows the increase in the proportion of people over the age of 60 in the local population. The population pyramid is a representation of the age and sex structure of the population. Each bar represents a particular single year of age and the length shows the population of that age. The structure of the pyramid is determined by births, deaths and migration. Up to the age of around 70, the number of males and females are fairly equal. At the top of the pyramid, from the age of 71 onwards, females outnumber males more. This is shown by longer bars on the female side of the pyramid. This reflects the higher life expectancy of women at older ages.

The pyramid also shows the ‘bulge’ of the ‘baby boomers’ born in the 1960s moving into the older ages. A sharp narrowing of the pyramid appears between the ages of one and 20 reflecting lower fertility rates from the late 1980’s to early 2000’s. The age census of 2001 reflects a substantial decrease in the age pyramid base corresponding to younger people (under 20 years) and the increase of older ones, translating into a slim base of the pyramid base.
2.2. Ethnicity and migration

Immigration has had an important impact in the positive evolution of local population. The immigration, mainly by foreigners, has resulted in a positive net flow to Carboneras over the last two decades.

The number of foreigners registered in Carboneras is around 925, representing 12% of total population. The main origin of this immigration is Morocco, associated with labour needs in agriculture and construction. Furthermore, the shortage of employment in fisheries has favoured inmigration of nationals from both Peru and Senegal.
3. ECONOMIC ASPECTS

Carboneras, together with its traditional economic activity, has established itself as an industrial centre, producing energy and cement. The local service sector and port activity has been increasing and there has been an increase and expansion of coastal tourism.

Currently, unemployment rates are high in Spain (around 20%) and the situation in Andalucia is more extreme, with a higher unemployment rate than the Spanish average. The province of Almeria recorded in 2010 an employment rate of 29.9% for men and 28.9% for female. Carboneras municipality is not an exception to the provincial average. Following a period in which unemployment fell during the early 2000s, unemployment has began to rise and has reached around 25% by 2010.

Carboneras has an average GDP per capita similar to the Almeria average, which in turn, is around 27% below the Spanish and EU average. The average declared income per capita in Carboneras is around 17,000 Euros, also below EU and Spanish average.

3.1. Importance of economic activities

The entire region has been lagging behind in terms of economic development in comparison with most Spanish regions. However, in the second half of the 20th century, this area witnessed a spectacular economic growth due to the rapid increase in coastal tourism and the development of intensive agriculture. Plants are now grown year-round in massive ‘invernaderos’ - plastic-covered "greenhouses" - for intensive vegetable production. Furthermore, the plans of re-industrialisation in the 1970’s led to the establishment of a cement factory (belonging to Holcim group) and a coal power plant in Carboneras (belonging to Endesa group). Finally, with an investment of around 235 million Euros, the biggest desalination plant of seawater in Europe was inaugurated in 2005, ensuring regular supply of water for the needs growing population in the region, for the intensive agriculture developments and for the increasing demand of water from the local coastal tourism.

The coastal tourism sector in the community has the capacity to provide around 700 beds. The location of Almeria airport, just seven kilometres from Carboneras, the relatively good state of conservation of its coastal amenities, the environmental values of the Natural Park of Cabo de Gata and the sunny and warm climatic conditions are key factors that have played a role in boosting local coastal tourism.

Fuelled by the development of coastal tourism and local economic growth, the construction sector has experienced a strong development over the last ten years to the extent that construction accounts for around 22% of total enterprises in the municipality of Carboneras. The recent crisis of the construction sector has led to relatively unskilled workers becoming unemployed and they have been seeing fisheries and agriculture as potentially providing alternative employment. However, in Carboneras these sectors do not have the capacity to absorb this surplus workforce and according to local informants, employment in fisheries has itself been showing a steady downward trend.
Source: own elaboration based on local statistics

**Figure 7:** Contribution of different economic sectors to total number of companies in Carboneras

**Figure 8:** Industrial port of Carboneras, showing the location of the cement factory and coal power plant
There are no estimates of the direct contribution of the fishing industry to the local economy. Based on data detailed in the next sections of this report, the Table 1 below presents estimates of GDP generated by the local catching, aquaculture, processing, marketing and ancillary sub-sectors in Carboneras. The method used was to apply a turnover and gross value added rate that was estimated from the Annual Economic Report 2009, economic statistics from the Spanish Ministry of Agriculture and Fisheries for the fishing fleet, and the Andalucia fleet register, as well as statistics collected locally.

In order to analyze the contribution of fishing to local economy, we can look at the estimation of GDP. GDP for Carboneras municipality is estimated at 87 million Euros, while GDP due to fisheries activities is estimated at 2.5 million Euros, therefore the direct contribution of fisheries to local GDP is around 3%. This low value is due to the statistical effect caused by considering in this analysis the rent generated by high capital intensive industries of the cement factory and power plant. When considering employment contribution to the community, the importance of fishing is much more evident given the labour intensive nature of the local fleets.

**Table 1: Estimates of contribution to GDP generated by the fishing industries (2009, in € million)**

<table>
<thead>
<tr>
<th></th>
<th>GDP contribution (€ million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fishing fleet</td>
<td>1.3</td>
</tr>
<tr>
<td>Aquaculture</td>
<td>0.5</td>
</tr>
<tr>
<td>Processing</td>
<td>0</td>
</tr>
<tr>
<td>Ancillary and marketing</td>
<td>0.7</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>2.5</strong></td>
</tr>
</tbody>
</table>

*Source: own elaboration*
3.2. Employment and unemployment

Employment

Direct employment, onboard in the fishing fleet, in Carboneras was 387 workers in 2006, employment on board amounted to 355 fishermen, which represents a reduction since the 1990’s. The aquaculture sub-sector employed 32 people and ancillary activities employed a further 87 persons in Carboneras. Historically the creation of new and better paid jobs in the local service sector has created a shortage of employees for the fisheries sector due to its less relatively attractive working conditions. This shortage has been satisfied by migrant workers coming in to the area and the sector.

