

**THE GOVERNANCE OF MUSSEL PRODUCTION IN GALICIA:
AN INSTITUTIONAL ANALYSIS**

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Abstract: This paper analyses the institutional foundations of the mussel production sector in Galicia, which is one of the leading producers in the world. After demonstrating the importance of the sector, the theoretical framework and an historical introduction, the paper formulates an agenda of institutional analysis topics from a positive perspective. This agenda includes the problem of the common pool, the role of the State, the legal norms, the property rights system, the organisation of the sector, the rules and public policies and the status quo. This paper sets a case analysis dealing with the relationships between institutions and economic organisation, and furnishes evidence and relevant knowledge for the elaboration of comparative analysis in the economics of natural resources.

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1- INTRODUCTION

All economic activity in a society requires the establishment of an organisational system that allows for the adequate development of production. The institutions are the “rules of the game” that organize economic activity and determine the incentive structure of the agents, the degree of efficiency and the viability of production.

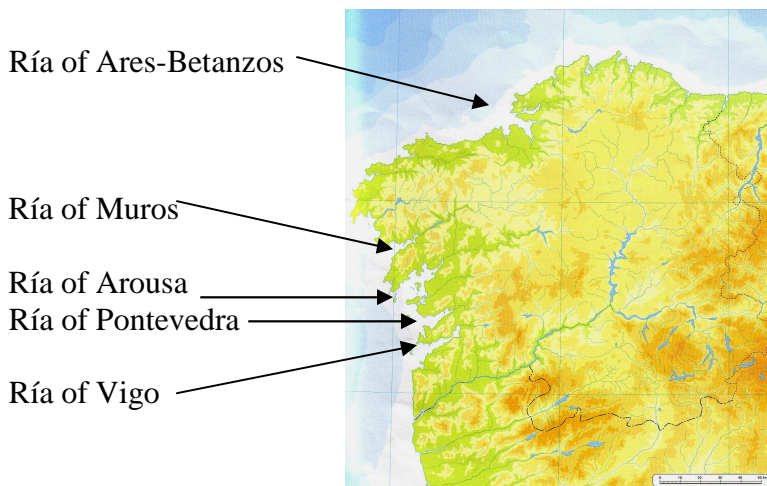
The development of economic activity related to the sea has traditionally been carried out with “the rules of the game” that were not so well defined as those on land. The fishing industry is perhaps the most representative of cases and it has produced extensive literature on fishing resources from an institutional approach (Jentoft, 2004). Moreover, there are many other activities linked to the sea, such as the use of tracts of the ocean surface to cultivate mussels or other crustaceans, which also need to be studied analytically from an institutional perspective, because institutions determine the biological, social and economic results of production.

This paper studies the institutional foundations on which the cultivation of mussels employing floating raft culture (floating raft farm) techniques are organized on the coasts of the Spanish region of Galicia, which is one of the leading producers in the world. The general character of the rules of the game that give structure to this production system based on the floating raft farms entails the study of the history of the sector, the role of the State, the legal norms, the property rights system and the

public policies. The approach of this paper is that of the New Institutional Economics (NIE), built on the *Coaseana* notion of transaction costs (Coase 1937, 1960) and the *Northian* vision of institutions (North, 1990).

The Galician production of mussels has been studied from various perspectives and scientific disciplines, which has resulted in literature dealing with the study of biological, historical and economic matters. This paper compliments the existing literature through a specialized study of the institutional foundations of the sector from a positive analysis perspective of the NIE.

Figure 1. Map of Galicia and its Rías



Galicia is a region situated in the northwest of the Iberian Peninsula and has 1,200 kilometres of coastline, on which there are a series of estuaries (also referred to as “*rías*”) that are actually ancient drowned river valleys which were taken over by the sea (figure 1). The Galician Rías group together a series of factors that allow for the establishment of floating platforms of the production of mussels (*Mytilus galloprovincialis*) in this geographic area of the Atlantic Ocean. The first two factors make a reference to the actual natural environment: A) These ría waters are

blessed with an extraordinary quality for the farming of mussels due to their warmth and the high amount of nutrients which they contain. B) The rías are ocean areas that are protected from severe weather conditions, which is why the mussel farms are resistant to the changing maritime weather. Together with these two irreplaceable and non movable natural factors, we should also point out the existence of the mussel seed in the Galician coasts and the historic development in Galicia of a social community that is bound to the sea.

Mussel cultivation has developed in five Galician Rías: Vigo, Pontevedra, Arousa, Ares-Betanzos, and Muros-Noia (figure 1, table 1). The system that has been employed is the floating platform or the floating raft farm that floats in the rías which contrast with other traditional systems of production such as stake cultivation employed in France or the beach mussel farming in Holland (Mackenzie, 1997). In this way, Galicia has produced “sea colonization” via the establishment of floating rafts on which a group of ropes are suspended where the mussels cultivate. The rafts are floating mussel farms that are usually configured in a rectangular shape and made of wooden eucalyptus trusses that are bound together, of which ropes are suspended for the cultivation. The rafts keep afloat thanks to a system of floating devices (ball cocks) which are also bound by chains to a block of concrete resting on the sea floor. These rafts have a maximum surface area of about 500 square meters and a maximum of 500 ropes with a length no longer than 12 meters long for the cultivation of mussels.

