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THE DEVELOPMENT OF ROMANIAN AQUACULTURE SECTOR

Case study

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Abstract

Aquaculture contribute ever more to the production of aquatic food worldwide, even if the sustainable limits for majority of wild fish stocks, are now almost reached or even exceeded. In the EU, aquaculture is an important economic activity in many coastal and continental regions. Aquaculture plays an important role in terms of access to food resources and it is necessary to use its potential to contribute to sustainable development, food security, economic growth and employment. In this regard, starting from EU aquaculture objectives, we intend to make an analysis of the national situation of aquaculture and its current potential. We will also analyse the progress of Romanian investments in aquaculture, identifying needs and opportunities for Romanian aquaculture development. The conclusions of the research may be useful for academic and business environment, to develop sustainable activities in aquaculture sector.

Introduction

An important competitive advantage for the EU aquaculture is represented by the quality of the products from the aquaculture sector. Nevertheless, the EU aquaculture sector output stagnates in contrast to the global trends and to the sharp increase that is recorded in other regions of the world. At the EU level there is an increasing discrepancy between the marine-origin food consumption and the volume of catches from the fishing sector. The partial reduction of this discrepancy may be achieved by means of a sustainable aquaculture from a social, economic and environmental point of view.

The aim of the common policy reform in the fishing domain is to fully exploit the potential of aquaculture in the EU in accordance with the objectives of the Europe 2020 Strategy: sustainability, food security, economic growth and employment. An improved framework for aquaculture will contribute to an increase in food and shellfish output and supply in the EU, will reduce the dependence on fish imports and will boost the development of rural and coastal areas. (Stanciu S., 2014)

The common policy reform in the fishing domain focuses on promoting aquaculture by means of an open coordination method: a voluntary cooperation process based on national multiannual strategic orientations and plans, which may help in identifying common objectives. In order to achieve these objectives, the active participation of all the people involved is necessary: the authorities, the specialised industry, the merchants, the consumer associations as well as the civil society representatives. Strategic orientations have the role to assist member states in defining their own national objectives, by taking into account their different initial situations, the national circumstances and the institutional provisions. Also, the EU legislation sets high standards regarding health, consumer protection and environment sustainability, standards that must be complied with in all aquaculture activities from the EU. These standards present implications connected with costs for the producers but they may turn into a competitive advantage if the consumer focuses on quality and they may contribute to an acceptance of aquaculture at a local level. The PCP reform relies on these high standards.

Material and methods

The analyzed data were provided by The National Institute for Statistics INS, The Ministry of Agriculture and Rural Development MADR, National Agency for Fisheries and Aquaculture ANPA, or international databases (FAO, IFOAM). The collected data have been processed, chart represented and analyzed, and were grounded the conclusions about the current status of aquaculture development in Romania.

The national situation of aquaculture

At present, aquaculture in Romania is performed practically exclusively in freshwater and is characterised, from a technological point of view, by two trends:

- Intensive breeding (especially of salmonids)
- Extensive and semi-intensive breeding of cyprinidae in polyculture, in ground pools (ponds and lakes).

In 2014, from the ANPA statistical data (2014), it results that there are 748 aquaculture licenses for a surface of 102,356 ha, out of which 6,673 ha are nurseries (6.5%) and 95,682 ha are breeding farms (93.5%). If the surface intended for aquaculture has been broadly the same for the last 9 years, one may notice an increase in the number of breeding farms to the detriment of nurseries. According to the Aquaculture Unit Registry (2014), there are 518 registered units in the aquaculture sector, which hold 575 aquaculture farms (ponds, lakes, etc.).

The 518 registered units are divided into:

- 19 nurseries (that hold only a nursery licence);
- 324 breeding farms (that hold only a breeding farm licence);
- 175 breeding farms and nurseries (that hold both a nursery and a breeding farm licence).

Cyprinidae breeding in polyculture in ground pools in an extensive or semi-intensive system presents the advantage of preserving water quality in the extensive breeding system or of generating a minor or negligible risk regarding water quality in the semi-intensive breeding system. The great majority of the aquaculture farms have a relatively long history and are well-placed in the natural landscape, playing an important part in consolidating the ecological balance, in removing excess water, in ensuring and maintaining big surfaces wet.