The majority of direct employment Carboneras is of men, while women represent only 7% of total employment in fisheries, aquaculture and ancillary industries. Possibly this is due to the lack of a processing sub-sector.

Table 2: Fishing employment in Carboneras, 2006.

<table>
<thead>
<tr>
<th>RELATED ACTIVITIES EMPLOYMENT</th>
<th>DIRECT EMPLOYMENT</th>
<th>Employment (355 on board, 32 aquaculture)</th>
<th>387</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Operators</td>
<td>76</td>
</tr>
<tr>
<td>INDUSTRY</td>
<td></td>
<td>Employment</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Operators</td>
<td>0</td>
</tr>
<tr>
<td>MANAGEMENT/ADMINISTRATION</td>
<td></td>
<td>Employment</td>
<td>16</td>
</tr>
<tr>
<td>SUPPLIES</td>
<td></td>
<td>Operators</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Employment</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Operators</td>
<td>3</td>
</tr>
<tr>
<td>REPAIRS AND MAINTENANCE</td>
<td></td>
<td>Employment</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Operators</td>
<td>3</td>
</tr>
<tr>
<td>RESTAURANTS</td>
<td></td>
<td>Employment</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Operators</td>
<td>0</td>
</tr>
<tr>
<td>COMMERCIAL SERVICES</td>
<td></td>
<td>Employment</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Operators</td>
<td>11</td>
</tr>
<tr>
<td>TOTAL RELATED ACTIVITIES</td>
<td></td>
<td>Employment</td>
<td>87</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Operators</td>
<td>21</td>
</tr>
</tbody>
</table>

Source: FLAG Levante Oriental
As the employed population in Carboneras is currently in the region of 2,600 people, the average employment dependency on fishing activities is around 18%. If indirect activities associated to fishing activities are taken into account, the average fisheries dependency in Carboneras municipality would be around 22%. After Huelva, this area shows the largest degree of dependency on fishing activities within Andalucia.
Figure 11: Fisheries dependency in Andalucia, 2008.

Source: Consejería de Agricultura y Pesca, Junta de Andalucía.

Figure 12: Territorial distribution of fisheries dependency in Andalucia, 2008, (red colour represents largest employment dependency on fisheries)

Source: Consejería de Agricultura y Pesca, Junta de Andalucía.
In this regard, the fisheries dependency in this community has been reducing since the 1990’s. This has been as a result of both emerging better paid jobs in other sectors and the reduction in fleet employment. In 1996 the employment in the fleet was 551, and this had been reduced to 355 in 2006, representing a reduction of 36%. On the other hand, the employment in the aquaculture sub-sector has increased by 19% between 2001 and 2009. However, in real terms this represents only six people and it does not compensate for the important loss of employment in the fleet.

Unemployment

Until 2007 the unemployment rate in Carboneras was falling but this situation has changed since 2009 with the unemployment rate rising to around 25%. The principal reason for this has been that one of previous strengths of the economic base in Carboneras, the construction sector supporting coastal tourism development, has turned into a weakness, making redundant part of its workforce.

3.3. Infrastructure

Access and road network

Almeria area has traditionally been underdeveloped in term of infrastructure, access and communications. Structural funds (mainly ERDF) have facilitated an improvement in the road network along Almeria coast. Almeria and Carboneras can be reached along the A-7 Mediterranean Highway, connecting the Mediterranean region with the Spanish A-92 that unites it with the rest of Andalusia. Given the current connections to major motorways, the transport time by lorries from Carboneras to Madrid is about six hours.

By air, Carboneras is served by Almería International Airport which is the fourth largest in Andalusia and services both domestic and international flights, mainly to Amsterdam, Madrid, Barcelona, Melilla, London, Manchester, Birmingham, Brussels, Dublin and Swiss, German and other EU cities. This airport is located around seven kilometers from Carboneras. Distance from Carboneras to the main cities is: Almeria 64 km, Sevilla 480 km, Madrid 578 km.

Carboneras is also connected by the sea and the neighbouring port of Almeria has connections to Melilla, Algeria and Morocco, and there are also tourist cruises in the Mediterranean. Connection from Almeria with the following destinations is possible: Trasmediterranea: Ghazaouet (Algeria), Oran (Algeria), Nador (Morocco), and Melilla. Comarit: Nador, Comanav: Nador.

Carboneras hosts not only a fishing port but also a merchant and yachting port (puerto deportivo). The yachting port contributes to promote nautical tourism in the area, taking advantage of the good sailing and climatic conditions in this area. Following from the success of this development there are plans to expand the capacity of the yachting port with a total investment close to 25 million Euros. However the current cuts in infrastructure investment could postpone the execution of this project.
The merchant port is a key element in the industrial development of Carboneras community, the port is mainly used by the Holcim-Endesa industrial plants to bring in raw materials (coal, lime, wind turbine pieces) and to ship out cement, minerals and goods. The current dock can handle ships of up to 7,000 tons. It is mainly used to ship in coal for the electric plant and raw materials for the Holcim cement works. There is an ongoing project with important public investment to expand the port and improve its capacity to host larger merchant vessels.

Carboneras hosts the biggest desalinisation plant of seawater in Europe and the water is used in industrial, agricultural and service sector processes.

Concerning public services:

**Health sector**: Carboneras hosts several centres of health care and clinics (*Centros de salud*) as well as centres for the elderly and social assistance;

**Training and education**: Carboneras has a network of primary and secondary schools and centres for vocational initial training and continuing education. For higher education, students from Carboneras can go to Almeria campus, which is around 70 kilometres away.
3.4. Local development plans

Carboneras local development strategy is set within the framework of the Operational Programme 'Andalucia' 2007-2013 under the European Regional Development Fund (ERDF). Priorities within this framework are being translated in Carboneras into important investments to strengthen key local infrastructures such as the industrial and yachting ports. Under the previous Programme (2000-2006) one of the most important public investments was in the seawater desalination plant.