The mussel farmers collect the mussel seed from the coastal rocks. Afterwards, the seeds are intertwined into the mussel cultivation ropes through nets and these “mussel cultivation ropes” are hung from the rafts for about 4 to 6 months. After this period of time, these ropes are brought back up to the surface and are unbound

into other ropes which contain a less dense mussel concentration in order for the mussels to grow and fatten. The new ropes are left in the sea for another year so that the mussels may obtain the adequate size for commercialisation. In this way, the mussels can be cultivated in 17 months, while in the rest of Europe a timeframe of at least twice that is necessary.

Part 2 demonstrates the relevance of the mussel sector in Galicia. Part 3 introduces the theoretical prospective of the NIE. Part 4 studies the historical path of the mussel sector in Galicia. Part 5 exhibits the institutional analysis of the sector.

2- THE MUSSEL SECTOR IN GALICIA

The Galician mussel production has surpassed 200,000 tonnes annually, which has been constant during the past few years (table 2). Consequently, we are talking about the second largest mussel producer in the world, second only to China. Nevertheless, we must point out that the world rate of growth of mussel production has been greater than the rate of growth in the Galician sector, which implies that the importance of Galicia, with respect to world mussel production, has decreased.

The Galician mussel sector is based on nearly 3,300 installed rafts in the five rías shown in figure 1. Furthermore, it directly generates more than 8,000 jobs and incorporates 1,000 aquiculture support vessels. The estimated first-wholesale mussel value is in the order of 114 million Euros (Franco Leis, 2006). In addition to the production activity, the mussel sector in Galicia entails backward and forward linkages in the production chain (Rodríguez, 2001). In this way, the mussel sector is arranged in a cluster that incorporates at least four secondary sectors: Supplier companies (8 million Euros of turnover, 540 jobs), purification/processing plants

(87 million Euros of turnover, 400 jobs), mussel cooking and processing plants (48 million Euros, 500 jobs) and canning companies (66 million Euros, 900 jobs). Collectively the cluster of mussel related enterprises turns over 340 million Euros annually and employs 10,500 people (Franco Leis, 2006).

Table 1. Characteristics of the rías where mussels are cultivated.

| | Length (Km) | Surface area (Km) | Volume (Km) | Maximum depth in meters | Rivers that flow into the sea |
|---------------|-------------|-------------------|-------------|-------------------------|-------------------------------|
| Vigo | 33 | 175 | 3,100 | 42 | Oitavén Lagares |
| Pontevedra | 23 | 145 | 3,240 | 40 | Lérez |
| Arousa | 26 | 230 | 4,300 | 65 | Ulla Umia |
| Muros-Noia | 12 | 120 | 2,700 | 46 | Tambre |
| Ares-Betanzos | 19 | 72 | 750 | 40 | Eume Mandeo |

Source: Consello Regulador do Mexilón de Galicia (Regulating Board of Mussel Production in Galicia)

The rafts have a maximum permissible area of 500m² of which between 300 and 500 ropes of 12 meters in length are suspended. This translates into about 60 to 90 tonnes of mussels produced annually by raft, depending on the area. It is also important to mention that this cultivation system is labour intensive.

With respect to the distribution of the mussel cultivation rafts in the Galician rías, about 70% of the rafts are situated in the Ría of Arousa, where there are currently about 36 mussel aquiculture zones. On the other hand, the rías of Vigo and Pontevedra contain 14.32% and 10.36% respectively, while the rías of the Rías Altas situated more to the north (Muros-Noia and Ares-Betanzos) have only 3.53% and 3.08% (table 3).

Table 2. World and Galician Production of mussel cultivation

| YEAR | World Production (Tonnes) | Galician Production (Tonnes) | %Galician Production/ World Production |
|-------------|----------------------------------|-------------------------------------|---|
| 1997 | 1,115,189 | 224,919 | 20.16% |
| 1998 | 1,337,772 | 250,743 | 18.74% |
| 1999 | 1,446,032 | 258,869 | 17.90% |
| 2000 | 1,370,957 | 244,128 | 17.80% |
| 2001 | 1,445,001 | 242,833 | 16.81% |
| 2002 | 1,634,280 | 256,627 | 15.70% |
| 2003 | 1,712,635 | 246,956 | 14.42% |
| 2004 | 1,770,356 | 292,316 | 16.51% |
| 2005 | 1,795,779 | 205,256 | 11.42% |

Source: Own elaboration (data from Spanish Ministry of Agriculture and Fisheries, OPMEGA, Labarta (2004) and FAO).

Table 3. Distribution of cultivation zones and mussel rafts by ría

| RIA (Estuary) | Number of mussel cultivation zones | Number of rafts | Percentage of rafts per ría |
|----------------------|---|------------------------|------------------------------------|
| Ares-Betanzos | 2 | 103 | 3.08% |
| Muros-Noia | 4 | 118 | 3.53% |
| Arousa | 36 | 2,292 | 68.68% |
| Pontevedra | 7 | 346 | 10.36% |
| Vigo | 14 | 478 | 14.32% |

Source: Own elaboration (Data from Consello Regulador do Mexilón de Galicia; and Labarta (2004))

With respect to the final destination of the Galician mussels, 65% of the total commercialised production is destined for the canning and freezing industry. Meanwhile, 35% is destined for the fresh-consumption market. Nevertheless, the higher prices obtained for fresh mussels results in a higher turnover for this type of product which represents between 50% to 60% of the total turnover of the sector, depending on the particular year (Labarta, 2004; Franco Leis, 2006).

As a result, the mussel harvest represents roughly 60% of the Galician landings for fresh product and therefore represents somewhere in the order of 23% of the total Spanish fish production (Labarta, 2004).