Traditional cypriniculture in ground pools is compatible with sensitive habitats and provides benefits and environmental services. In a lot of Natura 2000 sites from Romania there take place aquaculture activities, which are fully compatible with the natural value conservation of sites, the most eloquent proof being the designation of the aquaculture farm area as a Natura 2000 site. The extensive aquaculture farms became multifunctional farms in which other environment and social services are provided: recreation, biodiversity preservation and water management improvement. In Romania, the distribution of species from aquaculture production until 2005 was dominated by cyprinidae, both of an indigenous origin (carp, crucian carp) and of an Asian origin (cornel, silver carp, grass carp), representing 85%

of the total, the rest of 15% being represented by trout, perch, pike, bass, sheat fish, sturgeons etc. (MADR, 2015). In the period 2006 – 2013, this species structure was largely preserved, the tendency being slightly increasing towards cyprinidae, which represent, on avearge, 87%, as it may be noticed from figure no. 1. The rest of 13% is represented by the other species, out of which the most important is the trout. At present, in the Danube Delta, out of the total area used for fish breeding (43.937 ha), there are still used for fish breeding only 20.662,6 ha, out of which 16.767,0 ha are surfaces with glazed surface water and 3.895,6 ha are surfaces covered with flooded reed thicket, which are impracticable if the reed is not removed. (European Commision, 2014).

Out of the used surface a small part is for semi-intensive aquaculture with a population dominated by the phytozoo - planktonophage species (over 50-60%) in polyculture with carp and other species (sheat fish, perch, pike, crucian carp etc.) and a rather significant surface is for extensive aquaculture activities combined with recreational/sport fishing activities. An output of approximately 3,000 tons of fish for consumption is obtained from the aquaculture farms. Marine aquaculture (mariculture) is a recent activity in the Black Sea and there exists the desire of development in the future, by means of the application of some technologies adapted to the specific conditions offered by the Black Sea. Mariculture may be done directly in the sea, in anchored floating installations or in the terrestrial coastal part, with the possibility of direct supply by means of marine water pumping. The results of the evaluation prove that the great difficulties in developing mariculture in Romania are due to the natural conditions of the Black Sea, which has a high degree of instability, which implies big exploitation risks, to which we may add the effects of erosion and the lack of sheltered areas.

From the point of view of output volume, one may notice from Table no 1. that, after an increase until 2009, there followed a decrease of about 32% in 2010 as compared to 2009 and, then, a decrease of 7% in 2011 as compared to 2010, this fact being mainly due to the economic context from that period. Beginning with 2012, the output increased with 12% in 2012 as compared to 2011 and with 1.4% in 2013 as compared to 2012.(European Commission, 2015a)

The stage of investment in Romanian aquaculture

The uniform distribution of the hydrographic network on the territory of our country favoured the development of agriculture. In the lowland area, where the temperature of the environment is high and the summers are long, carp breeding and other species adapted to these environment conditions is practised in aquaculture farms, whereas in the mountain areas, where temperatures during the summer are moderate and those during the winter are very low, salmonids are raised in salmonid farms. In Table no 2. is presented the distribution of aquaculture units by region in Romania.

Starting from the present problems of aquaculture, specific for the sustainable development of the sector in accordance with the economic and social policy of the European Union, whose main objective is to reduce disparities and diminish the development gaps between regions, we performed a SWOT analysis of the areas favourable to aquaculture development.

Strong points:
- The hydrographic potential;
- The experience both in the domain of traditional extensive aquaculture and in the aquaculture based on closed recirculating systems;
- The existence of the ability to produce ecological fish;
- The existence of infrastructure and research staff in the domain of aquaculture;
- The possibility to approach a varied range of species and culture technologies.

Weak points:
- The insufficiently developed infrastructure (fodder warehouses, storerooms, technological roads etc.);
- The areas intended for aquaculture that is the property of the state is only partially tabulated;
- The lack of assets in order to ensure some acceptable guarantees for credits;
- Areas with uncertain legal status.

Opportunities:
- The existence of inactive, reed or clogged surfaces;
- The rehabilitation and introduction in production of inactive or decommissioned places;
- The fitting of former gravel pits or of abandoned/inoperative irrigation canals;
- The integration of new technologies that have as a result a better usage of space and resources;
- Tradition in fish consumption (religious holidays, other customs).