Within two years, Carboneras is set to become the largest industrial port in Almería, following a 20 million Euro contract tendered in 2009. Once this project has finalized, the Holcim/Endesa industrial port will have been expanded to 400m with and 18m draft, allowing ships of up to 100,000 tons to dock. The new port is expected to be able to handle around eight million tons a year, worth around 100 million Euros a year. Furthermore, it is expected that this development will create around 300 new jobs for the city of Carboneras. The port will be connected to the motorway and the new industrial park being built in Carboneras.
4. FISHERIES AND AQUACULTURE SECTOR

From January to December 2008, around 442 tons of fisheries products were auctioned at the port of Carboneras, worth an estimated 0.5 million Euro. From 1996 to 2008, the volume of landings marketed in Carboneras fish auction has fallen by around 75%, and value of landings has declined by 74% in the same period. As a result, the relative position of Carboneras in the context of the Andalucía fisheries sector has been reduced.

The most important fleet in this port is the surface long liners targeting swordfish and tuna species in the Mediterranean Sea. Carboneras hosts the largest fleet of surface longliners in the Spanish Mediterranean ports but most local surface longline vessels do not land at the Carboneras fish auction. This is an important point because it means that the economic importance of the catching sub-sector in Carboneras is larger than the value of landings at the Carboneras fish auction would suggest.

Despite this, the index of fishing decline\(^3\) elaborated for this area indicates a decline of 12.78 points from 1996 to 2008 for Carboneras, the second worst evolution in Andalucian fishing areas.

\[\text{Index of fishing decline} = \begin{cases} -12.78 & \text{Almería Oriental} \\ -5.03 & \text{Almería Occidental} \\ -19.43 & \text{Motril/ Granada} \\ -3.38 & \text{Málaga} \\ -1.31 & \text{Cádiz Estrecho} \\ -3.65 & \text{Huelva} \end{cases} \]

**Figure 14: Index of fishing decline in Andalucia, 1996-2008.**

\(^3\) This is an index elaborated by the regional administration based on the combined evolution of fishing, employment, fleet and landings.
4.1. Details of the local catching sector

In 2009, the fleet of Carboneras was made up of a total of 71 fishing boats, representing a total tonnage of 3,822.54 GTs and power of 11,723.80 HP, with the surface longline segment representing the most important fleet segment in this port (Table 3).

Table 3: Fleet segments in the port of Carboneras, 2009.

<table>
<thead>
<tr>
<th>Segment (length class)</th>
<th>Number of vessels</th>
<th>main gears used</th>
<th>Number of crew (average)</th>
<th>Main species fished (list at least 3 and up to 5 for all fleet types)</th>
<th>Main fishing locations (ICES areas)</th>
<th>Trip length (average days)</th>
<th>GT</th>
<th>KW</th>
</tr>
</thead>
<tbody>
<tr>
<td>00-12</td>
<td>18</td>
<td>Artisanal</td>
<td>1</td>
<td>Small pelagics</td>
<td>Coastal waters Almeria</td>
<td>1</td>
<td>45</td>
<td>546</td>
</tr>
<tr>
<td>12-24</td>
<td>5</td>
<td>Coastal purse seiner</td>
<td>5</td>
<td>Sardine, mackerel</td>
<td>Coastal waters Almeria</td>
<td>1</td>
<td>373</td>
<td>1,545</td>
</tr>
<tr>
<td>12-24</td>
<td>4</td>
<td>Bottom longliner</td>
<td>6</td>
<td>Hake</td>
<td>Coastal waters Andalucia</td>
<td>3</td>
<td>72</td>
<td>497</td>
</tr>
<tr>
<td>12-24</td>
<td>6</td>
<td>Bottom trawler</td>
<td>6</td>
<td>Hake, red shrimp</td>
<td>Coastal waters Andalucia</td>
<td>3</td>
<td>486</td>
<td>1,466</td>
</tr>
<tr>
<td>12-24</td>
<td>38</td>
<td>Surface longliner</td>
<td>8</td>
<td>Swordfish, tuna species</td>
<td>West Mediterranean</td>
<td>10</td>
<td>2,845</td>
<td>7,669</td>
</tr>
</tbody>
</table>

Source: own elaboration based on data from Instituto Andaluz de Estadistica and collection of local data.

Table 4: Fleet segment characteristics in the port of Carboneras, 2009.

<table>
<thead>
<tr>
<th>Bottom trawlers</th>
<th>Number of vessels</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average GT</td>
<td>81.08</td>
</tr>
<tr>
<td></td>
<td>Average Power (HP)</td>
<td>244.33</td>
</tr>
<tr>
<td>Bottom trawlers</td>
<td>Number of vessels</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Average GT</td>
<td>74.7</td>
</tr>
<tr>
<td></td>
<td>Average Power (HP)</td>
<td>309</td>
</tr>
<tr>
<td>Artisanal Fleet</td>
<td>Number of vessels</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Average GT</td>
<td>2.51</td>
</tr>
<tr>
<td></td>
<td>Average Power (HP)</td>
<td>30.33</td>
</tr>
<tr>
<td>Surface Longline</td>
<td>Number of vessels</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>Average GT</td>
<td>74.87</td>
</tr>
<tr>
<td></td>
<td>Average Power (HP)</td>
<td>201.83</td>
</tr>
<tr>
<td>Bottom Longline</td>
<td>Number of vessels</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Average GT</td>
<td>9.34</td>
</tr>
<tr>
<td></td>
<td>Average Power (HP)</td>
<td>88</td>
</tr>
<tr>
<td>Total</td>
<td>Number of vessels</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>Average GT</td>
<td>53.83</td>
</tr>
<tr>
<td></td>
<td>Average Power (HP)</td>
<td>165.12</td>
</tr>
</tbody>
</table>

Source: FLAG Levante Oriental
Carboneras port hosts around 60% of all the vessels in the entire Andalucía surface longliner fleet with 38 of the 72 Spanish fishing vessels involved in this fishery in 2009. The number of vessels fluctuates as there are seasonal licenses given to the vessels for different kind of fisheries. This concentration creates a strong dependency by the Carboneras fleet on the Mediterranean swordfish fishery. These surface longliners target swordfish (60% of total catch composition), as well as some tuna species (30-40% of total catch composition). The segment was made up of 38 surface longliner in 2009 with an average tonnage of 75 GT per vessel (Table 4), they operate in the West Mediterranean Sea, but with a fleet dynamics and fishing strategy changing with the season. The evolution and management of this fishery therefore has an important impact on the employment within this community. While the surface longline segment has remained important to Carboneras, in other segments there have a strong reduction in bottom long liner between 2001 and 2009.