The bulk of the Galician mussel production is destined for the consumption in the Spanish market. Spain is also a net exporter of mussels, while it imports around 8,000 to 9,000 tonnes of product, it exports around 28,000 tonnes (of which 22,000 tonnes are fresh product, 5,000 tonnes are frozen and 1,500 tonnes are canned) (Fernández, 2005).

3- THE NEW INSTITUTIONAL ECONOMICS APPROACH

For most of the 20th century, neoclassical economics did not consider institutions as a relevant factor. Although in the last two decades of the 20th century, institutions were back on the agenda of leading research of economic science due to the NIE. This programme drew attention to the institutional structure of production having to do with new theoretical bases (Matthews, 1986; Libecap, 1989; Williamson, 2000; Caballero, 2001; Menard and Shirley, 2005)¹.

In every society there must be mechanisms that restrict free access to the natural resources from human and non human capital (Eggertsson, 1990). These mechanisms entail a determined distribution of property rights, understood as rights that individuals have in order to make decisions dealing with assets, and the possibility to make transactions, which are property rights transfers between individuals. These transactions entail a set of costs that are a collection of resources that are used to establish, maintain and exchange property rights (Allen, 1991). The transaction process may be understood as a contract problem in which transaction

¹ The theoretical foundations of the NIE are different from the ones assumed by the old North American institutionalism at the end of the XIX century and at the beginning of the XX. Despite the fact that there exist relationships between both traditions of institutionalism, the theoretical and methodological bases of both traditions have, in general, notable differences (Hodgson, 1998; Williamson, 2000).

costs are those that derive from the *ex-ante* subscription of a contract and its *ex-post* control and enforcement (Eggertsson 1990).

In the neoclassical scenario of zero transaction costs, the parties would make those transactions that provide social benefits of efficiency, and the initial distribution of property rights does not affect production². However, Coase (1960) maintains that the real economy is characterised by incomplete markets and property rights, and by the existence of positive transaction costs. In this scenario, the readjustment of rights will only be undertaken when the increase in value of production resulting from the transaction is greater than the costs associated to the transaction.

In every society there are “the rules of the game” that determine the costs of transactions. The rules of the game, which are understood as the conceived or assimilated limitations by man to give shape to human interaction, are the institutions. Institutions are the formal and informal rules that mould the behaviour of individuals and organizations, and institutions include the mechanisms of enforcement of the rules³ (North, 1990). Since institutions and property rights define the behavioural norms for the assignment and use of resources, it is possible to predict how institutional differences affect economic activity (Libecap, 1999).

In the institutional framework of all modern societies, the State sets itself up as the organization with the monopoly on legitimate coercive power and establishes the set of property rights that determine the control of the resources. In this way, the State establishes a major part of the “rules of the game”, specifying the conditions of competition as well as of cooperation and establishing the level of transaction costs

² Analysing the arguments of Coase (1960), George Stigler (1966, p. 113) enunciated the Theorem of Coase: “under perfect competition the social and private costs will be equal.”

³ The formal institutions are explicit (constitution, laws, contract...) opposite the informal institutions (codes of conduct, social values, civic culture, ethical or religious matters...). The enforcement mechanisms mainly include different types of private agreements and third-party enforcements such as Courts.

(North, 1981). The political action of the State is the key to the institutional structure of production in each economic sector, but policy-making does not guarantee the establishment of efficient institutions due to the existence of positive transaction costs. The State plays a very important role when it establishes the property rights, and the particular structure of property rights in an economy influences the allocation and utilization of economic resources in specific and predictable ways (Libecap. 1999). Together with the role of the State and property rights, the comprehension of the economic performance should be understood as the result of a set of institutional, social, political and organizational relationships and assignments that are arranged in various levels of social analysis (Williamson, 2000). In this way, the NIE breaks with the idealized vision of pro-efficiency rules and develops a conglomeration of substantial elements such as the path's dependence, the relationship between State and property rights, the credibility problem of commitments or the analysis of the transaction costs in political markets.

The theoretical foundations of the NIE demonstrate the importance of the passage of time, the beliefs and politics in order to explain the processes of institutional change (North, 1990; Menard y Shirley, 2005). This entails the need for context-specific analysis that captures the historical evolution of the institutional design, as demonstrated by Alston (1996, p. 25), "Institutions are historically specific and for this reason it is necessary to be sensitive to the historical context, particularly in the study of the dynamics of institutional change".

4- THE HISTORICAL PATH OF THE SECTOR

Traditionally, the coastal population of Galicia resorted to the mussel harvest activity from its natural state on the rocky coastline. In this initial phase the mussel

market was not developed and the product did not have much value for the consumer and an important characteristic of the harvests was that it was primarily for personal consumption.

At the beginning of the 20th century, rafts (floating raft cultures) of mussel cultivation were established on the Mediterranean coast, primarily in Barcelona. Nevertheless, at that time, the low demand for mussels in Galicia could be met with the mussel extraction from the rocks. There were a few previous attempts to cultivate mussels by other means such as the stake method, but it was not until 1946 when the first floating rafts were established in the Galician rías, which were modelled after the existing floating cultures in the Mediterranean. Therefore, a transition took place towards a floating raft system for mussel cultivation in Galicia.

