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| <p><b>Analysis of the Balance between the Fishing Fleet Capacity and the Fishing Opportunities in the Romanian Black Sea Sector in 2015</b><br/> <i>(Alexandru Nicolaev, Eugen Anton, George Țiganov, Cristian Danilov, Valodia Maximov, Cătălin Păun)</i></p> | <p>“Cercetări Marine”<br/> <b>Issue no. 48</b><br/> <b>Pages 67-74</b></p> | <p><b>2018</b></p> |
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**ANALYSIS OF THE BALANCE BETWEEN THE FISHING FLEET CAPACITY AND THE FISHING OPPORTUNITIES IN THE ROMANIAN BLACK SEA SECTOR IN 2015**

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**ABSTRACT**

The common fisheries policy of the European Council decided, after detailed analysis, that measures to manage fishing capacity in a balanced manner with fishing opportunities should be imposed and called on each Member State to initiate early action to adjust the fishing capacity of their fleets to their fishing opportunities [Article 22 of Regulation (EU) No. 1380 / 2013].

In this context, the research work was conducted to assess the balance / imbalance existing between the capacity of the coastal fishing fleet on the Romanian Black Sea coast and the fishing opportunities at the level of each fleet segment.

To achieve this, it was necessary to evaluate each fleet segment and fishing technique, the state of fish stocks and mollusks stocks that have been overexploited, the level of unprofitable fleet segments (inactive) or too little used (number small fishing days), the level of economic indicators (economic performance). Analyzing and interpreting all of the above-mentioned aspects has allowed the assessment of the existing balances / imbalances between the fleet segments and the fish / mollusk stocks on which it depends.

**Key-Words:** Black Sea, fishing capacities, fleet segment, fishing days, fish / mollusk stock status, economic indicators

## AIMS AND BACKGROUND

The assessment of the existing balances / imbalances between the capacity of the coastal fishing fleet on the Romanian Black Sea coast and the fishing opportunities for each fleet segment shall be achieved by a standard method established at European level [Article 22 of Regulation (EU) No 1380 / 2013].

The analysis is based on the data collected through the Fisheries Inspectorate of the National Agency for Fisheries and Aquaculture (NAFA) from each economic operator who completes a standardized questionnaire, strictly on the specific economic indicators (sales revenue, salary costs, energy, repairs, depreciation, fixed and variable costs, net asset value), but also technical indicators (fishing capacities, technical characteristics of fleet segments, fishing gear, fishing techniques, fishing effort etc.) (NAFA, 2015).

## EXPERIMENTAL

Basically, there are two parameters for assessing the overcapacity or undercapitalization of a fleet: return on investment (ROI) and ratio of current revenue (CR) and revenue to ROI. The calculation of these two parameters was done by means of two calculation formulas, depending on the value of the economic indicators mentioned above, as follows:

### 1) *ROI = Net profit / Capital asset value*

*Net profit = (Income from landings + other income) - (crew costs + unpaid labour + energy costs + repair costs + other variable costs + non variable costs + depreciation)*

*Capital asset value = Vessel replacement value + estimated value of fishing rights*

The return on investment (or return on tangible fixed assets) thus calculated will represent unit profitability (in percent) of capital invested in the fisheries sector. If investment returns are positive and above the low-risk long-term interest rate, the investment values of the indicator would be positive, suggesting that extraordinary profits are generated, a sign of undercapitalisation.

Positive investment returns, but lower than the low-risk interest rate, would generate negative values for the indicator to point out that, in the long run, it would be more advantageous to invest elsewhere, which means that the fleet is likely to be overcapitalised and, consequently, economically ineffective. Negative values of Return on Investment may in itself indicate an overcapitalisation.

### 2) *The ratio between current and non-performing revenues (CR / BER)*

where:

*BER = (Fixed costs) / [1 - (Variable costs / Current revenue)]*

and where:

*Variable costs = Crew costs + Unpaid labour + Energy costs + Repair costs + Other variable costs*

and where:

*Fixed costs = Non variable costs + depreciation*

*Current revenue = income + other income*

The value of the ratio between current revenue and revenue corresponding to the fleet's ROI will indicate to what extent the current fleet revenue is close to the revenue required for the fleet to reach the short-term profitability threshold.

If the value of the ratio is greater than 1, the revenue generated will be sufficient to cover variable costs, fixed costs and capital costs, indicating that the segment is profitable with a potential undercapitalization. Otherwise, if the ratio is less than 1, the revenue generated is insufficient to cover variable costs, fixed costs and capital costs, indicating that the segment is unprofitable with potential overcapitalisation.

As mentioned above, the indicator of vessel use (VUR) is an important indicator for assessing the balances / imbalances between each fleet segment and the fish / mollusk stocks on which it depends.