While the number of vessels has reduced by five units between 2001 and 2009, engine power has remained practically constant and the tonnage in GT has increased by 23% in the same period. This increase in tonnage is in line with the recent development of the surface longliner fleet that have been supported by substantial investments from IFOP 2000-2006. In spite of the increase in fleet tonnage, employment on board has reduced by 36% from 1996 to 2008.

The Carboneras fleet targeting swordfish uses mainly surface longline gears, but swordfish are also caught occasionally by semi-pelagic longline ("piedra-bola") and as by-catch of the longline fishery that targets bluefin tuna and albacore. The traditional longline gear is increasingly being substituted by American-style longline gear, which is currently being used by about 29% of the vessels.

Most of the surface longline segment does not land their catches in Carboneras. More often catches are landed in other Mediterranean ports such as Calpe, Vinaroz and Altea or Portocolom in Mallorca. This is due to the proximity of fishing grounds and as a strategy to reduce fuel and transportation costs to the main markets. The value of landings of this segment (in all ports) was 1.2 million Euros in 2009. In support of fisheries management efforts, the fleet segment has also been carrying out pilot projects in partnership with scientific institutes to experiment with more selective fishing techniques in order to assess and reduce possible by-catch of birds.

The fishing area extends for the longline fishery from the Iberian Peninsula to 06ºE and up to the limits of the Moroccan and Algerian territorial waters (Figure 15). The major activity takes place in the summer and autumn months. The American style longlines showed an increase in the mean weight of the catch. As regards fishing effort, it has been stable recently.
The artisanal fleet in Carboneras fishes with a variety of passive gears, so called *artes menores* (traps, hooks and *palangrillos*, netters such as *trasmallo*). These vessels operate in the coastal waters, leaving and returning to port within a day. The *artes menores* fleet targets mainly crustaceans, cephalopods, and coastal fish species. Many of the smaller boats (see Table 4) are operate on a part-time basis with these fishermen engaged in other occupations, including agriculture.

The share of the catch from this segment by volume in Carboneras in 2008 was: Melva (38%), Mackerel (25.5%), Sardine (14.9%), Gilt sardine- *Sardinella aurita* (5.9%), Horse Mackerel (5.2%), Salema (4.3%) and Swordfish (2.8%).

And the share by value of the main species in 2008: Melva (26.9%), red shrimp (17.4%), mackerel (15.4%), Swordfish (14.1%), Sardine (11.9%), Bluefin tuna (3.4%), Gilt sardine (2.8%), Horse Mackerel (2.2%).
4.2. Fish stock status for Carboneras fleet

Mackerel (*Scomber japonicus*) in Geographical Sub Area 3. Southern Alboran Sea
The level of catches is unknown. No precautionary reference points have been proposed for this stock. The biomass estimate obtained by the acoustic survey is 3,000 t. The information presented on this stock and fishery is poor and, in the absence of any reliable biological reference points, it is not possible to assess the status of the resource or its exploitation rate.

Horse mackerel (*Trachurus trachurus*) in Geographical Sub Area 3. Southern Alboran Sea Total fishing fleet is composed by 147 boats, distributed in seven Mediterranean ports, targeting small pelagics. The level of catches is unknown. The biomass estimate obtained by acoustic survey is 71,000 t. The information presented on this stock and fishery is poor and, in the absence of any reliable biological reference points, it is not possible to assess the status of the resource or its exploitation rate.

Mediterranean Swordfish: Mediterranean swordfish fisheries are characterised by high catch levels with average annual reported catches similar to those of larger areas such as the North Atlantic. Currently, swordfish fishing is carried out all over the Mediterranean Sea. The biggest producers of swordfish in the Mediterranean Sea in recent years (1998-2008) are Italy (45%), Morocco (19%), Greece (10%), and Spain (10%). Also, Algeria, Cyprus, Malta, Tunisia and Turkey have fisheries targeting swordfish in the Mediterranean. Incidental catches of swordfish have also been reported by Albania, Croatia, France, Japan, Libya, Syria and Portugal. The Group recognized that there might be additional fleets taking swordfish in the Mediterranean, for example, Israel, Lebanon, Egypt and Monaco, but no data are reported to ICCAT or FAO for these countries.
Mediterranean total swordfish landings showed an upward trend from 1965-1972, stabilised between 1973-1977, and then resumed an upward trend reaching a peak in 1988 (20,365 t). The sharp increase between 1983 and 1988 may be partially attributed to improvement in the national systems for collecting catch statistics rather than any significant changes in what is caught.

Since 1988, the reported landings of swordfish in the Mediterranean Sea have declined, and since 1990, have fluctuated between about 11,000 to 16,000 t. In 2008 catches were 12,164 t. Reported catches for 2009 were very incomplete. The driftnet fishery for swordfish has been banned since January 1st 2002 in EU countries and from 2004 in all ICCAT Mediterranean countries, but illegal fishing is known to still occur in various areas. The use of nets and longlines in sport and recreational fishery was banned from 2004. ICCAT imposed a Mediterranean-wide one-month fishery closure for all gears targeting swordfish in 2008. Additionally several countries have imposed technical measures, such as closed areas and seasons, minimum landing size regulations and license control systems.

