

The “*fishing local systems*” as a competitive key factor for fisheries resources co-management: The case of Sardinia

Lorenzo Idda - Graziella Benedetto – Pietro Pulina

Department of Economics and Woody Plant Ecosystems
Agricultural Economics and Policy Section
University of Sassari
gbenedet@uniss.it

Key words:

Local system, territory, local development, fisheries and aquaculture

Abstract

Agri-food production systems, as well as fisheries and aquaculture, work today in a new competitive arena where the *territory* plays a prominent role. Each territory is characterized for the presence of a close network of social, economic, historical and cultural relationships, all together defining a specific way to produce. So, it is important to analyse the extra-economic linkages between the firms and the *territory* in which they work. More in detail, the analysis has to make reference to an organizational model similar to the *district* one, because fisheries and aquaculture production systems, as well as the other economic activities, must observe the requirements of this integrated conception of local development. The identification of the local systems of fisheries and aquaculture becomes, therefore, an essential strategic option in order to approach EU Fisheries and Cohesion Funds 2007/2013 and for an effective management of the fisheries resources. With reference to the last argument, special ‘fisheries districts’ can be considered the institutional basis of a successful cooperative management of local fisheries resources.

This paper proposes a methodology devoted to the identification and the characterization of fisheries local systems, which is preliminary to more deepened and accurate empirical studies. Factor analysis has been applied to Sardinia Census dataset (Istat, 2001) in order to draw, on the basis of some socio-economic variables, a regional map of the different types of Labour Local Systems, preliminarily identified as specialized for fisheries and aquaculture. This analysis is a part of a wider research project aimed to design the Sardinian Plan of Fisheries and Aquaculture.

1. Introduction

Sardinian fisheries work today in a very complex and uncertain socio-economic as well as institutional environment. With reference to the economic side, every day fisheries and aquaculture firms have to work in different and continuously changing local and commercial environments: for example, one has to bear in mind the different characteristics of the coastal areas, where industrial or tourist zones with high population density alternate quite desert regions where agriculture, forestry and fisheries are still the most important sectors. On the commercial side, the chances of selling the landed product by either Modern Distribution marketing channels or restaurants or the traditional retail are locally conditioned, overall, by the general state of commerce and tourism, by the land infrastructure equipment and by the tendency to associationism in each area. This situation is complicated by the fast and continuous change of such conditions, marked by the development of the marketing arena where the horizontal as well as the vertical relationships are progressively becoming strictly competitive.

Following these changes, the fisheries and aquaculture political framework, too, has get still further entangled. In Europe, in the recent years, the Common Fisheries Policy (CFP) has been reformed, the new European Fisheries Fund (EFF) launched and a Plan of Action for the Mediterranean Sea projected. Furthermore, the Green Book of the European Commission for an integrate sea policy has given raise to a deep reflection on the marine resources government. Last, the European Union promotes international integration through unceasing changing accords, partnerships and adhesions to regional organisations, such as GFCM, ICCAT etc.

In Italy, where the PESCA National Operating Program (NOP) 2000-2006 is quite concluded, now we are all waiting for the new Strategic Plan and NOP. In these documents will be defined the Italian program of the EFF financial resources assigned for the 2007-2013 period.

In Sardinia the Fisheries Regional Law n.3/2006, has acknowledged a widespread need of a clear and organic body of measures of intervention in the sector. Nevertheless, some central aspects of the law, such as the role and the management of the “fisheries districts”, are not precisely defined as well as the coherence with the incumbent national strategic and operating programming is not verified yet. Furthermore, Sardinian fisheries activity is constrained by the presence of several parks, reserves, protected marine areas and NATURA 2000 network sites and zones.

These arguments are not enough to catch the complexity and the uncertainty of the normative and socio-economic framework for regional fisheries. The Sardinian Administration is now projecting a 3-years Regional Fisheries Plan with the aim of accounting on an organic, efficient and coherent body of measures for the sector. To do this, it is necessary to analyse deeply the different sides of the problem. It is easy to find frequently, in programming documents like a Fisheries Regional Plan, the absence of any consideration of the specific conditions in which the firms work in the different local environments. The attention of the planner is mainly focused on the spatial distribution of the marine resources and on the relative management systems. The Sardinian “fisheries districts”, introduced by the Regional Law n.3/2006, seem to play exclusively this role.

On the other hand, it is important to think of specific policies for each one local system where fisheries and aquaculture are carried out, because the life of fishermen (and of their products) does not finish in the ports where they land, but it continues through the daily relationships with buyers, sellers, public administration, bankers, families. And we have seen above how much complicated has become this life. To do so, a characterisation of the fisheries local systems is needed to define standards of local tailor-made types of fisheries policies.