Threats:
- Underperforming investment;
- The dispersion and fragmentation of surfaces;
- The deterioration of the hydro-ecological status (erosion, pollution, natural dangers);
- Pools which remained without water after interventions/works at the supply source;
- Vulnerable pools (subject to the risk of floods);
- The competition which comes from the aquaculture products from the EU member states.

The modernisation and development of this sector is necessary because an important problem has been identified in the domain of aquaculture, i.e. the gross added value of the primary sector

(aquaculture) is inferior to the one of the secondary sector (the fish processing industry).
The values from the primary sector reflect the very low level of work productivity due to the poor equipment and machinery, to the excessive fragmentation of land as a result of privatisation (especially in the Danube Delta area) and to the poor management of some private aquaculture farms.
Another phenomenon encountered in present aquaculture is the aquaculture farms' low degree of population/re-population because the owners are interested in transforming the traditional aquaculture farms in units in which recreational/sport fishing may be practised. This situation was also determined by elements such as the lack of capital for the annual purchase of larvae and pre-developed spawn and market orientation towards imports.
In Romania's aquaculture, cypriniculture and salmon breeding represent the most important branches in the domain of aquaculture. The majority of investment in Romania's aquaculture, beginning with 2007, was done by relying on the projects implemented within POP, on the Priority Axis 2 – Aquaculture, fishing in inland waters, the processing and marketing of products obtained from fishing and aquaculture. Measure 2.1 – Aquaculture, Action 1: Increasing output capacity due to the building of new fish farms and Action 2: Output variations due to extending or modernising the existing fish farms. The investment resulting from the implementation of the 90 projects on Measure 2.1 – Aquaculture, Action 1: Increasing output capacity due to the building of new fish farms is presented in table no 3.
The public financial support helped small and medium enterprises in investing in the setup, extension and modernisation of aquaculture farms, quality equipment purchase, output diversification and the orientation towards added value products. The investment in aquaculture, beginning with 2007, was oriented towards aquaculture farm consolidation and resulted in: land fitting, technological roads, buildings, installations, the purchase of tools and equipment, means of transport, software and monitoring systems.
On the 10th of January 2014, on the Axes 1-2 and 5, there were 211 ongoing contracts, worth 732.531.366, 32 lei. Within POP 2007 – 2013, on the Priority Axis 2, there were submitted 535 financing applications, out of which 270 projects were selected and contracted. The data about total EU Allocation of EMFF (2014-2020) are presented in figure no 2. We can notice that the amount for Romania is 168,4mil Euro, which can be materialized in the efficient investment projects.(MEF,2015)

Conclusions

Romania has the potential and the resources to increase aquaculture fish output if an economic environment compatible with the one from the EU countries is created. The exploitation of the exceptional aquaculture potential in the European context, together with a proper legal and institutional framework, will definitely increase Romanian aquaculture competitiveess.
The SWOT analysis of the areas which are favourable to aquaculture development confirms, on the one hand, the problems identified as weak points and the potential risks and, on the other hand, it highlights the strong points and the opportunities that Romanian aquaculture may benefit from, by taking into consideration the development trends of aquaculture at the EU level.
Thus, the existence on the Romanian territory of surfaces which are favourable to practising aquaculture imposes the stimulation of new investment in order to set up new aquaculture farms and to ensure their financial sustainability. Also, at a national level, some measures must be taken in point of increasing competition and the viability of enterprises from the aquaculture sector, work condition improvement included**.**