STECF agreed with the finding that the stock is overfished (Biomass is below \( B_{\text{MSY}} \)) but is unable to quantify by how much it is overfished. Nevertheless, STECF broadly agreed with the advice from ICCAT regarding fishery closures and recommended that any fishery closure (no fishing with surface longlines and eradication of all illegal driftnet fisheries) should apply to the entire Mediterranean area and extend for a minimum of two months. STECF also has recommended that fishing capacity for swordfish should not be allowed to increase and preferable that it be reduced. Managing the fishery is challenging and there remains a high and growing demand for swordfish for fresh consumption in most Mediterranean countries.

A Mediterranean swordfish fishery management plan has been recommended that will ensure that the stock will be rebuilt and kept at levels that are consistent with the ICCAT Convention objective. Analysis has suggested that the seasonal closures may have beneficial effects and could move the stock condition to the level which will support MSY, but the effect of the recently employed two-month closure could not be evaluated due to incomplete 2009 data.

Following the results from recent studies, technical modifications of the longline fishing gears, as well as, the way they are operated can be considered as an additional technical measure in order to reduce the catch of juveniles. It has been recommended that this type of measure should be considered as part of a comprehensive Mediterranean swordfish management plan. Management measures aimed at reducing fleet capacity should also be considered as part of a Mediterranean swordfish management plan adopted by the Commission. Currently the Spanish swordfish longline fishery in the Mediterranean is regulated\(^4\), as a minimum size limit has been established at 90 cm and a closed season from 1 October to 30 November. Also, management of this fishery comprises other measures that affect the limit on fishing effort, as well as limitations concerning the fishing technology.

\(^4\) Swordfish fishing by surface longline in the Mediterranean is subject to regulation by the Decree of 27 July 2006 that regulates the technical characteristics of the gears and the minimum size for the catch, among others.
### Table A 1 Management and status of key fisheries for Carboneras fleet

<table>
<thead>
<tr>
<th>Species</th>
<th>Area</th>
<th>Management responsibility</th>
<th>Stock status relative to MSY (above, near, below, unknown)</th>
<th>main management regulations affecting the stock e.g. Area closures, quotas, specific recovery plans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hake</td>
<td>VIIc</td>
<td>EU-Spanish Gov</td>
<td>Below</td>
<td>Temporal closure, minimum size.</td>
</tr>
<tr>
<td>Swordfish</td>
<td>VII-VI</td>
<td>EU institutions ICCAT</td>
<td>Below</td>
<td>Temporal closure of two months, minimum size.</td>
</tr>
<tr>
<td>Mackerel</td>
<td>VIIc</td>
<td>Regional Gov</td>
<td>Unknown</td>
<td>Temporal closure, minimum size.</td>
</tr>
<tr>
<td>Melva</td>
<td>VIIc</td>
<td>EU-Spanish Gov</td>
<td>Unknown</td>
<td>Temporal closure, minimum size.</td>
</tr>
</tbody>
</table>

#### 4.1. Fisheries infrastructure

Capacity and dimension of the fisheries infrastructure in Carboneras remains relatively modest. There is a small harbor (see Figure 16) with facilities that cater mainly for the artisanal and purse seine fleets. However, the port in Carboneras has good infrastructure in relation to the volume of landings and the handling capacities are adequate to the local fleet. While most of the surface longliner based on Carboneras land their catches in other ports, there has been a slight increase in vessels landing in Carboneras as a result of a distribution contract with a company from Murcia that expired in 2009.

The fishing port infrastructure complies with the health regulations and fishing products trade regulations established in the EU legislation. There is a new machine for ice production that was installed at a cost of 0.4 million Euros, co-financed by funds from FIFG.
4.2. Details of the local processing sub-sector

There is no processing sub-sector in Carboneras. This is one of the reasons that the level of dependency appears to be quite low. Catches landed by local fleets are directly marketed without any value-added within the community, and in some cases the fish are processed in other ports. This represents a potential opportunity for future development.
4.3. Details of the local aquaculture sub-sector

Aquaculture is present in Carboneras and is the only fisheries sub-sector which has increased its employment, from 26 in 2000 to 32 in 2009. There are 3 companies in Carboneras with floating cages for the fattening of seabream and seabraß and producing around 500 tons annually. Local aquaculture plants also produced 23.3 millions of alevins of these species in 2008.
Figure 18: Production of alevins by Predomar S.L.

Figure 19: Production of alevins by Carmar S.L.
4.4. Details of the local ancillary sub-sector

The total employment provided by ancillary activities in Carboneras is 82 people. Indirect employment in the sub-sector includes those involved in the construction and repairing of fishing boats, auxiliary naval industrial fishing, transport, supplies, management, etc. It is difficult to assess the ancillary sector directly related to the fishing industry as there are various companies that worked mainly in fisheries in the past and still continue to do so, but at a lower level. For some of these companies, the fishing industry is now only a minor part of their market, although for some it may still represent an important contribution.
5. GOVERNANCE

5.1. Key local institutions

The institutional management consist of a co-management system between fishers’ organisations (cofradias) and the fisheries authority through territorial user rights for fishing (TURFs).

Some fundamental characteristics of this system are as follows:

- The organisation includes all the fishermen that are working in their geographical area.
- The institution has a democratic structure with two representative groups: the owners and the crew. Each group elects the same number of members in the Executive bodies.
- In some cases, the desegregation by gears is established (trawl is normally the most important, but is possible to establish sections for purse seine, long line, shell gathering or other minor gears called artisanals).
- It is compulsory for the members to sell at the auction market associated with the organisation. Nowadays, the most part of them are electronically equipped and provide basic data on landings to the administration.
- To support the administrative cost of the organisation a levy on sales of between 1.5 and 3% is levied.
- The organisations are non-profit making. Any surplus is used to improve infrastructure (normally the organisations provide shops with vessel equipment, gears, ice, etc.) or redistribute it to the members (i.e. as additional pension to retired members or widows, to pay ritual holidays, etc.).
- Under the general laws and rules established by the European Commission, Spanish Ministry and Regional Government of Andalucia, the organisations can establish additional rules: control the fishing time, accept or forbid fishing gears in the area, accept or not new members, establish areas or time of closures, etc.
- The importance of this institution is their control and punishment power. All members participate in the surveillance of collective agreements and the transgressor is punished in real time at the market: their products are not allowed to be sold in the market or they are forced to sell last (resulting in lower prices). Other forms of sanction include social isolation or exclusion from the collective services (shops, ice, bar, etc.).