This paper is an adaptation of the territorial analysis of the Sardinian fishing local systems made for the coming soon Regional Plan for Fisheries. The aim of this work is to define the role played by the fisheries firms in their relative local systems. With reference to this objective, a descriptive

characterisation of the different regional zones is made, based on the vocation for fishing and aquaculture, on local population characteristics, on the integration capability with other economic activities as well as with public institutions. In this sight the relationships between firms are integrated with the places where they are created and grow. This allows space to raise to a central position in the economic theory because it is no more conceived as a source of costs, but as a development factor, decisive for defining the competitive advantage of the systems of production.

The objective of the analysis is not only to locally contextualize the intervention opportunities, but also to concentrate on such opportunities a set of intersectorial actions by the promotion of the arrangement of the interventions made up by the private and public institutional agents. The analysis is focused on the classification of the Labour Local Systems (LLS) concerned by the fishing and/or farming and/or processing and/or distribution activities of the fisheries integrated system of production.

The paper is organized as follows: in chapter 2 territory, local development, fisheries district concepts are introduced and discussed; in chapter 3 the database and the methodology used are described, as well as the results obtained are interpreted in chapter 4; some concluding remarks are proposed in the final chapter.

2. The territorial interpretation

It is a long time since economic analysis have been started to pay increasing attention to the role played by territory as founding element of the development of a specific area: it is in fact an institutional environment characterised by specific rules, governance and incentives system. More in detail, it is well known that economic actions are embedded in social relationships (Granovetter, 1999) and that social capital endowment is very important. Specialized press, as well as academic world, pay attention to this notion since World Bank started supporting projects where cooperation between economic agents, and their relationships with public institutions, are promoted. This new politic philosophy is based on the belief that the cooperation mechanisms, the existence of trust between economic agents and the presence of voluntary associations are related to better economic performance. So they have to be economically and financially promoted, encouraged and supported, especially in the less developed regions.

The scientific debate has started from the Putnam's seminal work (Putnam, 1993), where the wide gap between the economic performances of Italian Northern and Southern regions are explained by the relative equipment of civicness and regulation capabilities. The quality of political institutions, Putnam says, derives from these endowments. Nowadays, the economic studies on social capital take into consideration very different fields of analysis.

The territory identity is defined by the institutional organisation of relationships rules adopted by the local agents. Given its complexity, a detailed and deep knowledge of the tangible and intangible components is essential for a coherent and efficient policy program. The promotion and exploitation strategies of a territorial system are chosen on the basis of the policy makers' capabilities of gathering the essence of the territory which is able to generate an exponential growth of its specific advantages. In Italy, an important role has been played by intermediate institutions, i.e. local administrations and entrepreneurial associations, for supplying specific public goods (such as equipped industrial zones, extension services, export promotion, incentives for unions) strengthening single and associate small firms. Arrighetti e Serravalli (1999) showed that local development is strictly correlated with some intermediate institutions patterns: on one hand, the developed Northern local economies show well-organized and thick institutional systems; on the other, in the Southern regions, where there is a lack of associations and public administration activity, the local development is slack, or is not powerful. Both institutions and social capital are important for development: today network entrepreneurial systems prevail; the big companies de-verticalize and set up network firms; little firms are organized in local production systems, industrial districts functional and entrepreneurial clusters.

Linkages, production relationships, cooperation are increasing with the aim of achieving more quality and flexibility. Consequently, potential transaction costs raise and institutional resources and social capital become important tools for containing them, assuring stability and certainty and generating new public goods.

When these arguments are transferred to agri-food systems, with particular reference to fisheries and aquaculture, the management of the firms is conditioned by the local agents' capability of sharing the same territory protection and exploitation objectives. The integration degree of agents, firms and authorities is able to produce a wide margin of competitive advantage for the local economy, because the firm's outcome is determined by the local environment. This is the reason why we can find spatially concentrated industrial production systems rather than scattered ones, when we bear in mind that what is geographically agglomerated is not only a set of firms working in the same sector, but also a community of people and specialized firm systems (Porter, 1991).

It is difficult, because of its universal nature, to set up a tangible representation of territory, where social relationships would be circumscribed in a limited space. It is opportune to use the concept of place, defined as a multifunctional social outcome of the aggregation of different residential settlements and productive locations (Sforzi, 2000). The economic, social and political organisation of the territory can be interpreted as a set of place systems, allowing us to draw the national economy and society by an outline of local systems. In this work, the local system is defined as a

“socio-economic territory-based unit” and is used for representing and interpreting the structure and the changes of society and economy.

For all the arguments discussed above, in this work the study and classification of the Sardinian fisheries zones are made using the Labour Local System (LLS) as research unit. LSS is defined as “a portion of territory made of several neighbouring communes, geographically and statistically comparable, which are the places of the daily life of the people who live and work there” (Sforzi, 2000). The LLSs are defined starting from a “commuting matrix” which describes the daily movements of people for working. The LSS is homogeneous on the socio-economic and social relationships side and can be seen as a good proxy of the institutional organisation described above. The fisheries local systems definition and analysis can be made by detecting the nature of the relationships and, more in detail, as well as the activities able to move workers and the fisheries and aquaculture location.

The Sardinian LLSs list and composition is taken from 2001 General Population Census data processed by the National Institute of Statistics (Istat).