The gratifying results of this system of cultivation were soon popularized and transformed the floating raft system into an extensive growth mechanism of production. As a result, the increase in supply made it possible to meet a growing demand in the market for fresh mussels as well as meeting the demand for the canning industry. Since 1946 the number of floating raft farms in the Galician rías grew and ultimately numbered somewhere in the area of 3,300 rafts. In fact, at the beginning of the 1970s, Spain became the leading producer of mussels in the world.

Galician mussel production went from 48,000 tonnes in 1962 to 138,000 in 1972, and the number of raft cultures increased by 90% in this same period (Labarta, 2004). According to Fernández (2005), from 1960 to 1976 the average rate of growth for the number of rafts was around 7%, while the mussel production in Galicia grew between 7.2% and 8.1%. The fact is that there was a notable growth trend in the volume of raft culture production. The estimates of Durán et al. (1991)

conclude that the production per raft farm went from 30 tonnes in 1946 to 56 tonnes in 1961, 60 tonnes in 1976, and again to 75 tonnes in 1991.

The number of floating raft farms established in the Galician rías experienced growth from 1946 to 1976 (table 4). During this 30 year period, the public administration granted a great number of licenses to establish floating raft cultures, and although many of these licenses did not result in the actual establishment of floating raft farms, many other licenses were in fact used, and despite the accounting difficulty, all of the analysis carried out coincide with the growth of the sector, especially in the 1960s and 1970s.

The development of the mussel cultivation sector in Galicia was stimulated, in the initial phase, by the existence of a noteworthy canning industry. In the period between 1946 and 1957, 1,100 licenses were granted for floating raft farms to a total of 250 people (although the licenses did not, in every case, ultimately result in the installation of rafts); 26% of these licenses granted went to businesses in the canning sector (Fernández, 2005). Afterwards, in the 1960s, the strong growth in raft cultures had a clear “family capitalism” component, since there are many families linked to the fishing sector that integrated into the mussel sector.

Floating raft Mussel cultivation is a very labour intensive activity (labour costs comprise about 75% of the operating expenses of the floating raft cultivation). The availability of labour was key for the development of the mussel sector. This population was able to balance their work with other production activities (such as agriculture and other fishing industry activities), and moreover, in the middle of the 20th century, people had difficulty finding work in the circumstances characterised by the sardine crisis as well as the difficulty of the canning industry. The fact is that

many households in the areas of the rías found an important source of income from the cultivation of mussels.

With respect to development and advances of the sector, the techniques of mussel cultivation employing the floating raft method were slowly being perfected based on different experiences during the second half of the 20th century. Since 1964 seafood processing plants begin to emerge that ultimately became an essential channel for bringing the mussels to the fresh seafood markets. At the same time, between 1975 and 1980, the sector experienced a notable mechanization process that facilitated and increased productivity. This process entailed the use of cranes and pulleys, the enlargement of boats and the introduction of the rope separating machine and the tubular net (Labarta, 2004).

Table 4. Number of floating raft farms in Galicia

| YEAR | Number of rafts |
|------|-----------------|
| 1946 | 10 |
| 1956 | 410 |
| 1960 | 1,099 |
| 1975 | 3,134 |
| 1997 | 3,337 |

Source: Own elaboration with data from several estimations of different authors.

5- INSTITUTIONAL ANALYSIS

a) The sea as a resource: the problem of the common pool and the role of institutions and property rights.

All societies and settings require some sort of property rights arrangement to control access and use of valuable resources if the losses of the common pool are to be

avoided. Property rights are essential social institutions for combating the potential wealth losses associated with the common pool (Libecap, 1999).

The establishment of property rights dealing with the management, cultivation and extraction of resources at sea constitute a way to increase efficiency against the tragedy of commons (Ostrom, 1990). The provision of government infrastructure and service, such as sea titles and enforcement mechanisms (judiciary and police force), is socially costly and is provided over time as sea values rise. When the costs of establishing property rights are less than the benefits derived by this definition, there exist the necessary conditions of efficiency to establish some type of property rights.

The problem with the regulation of free access resources and the depletion of these resources imply that, after reaching a critical juncture, it is impossible to increase production of the marine resources naturally. This is why the scientific and fishing community have been developing farming techniques in various sectors in order to increase production of fishing resources.

The favourable conditions of the coastal waters of the Galician rías, the development of floating raft mussel cultivation methods (requiring minimal capital investment) and the availability of labour, lead to the possibilities of the development of mussel cultivation. However, this combination of natural, technological and productive conditions required an institutional structure that orchestrated production. With the granting of rights by the State, the sector was transformed from a scenario of a common pool to a more efficient system that allowed for the cultivation of mussels.

Given the physical statements of the Galician “rias”, the deontological rules (Gardner and Ostrom, 1991) of establishing an organizational structure for the production of mussels were not too complex at the beginning. The establishment of institutions and property rights over tracts of sea in the Galician rías have resulted in a

relatively cheap and easy activity. This activity does not imply great problems of information, due to the ease in which to observe and identify these maritime tracks of sea where the floating raft cultivation is set up. Control and enforcement costs are also not insurmountable. The costs of the institutional definition are compensated by the social benefits derived from their establishment. In this case, continuation of the commons is not efficient and the response is the assignment of more definite property rights to the resource, whereby only owners are granted access (Coase, 1960, Libecap, 2005).