As the traditional bodies in Spain for facilitating organisation within the coastal fisheries sector and representing their interests in the broader community, the cofradias tend to be heavily involved in the Spanish FLAGs. Indeed, many of them have years of experience in promoting local development within the sector.

The local FLAG is the Levante Oriental FLAG. The decision-making body for this group is made up of several individual entities including all cofradias from the area (Carboneras and Garrucha) and private associations of ship owners (Carbopesca), and run by a two full time staff.
The public intervention by Levante Oriental FLAG is dependent on the advance payments from Regional Administration, and the methodology/process used for intervention is as follows:

- Local actors (potential beneficiaries) present projects to the FLAG;
- The selection committee of FLAG considers and selects projects;
- FLAG decides the level of funding to be extended to proposed projects and refers selected projects to the Regional Administration for eligibility checks;
- Regional Administration delivers the funding directly to the final beneficiary at the request of the FLAG;
- The FLAG itself receives and manages all funds and therefore makes the payment to the final beneficiaries;
- FLAG responsible for the follow-up necessary to ensure effective implementation of projects.

One of the main focuses of the action of the FLAG will be to support the creation of value added in the local landings.
5.2. Public intervention

Non fisheries specific support

Non-fisheries support has been very important in Carboneras, much more than fisheries support in the recent past. For example, the investment of around 235 million Euros to construct the biggest desalination plant of seawater in Europe, inaugurated in 2005. This plant ensures regular supply of water for the needs growing population in the region, for the intensive agriculture developments and for the increasing demand of water from the local coastal tourism.

Past support to fisheries

With respect to fisheries, Figure 22 and Table 5 below present the public sector investment under the 2000-2006 FIFG funds. Most investment has been associated with the surface longline fishing fleet development. The fishing industry of Carboneras has received a substantial amount of FIFG funds, around 16 million Euros. The main uses and expenditures were the construction of new industrial vessels (around 16 in the period 2000-2006), experimental fishing (around 10), temporary cessation and port infrastructure. The most expensive investments related to new constructions of vessels.

Source: own elaboration based on local data and stakeholders interviews.

Figure 21: Breakdown FIFG 2000-2006 by measures.
Table 5: Public investments in Carboneras community

<table>
<thead>
<tr>
<th>Public investment (Millions €)</th>
<th>Source of funding</th>
<th>What was the investment intended to achieve?</th>
<th>What were the expected outcomes?</th>
<th>What were the outcomes?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approximately €1-0.5 million per vessel, co-financed with €0.4-0.4 from FIFG. (Around 16 new units in the period 2000-2006)</td>
<td>FIFG/National administration /Andalucian administration /Private</td>
<td>Construction of new fishing units (surface longliners)</td>
<td>Reducing operational costs of the vessels and increasing safety.</td>
<td>Achieved regarding reduction of operation costs and increasing safety. Increase of fishing capacity in a fishery currently overexploited.</td>
</tr>
<tr>
<td>€0.8 million co-financed with 0.3 from FIFG</td>
<td>FIFG/National administration /Andalucian administration /Private</td>
<td>Cages for fattening of seabrass and seabream</td>
<td>Increase aquaculture production</td>
<td>Achieved</td>
</tr>
<tr>
<td>€0.5-0.3 million co-financed with 0.4-0.2 from FIFG (Around 10 new units in the period 2000-2006)</td>
<td>FIFG/National administration /Andalucian administration /Private</td>
<td>Experimental fishing and pilot projects</td>
<td>New fishing gears more selective to reduce juveniles bycatch and avoid incidental catches of turtles/birds</td>
<td></td>
</tr>
<tr>
<td>€0.7 million co-financed with 0.5 from FIFG</td>
<td>FIFG/National administration Andalucian administration /Private contribution</td>
<td>Fishing port infrastructure and storage capacity</td>
<td>Maintaining or increasing landing activities</td>
<td>Not achieved, but as from 2009 the situation seems to start to change as there are more local surface longliners landing in Carboneras</td>
</tr>
<tr>
<td>€0.2 million co-financed with 0.1 from FIFG</td>
<td>FIFG/National administration /Andalucian administration /Private contribution</td>
<td>Ice machine</td>
<td>Improving first sale process and quality of local fish products.</td>
<td>Achieved</td>
</tr>
<tr>
<td>Below 15,000€, co-financed with FIFG.</td>
<td>FIFG/National administration /Andalucian administration</td>
<td>Temporary cessation of activities.</td>
<td>Adjustments of fishing effort</td>
<td></td>
</tr>
<tr>
<td>Public investment (Millions €)</td>
<td>Source of funding</td>
<td>What was the investment intended to achieve?</td>
<td>What were the expected outcomes?</td>
<td>What were the outcomes?</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------------</td>
<td>---------------------------------------------</td>
<td>---------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>/Private</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Non fishing public investments

<table>
<thead>
<tr>
<th>€250 million co-financed with EU cohesion and regional policy (ERDF and cohesion funds)</th>
<th>ERDF/National administration /Andalucian administration</th>
<th>Desalinization seawater plant</th>
<th>Ensure water needs of local population are satisfied.</th>
<th>Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Contribute to coastal tourism, industrial and agriculture development.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>€20 million co-financed with EU cohesion and regional policy (ERDF and cohesion funds)</th>
<th>ERDF/National administration ERDF/National administration /Andalucian administration</th>
<th>Expand industrial port to allow bigger merchant ships that would reduce the freight costs of factory of cement and coal power plant.</th>
<th>Ongoing</th>
</tr>
</thead>
</table>

| €23 million co-financed with EU cohesion and regional policy (ERDF and cohesion funds) | ERDF/National administration ERDF/National administration /Andalucian administration | Expand yachting port to boost nautical and high-class tourism services the community. | Increase berths from current 90 to 679. | Ongoing |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|--------|

Source: own elaboration based on local data and stakeholders interviews.