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Appendices

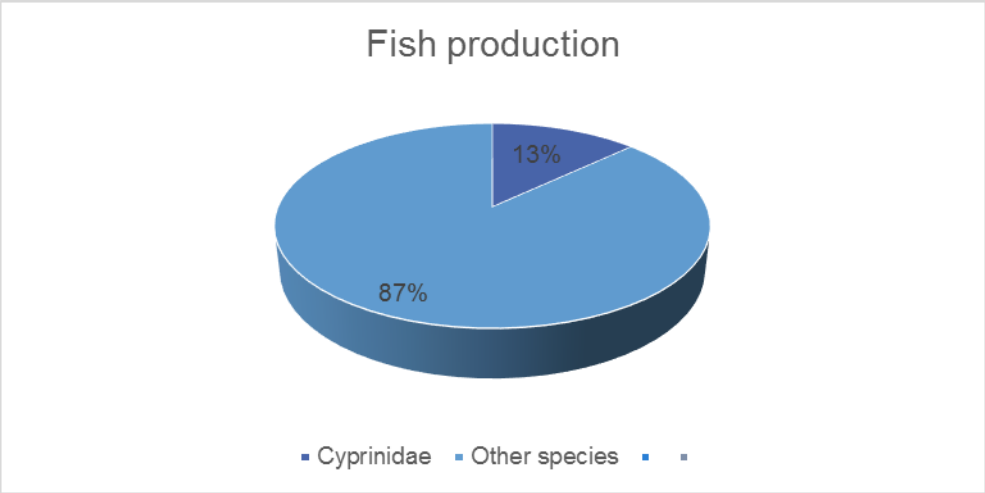

Figure no 1 The distribution of fish production in Romanian aquaculture
Source: Author, using the data from The National Agency for Fisheries and Aquaculture Report,(2014)

Table no 1. Production volume of aquaculture on species (tonnes)

Species	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Cyprinus carpio	3.136	3.544	3.977	4.142	2.888	2.652	3.266	3.395
Carassius gibelio	1.268	1.653	1.462	1.623	934	1.048	868	1.004
Cornus sanguinea	2.091	1.696	2.959	2.971	2.016	1.323	2.087	2.031
Hypophthalmichthys nobilis	894	2.056	2.228	2.352	1.020	1.289	2.110	2.110
Ctenopharyngodon idella	256	41	426	283	84	62	182	190
Silurus glanis	19	26	149	133	164	33	43	44
Sander lucioperca	30	93	49	45	57	42	56	43
Esox lucius	80	27	14	22	31	34	31	28
Perca fluviatilis	7	5	1	6	6	4	7	2
Salmo trutta	123	725	1.037	1.238	1400	1.710	1.074	1.106
Acipenseridae	0	0	0	0	39	19	11	16
African silurus glanis	0	0	0	0	0	72	150	94
Other species	184	446	230	316	342	64	112	68
Mussels, oysters	0	0	0	0	0	1	9	16
Crayfish	0	0	0	0	0	0	1	0
TOTAL	**8.088**	**10.312**	**12.532**	**13.131**	**8.981**	**8.353**	**10.007**	**10.147**

Source: The National Agency for Fisheries and Aquaculture Report,(2014)

Table no 2. Distribution of aquaculture units by region

Region	**Number of districts**	**Number of units**	**Number of ponds**	**Total Area**	**Incubators Area**	**Ponds Area**
North - East	6	58	72	9412,2	942,014	8470,18
South - East	6	93	99	66726,1	3385,26	63340,7
South	7	143	160	14122,5	1472,81	12649,7
South - West	5	38	39	2544,15	129,312	2414,83
West	4	39	37	1709,22	279,676	1429,55
North - West	6	66	80	3128,84	380,741	2748,09
Center	6	53	57	2726,49	83,3207	2643,17
Bucharest - Ilfov	2	28	31	1986,2	0	1986,2
TOTAL	**42**	**518**	**575**	**102356**	**6673,14**	**95682,3**

Source: The National Agency for Fisheries and Aquaculture Report, Aquaculture Unit Registry (2014)

Table no 3. Investment projects in aquaculture in Romania

No	**Action of Measure 2.1**	**Number of investment projects**	**Value (RON)**
1.	2.1.1 – Increasing production capacity due to the establishment of new production capacities	90	774.690.652,17
2.	2.1.2 – Production variations due to the extension or modernization of existing fish farms	47	210.565.017,41
3.	2.1.3 – Increasing the amount of fish that come from farms	0	0
4.	2.1.4 – Measures for the aquatic environment	76	95.107.889,32
5.	2.1.5 – Public health measures	0	0
6.	2.1.6 – Animal health measures	0	0
TOTAL		**213**	**1.080.363.558,90**

Source: The Common Fisheries Policy. Fisheries, available at http://ec. europa.eu/fisheries/cfp/index_en.htm. European Commission, (2015b).