In the middle of the 20th century, when the demand for the establishment of floating raft cultivation rights begins to become prevalent, this institutional change results in a win-win situation. This avoided the emergence of distributive conflicts, and the granting of property rights also supposed an institutional change that favoured economic efficiency gains through the foundation of a system of mussel cultivation which is superior to the common pool phase. This experience provides a special opportunity to examine the emergence of rights structures, such in the case of economic frontiers on land (Libecap, 1999).

b) The role of the State

The establishment of the rules of the game for the cultivation of mussels in the Galician rías was implemented by the State. In reaction to the demand by institutions that were allowed to cultivate mussels in the rías, the Spanish State granted rights to establish floating raft farms of mussels for 30 years (1946-1976).

During this period, the State Administration did not erect many hindrances in the license granting process for the setting up of floating raft farms. Between 1946 and

1959, somewhere in the neighbourhood of two thousand licenses were granted, and between 1959 and 1976 around 5,600 were granted. Only in 1964 were there 1,500 licenses granted and in 1965 a total of 570. In fact, in 1976 the State had granted somewhere in the order of 7,500 licenses (Fernández, 2005).

The granting of licenses in order to establish floating raft farms are best understood considering two factors. On the one hand, the State granted licenses to establish floating rafts on par with the institutional demand. The system was similar to the mechanisms of appropriations on land by order of occupation: *once a tract of ocean was granted to an applicant*, and when the floating raft farm was made operational, the applicant ended up consolidating his rights over this mooring point.

On the other hand, the granting of licenses scarcely required any cost for the applicant so that the application and the consequent granting of the license were essentially free. As a result, many of the licenses were not used afterwards due to the labour intensiveness of floating raft farming, while the price of mussels did not allow for sufficient returns. In addition, some of the 2,000 mooring points that were vacant in 1974 were very shallow and were in very open, exposed areas (Labarta, 2004). To sum it up, more than half of the licenses granted in 1976 were not used, and therefore, the number of actual rafts was around 3,300 for that year. It is therefore important to distinguish clearly between the number of licenses granted and the actual number of existing rafts.

During the three decades of rapid growth of mussel cultivation, Spain was under the dictatorial regime and it was the Franquist State that took on the role of granting licenses for the establishment of floating raft farms whose objective it was to stimulate the development of the mussel sector and to overcome the associated economic difficulties.

Coinciding with the political transition to democracy, the State suspended the granting of new licenses in 1976. This situation implied a change in the role of the State regarding the granting of raft rights: Meanwhile, up until 1976 whosoever wished to establish a floating raft farm could do so with relative ease. Since that year, however, the State implemented a status quo on license granting and prohibited the establishments of new raft farms.

Moreover, the Spanish political transition to democracy led to the Constitution of 1978, that allowed for the gradual process of political decentralisation towards the Autonomous Communities (Spanish regions) in a de facto federal formula. This decentralisation entailed the relinquishing of many competencies to the autonomous governments in matters dealing with fishing and aquaculture (Caballero, Garza y Varela, 2007), and as a result, in the case of the fishing and agriculture industry, the regional government of Galicia (Xunta) was transformed into the competent political organ for floating raft mussel cultivation and adhered to the policy of not granting more licenses to set up more rafts.

Since no more licenses were being granted for rafts as of 1976, the mussel sector could only base expansion on the increase in productivity and intense growth. As a result, the industry went from 170,000 tonnes in 1975-76 to 250,000 tonnes in 1986 based on mechanisation, learning by doing, improvements in floating rafts and by budding scientific research.

c) Legal rules

The rules of the sector are taken from the Royal Order of 1930 that regulated the installation of hatcheries and fish farms and the order of 16 December of 1953, BOE N°

356, which modified the norms of conferment of floating hatchery licenses for the production of seafood, and it also regulated the exploitation of mollusc hatcheries and established the minimum requirements for applicants.

The Decree 2559 of 30 November, 1961 approved a “new rules and regulation concerning the exploitation of hatcheries situated in the Coastal areas”, which established the regulations concerning the granting of licenses for the cultivation of molluscs in designated, established cultivation areas suitable for cultivation. This decree revised the norms of license granting, establishing the possibility to renew every 10 years and that the grant would expire if the hatchery were not put into operation within a two year timeframe.

The Orders from the Ministry of Commerce of 1963 set in place a group of designated cultivation areas that organised a total of 4,750 points particularly for the establishment of raft cultivation: Order of 16 January (893 anchoring points), Order of 17 July (815), Order of 5 September (1,540) and 27 November (1,502).

The Seafood Ordinance law (Law 59 of 30 June, 1969) implies a greater legislative expansion and includes a catalogue of legal figures for the cultivation of shellfish. This law regulates the establishment of shellfish harvesting in three subdivisions: a) it regulates the procedures for the granting of licenses and authorization; b) it regulates the fees of use for the licenses in the public domain; c) it approves the existence of special zones in the most suitable areas for cultivation. The latter aspect has been specified exclusively for the Galician case in the Plan of Shellfish Exploitation of Galicia (PEMERGAL, Decree 1238/70 of 30 April).

The Ordinance of 31 May, 1976 (BOE N° 113, p. 18131) established that during an extendable three years period “no applications will be neither accepted nor processed for the granting of licenses for mooring floating hatcheries for the purpose of mussel

cultivation” because of the “obvious imbalance of the mussel market due to shrinking demand.

The Ordinance of 13 March, 1981 (BOE N° 142, p. 13644) dealing with “the liberalisation of the mussel sector” opened up the possibility to grant new licenses, although, after assuming the responsibility, the Xunta nonetheless did not grant any new licenses.