VUR refers to the total fishing capacity (inactive and active vessels). Inactive vessels are, however, an unused capacity that reduces overall technical efficiency and fleet capacity utilization rate as a whole. VUR for active vessels is calculated for each fleet segment and is the value resulting from the effective fleet effort / maximum effort ratio that could be achieved by the fleet. This indicator shows to what extent the capacity of the fleet could be reduced without reducing the fleet's overall yield (landings).

When the VUR value is greater than 0.9, the fleet segment has a homogeneous level of activity to the greatest extent. Recording values lower than 0.7 highlights the fact that the fleet segment is technically overcapacity.

## **RESULTS AND DISCUSSION**

From the processing of the data and information received under various documents (fishing logs, sales notes, fleet register, questionnaires, etc.) through NAFA inspectors, from economic agents that are fishing on the Romanian Black Sea coast, in 2015 there were 151 vessels and boats, out of which 127 active and 24 inactive. The share of active vessels on fleet segments was as follows: 9% 00-06 m boats, 79% 06-12 m boats, 9% 12-18 m vessels, 1% 18-24 m vessels and 2% vessels of 24-40 m.

Depending on the fishing gear used in the activities carried out by the economic agents, two types of fishing techniques were recorded: PG [boats using only stationary gears (stationary uncovered pound net, pots, gillnets, set longlines and hand lines) and PMP (boats and vessels using both stationary fishing gear and assets (midwater otter trawl, pelagic trawl, purse seines, beach seines and manual harvesting mollusks with divers)] (Anton , 2006, Țoțoiu et al., 2017). The share of active vessels on fleet segments and fishing techniques was the following: 9% boats 00-06 PG, 61% boats 06-12 m PG, 18% boats 06-12 m PMP, 9% ships 12-18 m PMP, 1% boats 18-24 m PMP and 2% ship of 24-40 m PMP (Anton et al., 2009, Danilov et al., 2016).

The total catch landed in 2015 weighed 4,842,573 kg and was worth 4,282,353 €.

In 2015, the activity was concentrated mainly on the harvesting of the Rapa

whelk mollusk, which represented 92% of the total catch, and it was exploited with beam trawl, generally on vessels larger than 12 m, but also by hand with divers, with boats of less than 12 m. The 18% difference was represented by the bivalve *Mytilus galloprovincialis* (1%) and the remaining 17% by pelagic species (sprat, anchovies, horse mackerel, Danube shad etc.) and demersal species (turbot, gobies, red mullet etc.) (Țiganov et al., 2017).

The studies showed that the impact of the Romanian fishing fleet on the state of fish and shellfish stocks is insignificant, it is the lowest in GSA 29 / FAO Division 37.4.2, the only fishing area in the Black Sea.

A potential imbalance between the capacity of the coastal fishing fleet on the Romanian Black Sea coast and the fish / mollusk stocks on which it depends may occur only when a fleet segment takes more than 10% of a fish / mollusk stock with high biological risk.

Compared to catches made at the Black Sea level, the catches made by the Romanian fleet in 2015 were below 10%, most of them under 1%, which excludes the occurrence of any imbalance between the capacity of the coastal fishing fleet on the Romanian Black Sea coast and the stocks of fish / mollusks on which it depends.

The share of revenues by fleet segments and fishing techniques is presented in Table 1 together with the values of the other economic indicators determined by the processing of the data recorded by the economic operators in the questionnaires, which were, in fact, the basis for determining both the return on investments (**ROI = Net profit / Capital asset value**) as well as the ratio between current income and revenue corresponding to the profitability threshold [**ratio between current and non-performing revenues (CR / BER)**].

**Table 1.** The share of revenues by fleet segments and fishing techniques.

| Indicators                   | VL2440P<br>MP | VL1824P<br>MP | VL1218P<br>MP  | VL0612P<br>G  | VL0612P<br>MP  | VL0006P<br>G |
|------------------------------|---------------|---------------|----------------|---------------|----------------|--------------|
| Income                       | 852411        | 171407        | 1654856        | 351411        | 1196361        | 55907        |
| Other income                 | 0             | 0             | 0              | 0             | 0              | 0            |
| <b>Current revenue</b>       | <b>852411</b> | <b>171407</b> | <b>1654856</b> | <b>351411</b> | <b>1196361</b> | <b>55907</b> |
| Crew costs                   | 106770        | 10316         | 165486         | 108374        | 107672         | 14835        |
| Unpaid labour                | 7368          | 0             | 3887           | 332           | 26113          | 332          |
| Energy costs                 | 112277        | 18814         | 186151         | 65589         | 131330         | 4910         |
| Repair and maintenance costs | 8302          | 6580          | 30614          | 26374         | 30410          | 1599         |
| Other variable costs         | 5218          | 0             | 4558           | 13146         | 5719           | 949          |
| Non                          | 12335         | 942           | 17333          | 65617         | 9751           | 1886         |