**Future public support in fisheries**

The public intervention scheme for the local fisheries sector Levante Oriental FLAG (including Carboneras and Garrucha) has a budget of around 2.04 million Euros for the EFF period 2007-2013. According to the stakeholders consulted this budget is not sufficient to address the problems and needs for improving value added generation capacity in Carboneras fishing sector.

In this context, stakeholders commented that further efforts into alternative employment and value added activities should be encouraged, and this will require regional/national government and EU-support.
For example, given the coastal tourism development in this area, local artisanal fleets could take advantage of synergies with initiatives such as “pesca-turismo” programmes.

Another example for the future public support in fisheries is the development of small scale fish processing facilities in this community to add value to the some species landed by local fleets. Currently, there are no fish processing facilities in the community to add value to the local landings, which are processed in other Andalucian ports. To tackle this weakness, there are plans in the local FLAG to develop future measures to add value to local landings. For example, Carboneras fleet has significant landings of Melva and Mackerel, species which could be processed and marketed by local producers under the recently established Protected Geographical Indications “Melva of Andalucia” and “Mackerel of Andalucia”.

Finally, stakeholders also consider that training and re-training future projects to increase social capital and knowledge remain also necessary; though will have greater impact if entrepreneurship initiatives and increasing new businesses are supported. In particular, continued social support for entrepreneurship activities and training and tourist-related expansion of facilities of the community are important aspects for the future of this community.
6. Stakeholder Analysis

The following details the key stakeholders. As required in the methodology adopted for this study, the data collected during the first step and the trends observed have been shown to a selected group of stakeholder belonging to the community of Carboneras.

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inmaculada Torres</td>
<td>Technician-expert</td>
<td>Local Action Group of Levante Oriental</td>
</tr>
<tr>
<td>Blas Alarcon</td>
<td>Technician-expert</td>
<td>Local Action Group of Levante Oriental</td>
</tr>
<tr>
<td>Simón Pérez</td>
<td></td>
<td>Carboneras cofradia</td>
</tr>
<tr>
<td>Josefa Ruiz</td>
<td></td>
<td>Carbopesca ship-owners association</td>
</tr>
<tr>
<td>Dolores Capell</td>
<td>Main advisor municipality</td>
<td>Ayuntamiento de Carboneras</td>
</tr>
</tbody>
</table>
7. QUALITATIVE INTERPRETATION AND ANALYSIS

7.1. Key events and drivers of change

Population

In the period between 1996 and 2009, Carboneras increased its population by 28%, a growth rate higher than the average for the province of Almeria and than many other Spanish fishing communities. This positive evolution is not only due to the positive evolution of demographic growth ratios in area but also to immigration driven by local economic growth. Associated with the creation of new and better paid jobs in the service sector, there has been a shortage of employees within the fisheries sector due to its less relatively attractive working conditions.

In parallel, the local population is ageing as the ‘baby boomers’ born in the 1960s are moving into the older age and there has been a reduction in birth rates in the 1990s to early 2000s. Despite this, the population projection for next ten years suggests a continuation of positive growth rates in the population of Carboneras.

Economy

The entire region has been lagging behind in terms of economic development in comparison with most Spanish regions. However, in the second half of the 20th century, this area witnessed an important economic growth due to coastal tourism and intensive agriculture, based on greenhouses. Furthermore, diversification into industrial sectors has led to the establishment of a cement factory and a coal power plant.

Fuelled by the development of coastal tourism, the construction sector has experienced a strong development over the past ten years. However the construction sector has substantially reduced its activity since 2010 making redundant a large proportion of its unskilled workforce and resulting in a high local unemployment rate.

Fisheries

Key drivers within the sector include:

- While the number in vessels has reduced in five units from 2001 to 2009 and the power has remained practically similar, the tonnage in GT has increased by 23% in the same period. This increase in tonnage is in line with the recent development of the surface longliner fleet in this port supported by FIFG funding. However, in spite of this increase in fleet tonnage in the local fleet, the employment on board has reduced by 36% from 1996 to 2008.

- Carboneras port hosts around 60% of the total number of Spanish vessels in the surface longliner fleet in Mediterranean Sea, this concentration and port specialisation creates a strong dependency of Carboneras fleet on the Mediterranean swordfish and tuna fishery. Therefore, the evolution and management of this fishery has an important impact in the employment and wellbeing of this community.
Scientific advice (STECF, ICCAT) broadly agreed that the Mediterranean Swordfish stock is currently overexploited, and recommend that any fishery closures should apply to the entire Mediterranean area and extend for a minimum of two months. It has also recommended that fishing capacity for swordfish should not be allowed to increase and preferable that it be reduced.

This fleet has been facing the increased competition from other foreign fleets. According to local stakeholders, many of these other fleets are less well regulated and are involved in IUU fishing. Stakeholders also pointed out that illegal drift-net fishing still occurs in the Swordfish/tuna fishery. According to them, these drift-nets exacerbate the problems of overexploitation and declines in yield as they are more harmful for the stock than the relatively more selective fishing gears (longlines) used by the Carboneras fleet.

From 1996 to 2008 the volume of landings marketed in Carboneras fish auction decreased by 75%, and value of landing went down by 74%. The relative dependency on fisheries in Carboneras in the context of Andalucía fisheries sector has also reduced over this period.

Fisheries dependency in this community has been reducing with the decline in the fisheries sector since the 1990’s. In spite of this, Carboneras is currently the second most fisheries-dependent community in Andalucía.

7.2. Adaptation

Population and economy

The employment shortage in local fleets has been addressed in the short term by using immigrant labour from Peru and Senegal. The lower costs of this immigrant labour has also helped the catching sector to deal with the increased fuel costs and reduced landings.

Outside the sector, one of the adaptive responses of those becoming unemployed in recent years from construction and services has been turning their attention to primary sectors (fishing and agriculture activities).