The Spanish Marine Cultivation Law of 25 June of 1984 comprehensively organized the legislation of the marine cultivation sector, regulating both the mollusc and crustacean production regarding establishments in the public domain, and the marine cultivation on private property (fish farms and the like). Among other aspects of this law, it also regulates the procedures to assign grants or authorization for aquaculture.

The Decree of reorganization of the designated aquiculture areas 197/1986, is the basis on which the restructuring of the aquiculture zones were reorganized. In 1986 the limits of the specifications for floating raft cultures were also established.

In the last decade of the 20th century, the main legislation of the Autonomous Community of Galicia in matters relating to the fishing industry include the law 6/1991 addressing infringements for marine resource protection matters, law 6/1993 of the Galician fishing industry and law 9/1993 dealing with Fishing Guilds. Nevertheless, these legislative developments did not imply substantial changed in the institutional structure and of property rights for the cultivation of mussels.

More specifically, the Galician Law of Fishing of 1993 constitutes the central component of the legal norms in force and was complemented by the regulations for marine hatchery cultivation in Galician waters (Decree 406/1996 of 7 November) and of

various ordinances such as the Ordinance of 18 April of 2001 addressing the relocation of mooring points and changes in hatcheries.

d) The system of property rights

Property rights refer to the sanctioned behavioural relations among economic agents in the use of valuable resources (Libecap, 1999). We can define property of resources as the set of rights and obligations that can be exercised during a period of time (Scott, 1986). *A type of response to the problem of open access is a hybrid of private ownership and state regulation, whereby individuals hold property rights, but the range of resource option is heavily constrained by regulatory restrictions. The regulation define how much of the resource can be extracted at any point in time, when it can be accessed, the types of investment that can be made, and the nature of allowable exchange* (Libecap, 2005).

The public domain cannot be occupied privately without permission being granted by the State. Mussel cultivation activities on floating raft farms require an administrative license granted previously by the Ministry of Fishing of the Government of Galicia.

The license implies the granting of a personal right, the right of use and exclusive exploitation of a tract of water in the public domain that is necessary to set up the hatchery and to cultivate mussels. The administrative grant indicates the surface area to be exploited (conditions of use, type of cultivation and authorized techniques) (González Laxe, 2003).

The legal system of grants for the cultivation of mussels implies a system of property rights that is characterised by the following way:

- The situation of exclusivity regarding access to the rafts and the cultivation of mussel extraction is guaranteed, in order to avoid the appropriation of labour and investment by other parties other than the license grantee. In this way, the raft has an owner and is not open to other parties.
- With respect to the transferability, transfer of title rights are accepted in the case of death of the license holder (mortis-causa), and the transfer between two living parties (inter-vivos) is also accepted with certain restriction, which is fundamentally that the new title holder is professionally dedicated to aquiculture or that he possesses the necessary means to exploit the hatchery⁴. The possibility of hiring a floating raft is not accepted, although in practice there do exist agreements between private parties.
- With respect to the period of time granted for exploitation, we should point out that the fishing law of Galicia of 1993 does consider the granting of a ten year period, with two possible and consecutive extensions of another ten years each.
- With respect to the choice of techniques and products to be cultivated on the rafts, the proposal for change must be authorized by the Ministry of Fishing, in accordance with the Ordinance of 18 April of 2001 dealing with modification or changes in location of mooring points and system changes, location and hatchery cultivation.

⁴ According to calculations made for the year 2004, each farm raft license has a market value of between 210,000 and 45,000 Euros (Carbajo, 2004).

According to Libecap (1999), the ownership of an asset consists of three elements: a) the right to use the asset (*usus*), b) the right to appropriate the returns from the asset (*usus fructus*), c) the right to change its form, substance and location (*abusus*). The license granting system of mussel cultivation in Galicia verifies the two first types of rights, while the third type of right is limited and restricted by the rules and subject to the authorisation and control of the State.

Regarding this matter, Schlager and Ostrom (1992) distinguish two types of property rights dealing with resources: operational-level property rights (access and withdrawal) and collective-choice property rights (management, exclusion, alienation)⁵. The system for granting license for floating raft cultivation in Galicia guarantees the access rights, withdrawal and exclusion, whereas the rights of management and alienation are more restrictive.

In conclusion, the system constitutes a property rights structure that has to do much more with private property than with the common pool system. The State and the set of laws favour the exclusivity and transferability of licenses as well as favouring private control of production.

e) The failure of co-management in the 1970s.

Already in the middle of the 20th century, there were signs that the organisational structure of the mussel sector was confronted with an atomised production in the face of a demand controlled by a more limited number of agents. In this way, the “oligarchy of

⁵ The distinction between rights at an operational-level and rights at a collective-choice level is crucial. It is the difference between exercising a right and participating in the definition of future rights to be exercised (Schlager and Ostrom, 1992). In the first group, we can find the right of access (the right to enter a defined physical property) and the right of withdrawal (the right to obtain the products of a resource). In the second group, we can find the right of management (the right to regulate internal use patterns and transform the resource by making improvements), of exclusion (the right to determine who will have an access right) and of alienation (the right to sell or lease either or both of the above collective-choice rights).

demand” explains how, in spite of the increase in demand, the price paid to the producers tended to be suppressed in real terms. This sector has depended on the commercialising actors.

In about the middle of the 1970s, the public sector tried to modify this situation by creating an association where the users and government representatives both participated. The experience constituted an attempt of co-management (Jentoft, 1998).