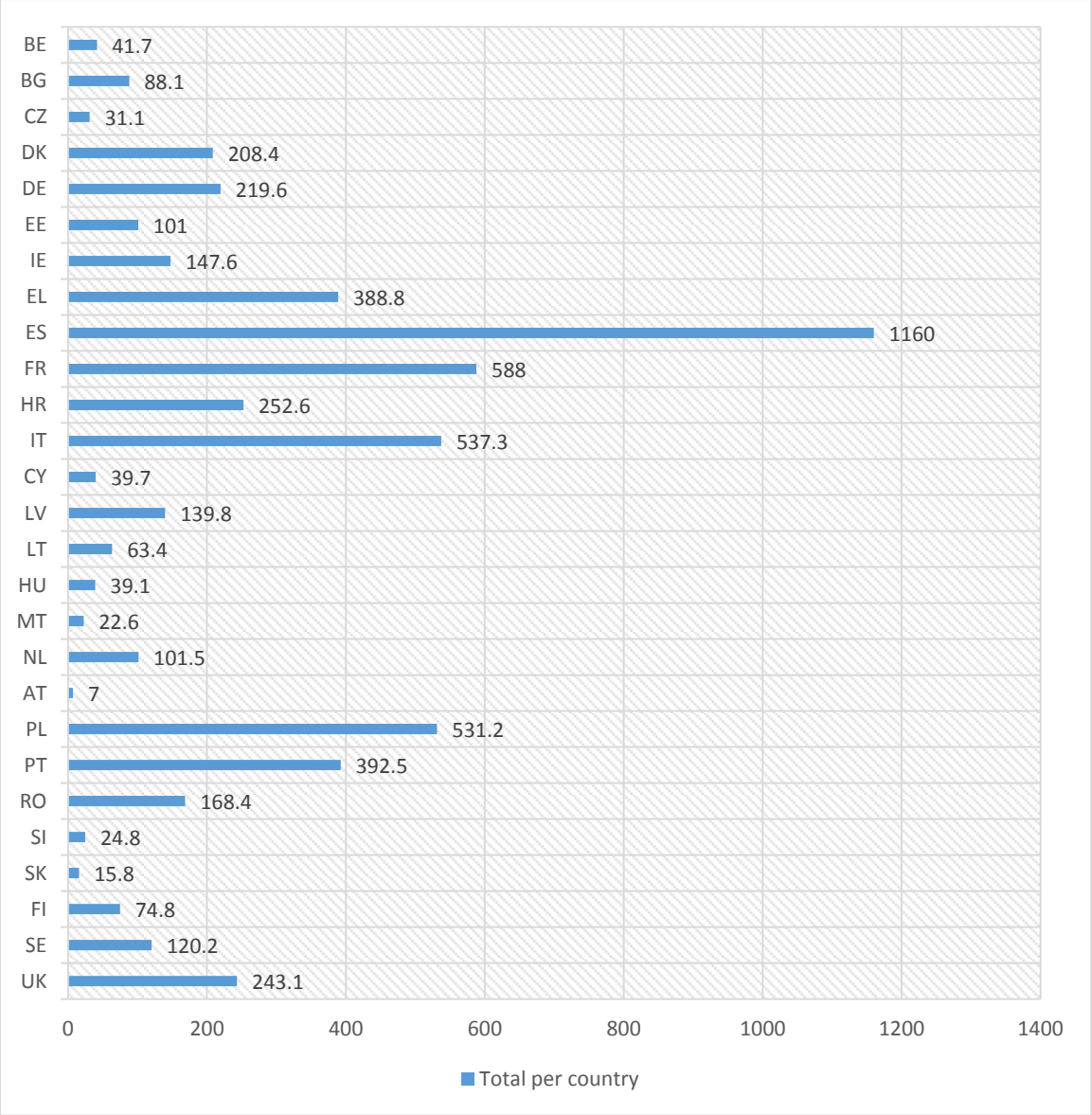

Figure no 2 Total EU Allocation of EMFF (2014-2020) mil. Euro, Source: The Common Fisheries Policy. Fisheries, available at http://ec. europa.eu/fisheries/cfp/index_en.htm. European Commission, (2015b).