|                                   |                |               |                |               |               |              |
|-----------------------------------|----------------|---------------|----------------|---------------|---------------|--------------|
| variable costs                    |                |               |                |               |               |              |
| Depreciation                      | 45245          | 7568          | 60747          | 15533         | 6580          | 2595         |
| <b>Total costs</b>                | <b>297515</b>  | <b>44220</b>  | <b>468776</b>  | <b>294965</b> | <b>317575</b> | <b>27106</b> |
| <b>Net profit</b>                 | <b>554896</b>  | <b>127187</b> | <b>1186080</b> | <b>56446</b>  | <b>878786</b> | <b>28801</b> |
| Vessel replacement value          | 1630000        | 360000        | 3080000        | 532800        | 291700        | 66000        |
| Estimated value of fishing rights | 1861           | 472           | 27888          | 16483         | 22563         | 2639         |
| <b>Capital asset value</b>        | <b>1631861</b> | <b>360472</b> | <b>3107888</b> | <b>549283</b> | <b>314263</b> | <b>68639</b> |

|  |               |               |               |               |                |               |
|--|---------------|---------------|---------------|---------------|----------------|---------------|
| <b>ROI</b>                                     | <b>34%</b>    | <b>35.3%</b>  | <b>38.2%</b>  | <b>10.3%</b>  | <b>279.6%</b>  | <b>39.5</b>   |
| <b>ROI – risk free long term interest rate</b> | <b>30.38%</b> | <b>31.68%</b> | <b>34.58%</b> | <b>6.68%</b>  | <b>275.98%</b> | <b>35.88%</b> |
| <b>BER</b>                                     | <b>80139</b>  | <b>10749</b>  | <b>102212</b> | <b>207227</b> | <b>21827</b>   | <b>7527</b>   |
| <b>CR/BER</b>                                  | <b>10.64</b>  | <b>15.95</b>  | <b>16.19</b>  | <b>1.70</b>   | <b>54.81</b>   | <b>7.43</b>   |

Data sources related to the long-term interest rate value:

- 3.62% communicated by the European Central Bank in Convergence Report - June 2016 ([www.ecb.europa.eu](http://www.ecb.europa.eu))
- 3.62% communicated by the Romanian National Bank in the Annual Report 2015, Cap. 11. ([www.bnr.ro](http://www.bnr.ro))

The interpretation of return on investment (ROI) was made by comparing these values with the 3.62% long-term interest rate shared by the European Central Bank and the National Bank of Romania at the end of 2015.

As it can be seen in Table 1, all fleet segments 24-40 m PMP, 18-24 m PMP, 12-18 m PMP, 06-12 m PG, 06-12 m PMP and 00-06 m PMP had a positive return on investment (ROI), the value of the ROI index being in all these cases higher than the long-term interest rate (3.62%).

The main objective of fishing activities in 2015 was the harvesting of the gastropod Rapa whelk, which, at the end of the year resulted in an increase in catches and in total incomes. The catches and the highest incomes were made by the segments of vessels over 12 m in length that practiced mechanized fishing with beam trawl gears. The catch captured by these fleet segments represented 67% of the total catch and 63% of total revenue.

In the case of rapa whelk harvesting, as opposed to fishing for continuously moving fish species (feeding, reproduction or wintering migration), vessels no longer need to travel long distances to locate agglomerations. Rapa whelk is a

species grouped in locations already known and the distances from port to activity areas, respectively the depths on which fishing operations are performed, are relatively small. This situation has shown a lower fuel consumption advantage implicitly led to a reduction in costs and to a profit and a higher return.

As Table 1 also shows from the data obtained from the CR / BER report, it was found that all values in this report are greater than 1 for all segments of the fleet, indicating that the fleet generated sufficient revenue to cover fixed costs, variables and capital, and implicitly it can be said that the fleet segments were profitable with a potential undercapitalization.

A fishing fleet deficit was recorded for fishing effort, the actual number of days affected by fishing activities (important indicator of vessel use). One reason that causes deficiencies is due to objective reasons such as the unstable hydro-climatic conditions that characterize the Black Sea or the precarious technical condition of the fleet when considering that most of the ships and boats are old, already damped. On the other hand, there are also subjective reasons, especially for craft less than 12 m long. The observations made over time have shown that the fleet could still fish for at least 5 months a year, that is 150 days.

From the data recorded in 2015 it resulted that the number of actual fishing days was 122.5 days, close to the maximum number of days to be achieved, only to vessels belonging to the 24-40 m fleet segment PMP. For the other fleet segments, the number of actual fishing days has fluctuated between 22 days (segment 6-12 PG) and 59 days (segment 12-18 m PMP), see Table 2.