In 1974 The Society for the Industrial Development of Galicia (with a majority participation from the National Institute of Industry that was a public sector agency) and the Savings Banks created the Society of Mussel Producers of Galicia (Sociedad Mejillonera de Galicia-SOMEGA) whose aim it was to change the conditions of mussel commercialization and to influence prices. SOMEGA assumed activities related to the extraction, cultivation, processing, canning (packaging), industrialisation and commercialisation of mussels, and furthermore, incorporated 618 owners/businessmen (“bateeiros”) from the mussel sector as stock holders.

The fact is that this attempt initiated from the public sector was not successful, and in a span of three years the financial situation of SOMEGA was critical. Public policy through this association could not prevail in a sustainable way. This is why the co-management method failed as a quasi-organisational formula of the mussel production sector in Galicia. Since then, the public sector has refrained from involving itself so directly in the organisation and commercialization of the sector.

f) Organisation of the sector

The sector is greatly atomised with respect to administrative licenses, with a very disconnected property structure in which the property average is 1.35 rafts per title

holder (Labarta, 2004). The majority of rafts are the property of family businesses with a low level of concentration, and in the Ría of Arousa, the average is about 1.15 rafts per title holder (table 5).

Table 5. Concentration de property of rafts

| | Rafts/ Title holder | Number of owners with more than 4 rafts |
|-------------------|---------------------|---|
| Ría of Ares | 14.71 | 4 |
| Ría of Muros-Noia | 4.07 | 8 |
| Ría of Arousa | 1.15 | 9 |
| Ría of Pontevedra | 2.42 | 10 |
| Ría of Vigo | 1.58 | 8 |

Source: Labarta (2004)

The smallholding characterised a sector which was able to employ advanced methods of production, yet within an underdeveloped commercialised system in that sector. The decree of 1962 and the growing number of purifying plants being set up, ended up transforming this phase of the process into the key of the commercialization phase. However, the role of funnel of the purifying plants was not able to counter the lack of strength in commercialisation.

After the failure of the SOMEGA co-management experience, the only road left to the mussel producers to gain influence in the markets and the public sector was by forming associations. In a scenario where the legal barriers to entry limit the competition, associations of producers aim to adapt cartel strategies that fix prices and assign production caps for its members.

In 1979, twenty two mussel producing associations joined to form the Federation of Mussel Producers of Galicia (FEPMEGA-Federación de Productores de Mejillón de Galicia) in order to establish prices and control quantities. The E.E.C. (European Economic Community) relinquished responsibilities and gave aid to the organisations of

producers, resulting in the integration of FEPMEGA into the Organisation of Mussel Producers of Arousa (OPMAR-Organización de Productores de Mejillón de Arousa) in 1987. OPMAR carried out activities related to pricing and product policy, and sought to influence collections regulation. In 1996 OPMAR became OPMEGA (Organización de Productores de Mejillón de Galicia) that is currently the largest organization and is made up of 1,860 floating raft farms and 1,280 members. Other producer organizations include AGAME with 900 floating raft farms and the Federation of Arousa Norte with 600 floating rafts farms.

Using different names and formulas, the mussel sector maintained an organisational majority up to the present, incorporating around 70% of the total production in only a few years. These organisations tried to fix mussel prices along with the canning and processing industry and attempted to maintain the barriers of entry and to acquire financing.

There also exists a group of firms that have integrated the production and commercialisation phase of fresh product, and have even integrated the transformation phase. Of the four cases representative of this situation, the most relevant is that of PROINSA, that joins 80 floating raft cultures.

g) Rules and public policies

In relation to the main functions that correspond to the public and private sector, the rules of the game of mussel cultivation have stabilised since the mid 1970s. The rules of the game are characterised by a public sector that has assumed the system of rights stemming from the Franco era, that has decided not to grant more rights for establishing more floating raft farms, and declines co-management of the SOMEGA type, and

promote public policy of support for the sector. In this way, the producers consolidate their rights over the raft farms and their ability to form associations. This system of game rules is completely compatible with the current economic model and the economic role of the State established by the Spanish democratic Constitution.

According to Gonzalez Laxe (2003), we can point out the two main axes of the possible action of the Public Administration regarding the mussel sector: 1) Planning and management. 2) Control and inspection tasks.

In relation to the first axis, planning and management tasks aim to find and adequate use of the public domain which include the following elements: A) Production regulation, which includes aspects such as the organization of cultivation zones and the conditions of use (usufruct) of the public good. B) The protection of the natural environment, which guarantee that the mussel production activity is respectful of the natural environment. C) Financial support of the sector, with special emphasis on the domestic economy linked to mussel cultivation. D) Technical support (R&D) (González Laxe, 2003). In relation to this last aspect, the intense support of R&D applied from the public sector (in various specialities such as biology, ecology and pathology) are combined with private external R&D (whose ultimate objective is for matters of the technology of facilities and the processes of mussel harvest and selection)⁶.

In relation the control and inspection axis, the objective consists of assuring the fulfilment of the established regulations, such as the control over the existing rafts and their placement. Another relevant case of control refers to the quality control regulation with respect to the norms stemming from bodies such as European Council Directive 91/492/EEC of 15 July of 1991.

⁶ Within this first axis, some of the main public policies of the State have been focused on providing insurance, in commercialization campaigns and in seabed cleanup operations and alteration due to pollution. “The system of control of the red tide” has been especially relevant”, started in 1978, it has resulted in the prevention of the worse effects of the red tide in the sector.