With exception of the construction sector, which is in a deep crisis, the rest of local economy continues to be dynamic and integrated in the development of the community, in fact there is a project to expand the industrial port of Carboneras to allow larger merchant ships. This sort of diversification is also seen in the service sectors where the areas rich natural vales (e.g. Cabo de Gata Natural Park) are supporting new economic activities associated to coastal tourism and environmental tourism. The projected expansion of local yachting port is a reflection of this new local development associated with nautical tourism. Furthermore, the good quality of seawater in the proximity of the natural park offers the possibility for location new aquaculture cages.

Fisheries

Given the strong dependency of Carboneras fleet on swordfish and tuna fisheries, which are overexploited, local fleet have had to take different measure to adapt to the new context of reduced fishing possibilities:
• Fishing activity of Spanish longline fleet, including Carboneras fleet, is regulated with a minimum size limit established at 90 cm and a closed season from 1 October to 30 November. Also, management of this fishery comprises other measures that affect the limit on fishing effort, as well as limitations concerning the fishing technology.

• Carboneras ship-owners have had to incorporate technical modifications of the longline fishing gears, as well as, the way they are operated as additional technical measures in order to reduce the catch of juveniles. This type of measures are considered as part of a future Mediterranean swordfish management plan.

• Another adaptive responsive by the local fleet has been the use of other Mediterranean ports. This is due to the proximity of fishing grounds or markets as an strategy to reduce fuel costs or transportation costs of the fresh swordfish to the main markets.

• Development of aquaculture has been based on “traditional” species (seabream and seabrass) producing alevins and fattening. According to local stakeholders, there are possibilities of development in the tuna fattening aquaculture in this area given the quality of its coastal waters.

• The local development plan of the fisheries sector in Carboneras is guided by the Fisheries Local Action Group Levante Oriental, which indicate a desired direction and strategy for the future based on adding value to local landings.

7.3. The role of public intervention in the past and in the future

Non fisheries specific support has been very important in Carboneras, much more than fisheries support, both in the recent past and immediate future. The future public intervention in Carboneras is likely to continue to highlight the maritime activities in this community, building on current projects to expand the industrial and service sectors. In this context, we can mention the development of the yachting and industrial ports aimed at boosting the development of coastal tourism and making more competitive the local industrial factories respectively.

Regarding support to fisheries sector, the fishing fleet of Carboneras has received a substantial amount of FIFG funds. The main uses and expenditures were the construction of new industrial vessels (around 16 in the period 2000-2006, mainly for the surface longline fleet), and experimental fishing pilot projects. The development of the swordfish fleet has taken place in a fishery currently overexploited, requiring future fishing effort limitation or reduction. In spite of this fisheries public investment that stimulated a substantial increase in tonnage of the local fleet, the employment in the local fisheries sector has declined by 35% in 10 years.

The future fisheries public intervention should aims at increasing the value added of local catches. Currently there are no fish processing facilities in the community to add value to the local landings, which are processed in other Andalucian ports. To tackle this weakness, there are plans in the local FLAG to develop future measures to add
value to local landings. For example, Carboneras fleet has significant landings of Melva and Mackerel, species which could be processed and marketed under the recently established Protected Geographical Indications “Melva of Andalucía” and “Mackerel of Andalucia”. The elaboration of these processed products in other fishing communities of Andalucia amounted to 17 million Euros, multiplying the price of first-sale by a factor of two or three.

The future fisheries public intervention could also help the local artisanal fleet to take advantage of the strong development in the tourism sector in this community with initiatives such as “pescaturismo” or guided sea-cruises to sight marine mammal and turtles in the surroundings of Cabo de Gata Natural Park. Coastal tourism is in fact one of the main pillar of the local economy.

Furthermore, future fisheries public intervention should support projects involving retraining for the under- and unemployed individuals, benefiting both the community and individuals. This is especially important given the high unemployment rate in this community.

**7.4. Conclusion**

In conclusion, this report has demonstrated a number of trends and important factors with regards to the fisheries sector and the wider economy in Carboneras community.

This community is still strongly dependent on the fishing sector, but this dependency has been reducing as fishing jobs reduce and other job alternatives emerge associated with other maritime sectors including coastal tourism services and local industries.

The Carboneras fishing sector has traditionally specialised in the surface longline fishery for swordfish and tuna and is strongly dependent on the state of the migratory stocks. A substantial amount of FIFGS funds were provided for the construction of new surface longliners in Carboneras, though without increasing the landings in the local port as most of this fleet land in other Spanish ports.

Given the overexploitation of swordfish and tuna stocks, management measures aimed at reducing fleet capacity are likely to be considered as part of a future Mediterranean swordfish management plan and these will have an effect on community within Carboneras.

Stakeholders are also concerned about the IUU fishing in the tuna and swordfish fisheries. According to the stakeholders consulted, there is a not a bright perspective for this local fishing sector if allegedly IUU from some foreign fleets is not tackled effectively. On the other side of the coin, there is a high and growing demand for swordfish for fresh consumption in most Mediterranean countries, offering good future opportunities to this community if the stocks are able to recover.

The recently established local FLAG is focusing its efforts on identifying ways and means to increase the value of local landings. The development of local small scale processing plants that can process some species landed by local boats multiplying the landing prices by a factor of 2-3 (i.e Melva and Mackerel) is seen as an important next step.

Training and re-training projects to increase social capital and knowledge remain also necessary; though will have greater impact if entrepreneurship initiatives and increasing new businesses are supported. In particular, continued social support for
entrepreneurship activities and training and coastal tourism related expansion of facilities in this area are important aspects for the future of this community

Further efforts into alternative employment and value added activities should be encouraged, and this may require regional government and EU-support. Carboneras is, after all, located in an economically underdeveloped region with a very high unemployment rate, and thus an area with few other economic opportunities different to agriculture, construction or tourist-related sectors. The strong development of coastal tourism in this area is precisely an activity which can help fishermen to diversify its activity, for instance initiatives of “pesca-turismo” or “eco-turismo” managed by the local artisanal fleet are good examples of future opportunities.