In conclusion, most fleet segments have been fishing under the 150-day maximum, indicating that the fleet segments have overcapacity. Practice has shown that by reducing the number of days affected by fishing activities there is implicitly a reduced pressure on fish and shellfish stocks.

**Table 2.** Fishing effort overview.

| Fleet Segment     | Fleet structure and technical features |               |                | Effective effort |               |                | Maximum effort |                |                 | Vessel usage indicator |             |             |
|-------------------|--|---------------|----------------|------------------|---------------|----------------|----------------|----------------|-----------------|------------------------|-------------|-------------|
|                   | No. of vessels                         | GT            | KW             | days             | GT days       | KW days        | days           | GT days        | KW days         | days                   | GT days     | KW days     |
| 24-40 m PMP       | 2                                      | 240           | 1111.6         | 245              | 58800         | 272342         | 300            | 72000          | 333480          | 0.82                   | 0.82        | 0.82        |
| 12-18 m PMP       | 11                                     | 340.37        | 2305           | 645              | 219539        | 1486725        | 1650           | 561611         | 3803250         | 0.39                   | 0.39        | 0.39        |
| 18-24 m PMP       | 1                                      | 70            | 272.06         | 33               | 2310          | 8978           | 150            | 10500          | 40809           | 0.22                   | 0.22        | 0.22        |
| 06-12 m PG        | 78                                     | 120.39        | 1256.46        | 1747             | 210321        | 2195036        | 11700          | 1408563        | 14700582        | 0.15                   | 0.15        | 0.15        |
| 06-12 m PMP       | 23                                     | 65.25         | 678.42         | 1058             | 69035         | 717768         | 3450           | 225113         | 2340549         | 0.31                   | 0.31        | 0.31        |
| 00-06 m PMP       | 12                                     | 8.78          | 201.84         | 317              | 2783          | 63983          | 1800           | 15804          | 363312          | 0.18                   | 0.18        | 0.18        |
| <b>Total 2015</b> | <b>127</b>                             | <b>844.79</b> | <b>5825.38</b> | <b>4045</b>      | <b>562788</b> | <b>4744832</b> | <b>19050</b>   | <b>2293591</b> | <b>25181982</b> | <b>0.35</b>            | <b>0.35</b> | <b>0.35</b> |

The Vessel Use Indicator (VUR) has been calculated for each fleet segment and it is the value resulting from the effective fleet segment effort / effort ratio that could be achieved by the fleet segment. This indicator shows to what extent the

capacity of the fleet could be reduced without diminishing the fleet's overall yield (landings).

As mentioned above, a fleet segment records a homogeneous activity when the VUR value is greater than 0.9, in our case a value close to it we only encounter the 24-40 m PMP fleet segment. Table 2 shows that the VUR value for the other fleet segments was between 0.18 and 0.39, which highlights the fact that the fleet segments exhibited technical overcapacity.

## CONCLUSIONS

Biological indicators were based on exploited stocks (fishing mortality rate), which were exaggerated in the Black Sea area. But, depending on the level of the indicators (all under 10% and the majority below 1%), the impact of the fishing fleet in Romania is not significant. The impact of the Romanian fleet on species status stocks is the lowest in the GSA division 29 / FAO 37.4.2 we refer to this fishing area - the only one in the Black Sea.

By the value of the economic indicators achieved in 2015 (return on investment (ROI) and the ratio between current revenues (CR) and revenues corresponding to the profitability threshold (BER), it can be stated that in 2015 Romania's fishing fleet was in balance and profitable.

However, in order to achieve better future results for the fishing fleet, but also with a sustainable resource gesture, a few measures were recommended, as follows:

- The fishing fleet is to carry out fishing operations in all optimal periods of time in order to accomplish such activities in good conditions in order to achieve the quotas;
- Seasonal function, to take advantage of the seasonal capture of all migratory species in the coastal zone of the Romanian seaside, using the appropriate fishing gear to catch all segments that are the subject of the fishery;
- Guidance for fishermen to use new diversified / selective fishing gears for target species capture;
- Vessels over 12 meters in length also have a greater interest in the exploitation of sprat stocks [increased fishing effort (fishing days)] which are under-exploited [in 2015, the sprat capture represented only 3.2% (110 t) of the total allowable catch of 3442.5 t)];
- Implementation of the annual plan for monitoring, control and inspection of all fishing activities, under the guidance of the specialist assistance of the Commission and EFCA;
- Organizing training courses for fishermen.

The general measure that ensures the balance between fishing capacity and fishing opportunities for the national fleet would be support for marketing support, the creation of bidding markets for fish and shellfish prices. This auction will cover the needs of Black Sea fishermen to sell their products electronically, which will eventually result in revenue growth by using a transparent and more efficient first-sale system for registered merchants.

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