Finally we must point out that there does exist a Regulating Entity: The Regulating Board of Denomination of Origin “Mussels from Galicia” (Consello Regulador de Denominación de Origen - Mexilón de Galicia), formed in 1994 and recognized in 2001 by the ministry. The purpose of this board is to defend the production of Galician mussels and the category of product of quality, and to improve production, processing and commercialization of this product.

h) Status quo.

If completely defined, a system of private property rights equates private incentives with social benefits and costs. In the limit, if property rights are so well defined that private and social net benefits are equalized in economic decisions, there will be no externalities (Libecap, 1999).

In reality, the establishment of floating raft cultures is carried out with imperfect property rights and present a series of negative external effects. Such effects include ecological and hydrographical effects as well as interaction with navigation. Among the ecological effects – that point out the risk of knocking the natural environment out of balance- we must point out that mussel production generates a large quantity of sediment in which there is considerable organic material that produces a layer of sludge sediment. Combined with this effect to the seafloor by the debris generated, there are other ecological effects such as competition with other pelagic (open ocean) fish, and the widening of the habitat of detritus species, banks of reproduction (in scarce species), the introduction of non-native species (NNS) (algae, parasites) and the break up and disintegration of obsolete facilities and equipment (Penas, 2000). Part of these effects imply not only changes of marine

species but also the generation of a new, differentiated biological micro system. (Labarta, 1984).

Nevertheless, the existence of negative external effects does not itself explain the Galician institutional stability and the status quo in the number of floating raft licenses. In agreement with the comparative institutional analysis (Greif, 1998; Aoki, 2001), an institution is self-enforcing when it has persisted for a period of time by constituting a balance without having external factors imposed upon it. Moreover, the study of institutional stability and dynamics implies that we should consider some political parameters as endogenous variables (Greif, 2006).

The institutional foundations for the production of mussels in the Galician rías since the last quarter of the 20th century has set up a scenario of institutional equilibrium, in which there has not been any new licenses granted for floating raft cultures and in which a winning coalition has been organized that maintains the status quo.

The pressure exerted by arguments made in favour of the natural environment, pressure by other users of the maritime space (sailing, recreational ports, other aquiculture categories) and pressure from the current mussel producers (that do not want more competition) form the base of the winning coalition (Riker, 1992) which has maintained the status quo and has blocked license grants for new floating raft cultures. The “winset of the status quo” (Tsebelis, 1995) in matters of new property rights are configured as an empty set for the policy-makers. In this way, the number of rafts and their property has not been subject to big institutional change since

1976. The State focused its activity in public policy described in the previous subsection⁷.

Moreover, changes in property rights arrangements affect distribution as well as production. Even when there might be aggregate or collective economic benefits to a new property rights structure, if some parties perceive that they are better off under the status quo, they will resist the new arrangement (Libecap, 1999). *Parties who anticipate the new regulation or assignment of property rights will make them worse off relative to the status quo will see few benefits from the new regime and will attempt to block it, unless compensation is forthcoming* (Libecap, 2005).

The existence of aggregate gains from new institutions is not sufficient to insure that such arrangements will emerge. The agreement on a new, socially-beneficial institutional structure for the Galician mussel sector found several difficulties, such as the uncertainty on the aggregate gains to be shared, the high number of bargaining parties involved, the information problems and the distributional issues. The parties may agree that something must be done, but they cannot agree on how to proceed most effectively (Libecap, 1999).

6- CONCLUSION

This paper has rigorously studied the institutional foundations of the mussel production sector in Galicia. After demonstrating the importance of the sector, the theoretical framework and an historical introduction, the paper formulates an agenda of institutional analysis topics from a positive perspective. This agenda includes the role of the State, the system of property rights and the institutional equilibrium

⁷ In this way the policy of the status quo also was imposed in matters related to the designated farming zones (polígonos) and of the organization of rafts in those zones, in spite of the fact that the choice of location had not followed solid maritime and return criteria.

situation that maintains the status quo for the granting of license for establishing floating raft farms. In this way, this body of work allows us to better understand the economic performance of the sector upon clarifying the institutional structure of production.

The institutional structure of property for the cultivation of mussels in Galicia did not experiment any “big-bang” changes since the concession of licenses for new floating raft farms was suspended in 1976. This put an end to the possibility for extensive growth. This change coincided with the gradual loss of importance of the Spanish mussel sector with respect to world production.

The analysis of the institutional foundations of mussel production in Galicia is of the utmost interest for three underlying reasons. In the first place, for the players in the Galician sector, this article provides a multidisciplinary focus on the social sciences dealing with institutional, political, legal and economic matters that lead to a better understanding of the sector. In the second place, for the specialists in institutional analysis, this paper sets forth a case analysis dealing with the relationships between institutions and economic organisation, and therefore widening the applied empirical analysis base. In the third place, for the mussel producers in other parts of the world, the paper furnishes evidence and relevant knowledge for the elaboration of comparative analysis. Nevertheless, we have to point out that institutional foundations and property rights regimes could not always be so easily transferred from one society to another (Libecap, 1999).

A better understanding of the sector institutions opens possibilities for future endeavours of positive institutional research and constitutes the base on which normative proposals can be formulated. With respect to the latter, the institutional analysis of the historic path is fundamental, being that the institutional reform

possibilities have to take into consideration the present situation in order to evaluate the possibilities of success of the change. In this manner, according to Libecap (2005), the legacy of past informal or formal property rights can give some parties a vested interest in the commons, this is to say, history and precedent matter.

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