3. Data and methods

The aim of the analysis is to identify and to characterize fisheries and aquaculture local systems in Sardinia. To do this, 2001 General Population Census and 2001 Industry Census data are used.

A preparatory selection stage allowed us to focus our attention on those systems, among the 45 Sardinian LLSs, where fisheries and aquaculture firms and workers are located. The 25 LLSs so characterized are defined Fisheries Local Systems (FLSs). Some of these are located in the internal regions of Sardinia because in these zones some fresh water fish farming, as well as the connected services, is carried out.

The 25 FLSs have been characterized on the basis of their productive and distributive activities specialization. We acknowledge that this discriminating character has only a partial meaning when used to classify the territorial organisation; on the other hand, specialization can be important when orienting a local socio-economic community towards a system or network outline.

Specialized LLSs definition and classification is made possible by the simultaneous use of several indexes measuring the weight of fisheries activities with reference to the local economy as a whole. These indexes measure the territory vocation for fisheries production and/or processing and/or wholesale and retail distribution. The linkages between production and marketing stages are crucial for the efficiency of the agri-food organization. The analysis of linkages is important because it makes us able to gather the real nature of the relationships, and so to characterize the local fisheries system of production, as well as to identify eventual chances for the development of the system.

This is because different marketing channel (such as wholesale or retail) can produce different backward effects and productive orientations.

The synthesis of such information in a limited number of variables has been made by factor analysis. Principal component procedure is used for factor extraction. The most significant factors (showing eigenvalues greater than 1) have been rotated by varimax algorithm with Kaiser normalization. In table 1 one can find the list of 8 variables processed by factor analysis and the results obtained.

Tab.1 – Rotated factor loadings

Variables	Factor 1	Factor 2	Comunality
Fisheries workers/Total workers	0.902	-0.175	0.845
Fisheries firms/Total firms	0.745	0.167	0.583
Fisheries products processing workers/Total industry workers	0.298	0.830	0.777
Fisheries products processing firms/Total industry firms	0.079	0.882	0.783
Fisheries products wholesale workers/Agri-food wholesale workers	-0.586	0.487	0.581
Fisheries products wholesale firms/Agri-food wholesale firms	-0.136	0.918	0.861
Fisheries products retail workers/Agri-food retail workers	0.827	0.144	0.704
Fisheries products retail firms/Agri-food retail firms	0.787	0.098	0.629
Eigenvalue	3.139	2.625	
% variance	39.230	32.810	
% cumulative variance	39.230	72.040	

4. Main results

Two factors explaining 72% of total variance synthesize the information supplied by the 8 original variables. The two principal components catch the most part of the variables' variance, exception made for fishing firms and wholesale workers, which show low levels of comunality. Bartlett's test (resulting a chi-square value equal to 124,734 with 28 d.o.f.) refuses the hypothesis of orthogonality between the original variables, confirming the validity of factor analysis.

Let us now explain the factors' meanings. The first factor can be used as a fisheries and retail specialization index for LLSs; the second factor, on the other hand, measures mainly the orientation of FLSs towards fisheries product processing and wholesaling. This means that there is a high correlation degree between fishing and retail, on one side, and a strict integration between processing and wholesaling activities, on the other.

Table 2 shows the LLSs factor scores. Only the first factor has been used for determining the specialization degree of FLSs. Four categories of FLSs resulted from the analysis of first factor scores:

- 1) high-specialized FLSs (factor score greater than 1);
- 2) specialized FLSs (factor score between 0 and 1);

- 3) low-specialized FLSs (factor score between -1 and 0);
- 4) unspecialized FLSs (factor score less than -1).

Only 5 high specialized LFSs resulted.

Tab.2 – FLS classification

FLS	Factor 1	Factor 2	Label
Terralba	1.576	0.756	Filierès- inclined FLSs
Alghero	0.709	3.860	
Carbonia	0.456	0.602	
Castelsardo	2.423	-0.703	Production and/or retail FLSs
S. Teresa di Gallura	1.374	-0.637	
Bosa	1.345	-0.813	
Oristano	1.068	-0.127	
Siniscola	0.707	-0.758	
Pula	0.392	-0.836	
Valledoria	0.210	-0.328	
Tortolì	0.104	-0.811	Processing and/or wholesale FLSs
Sanluri	-0.111	1.112	
Guspini	-0.342	0.410	
Cagliari	-0.378	0.636	
Nuoro	-0.750	0.053	
Olbia	-0.911	0.133	
Orosei	-1.031	0.027	
Sassari	-1.324	0.751	Unspecialized FLSs
Isili	-1.185	-0.298	
Macomer	-1.035	-0.642	
San Teodoro	-1.064	-0.107	
La Maddalena	-0.376	-0.781	
Iglesias	-0.556	-0.587	
Lanusei	-0.602	-0.823	
Muravera	-0.698	-0.090	

A new interesting classification of FLSs is made possible by the integration of the two sets of factor scores. We call “filierès-inclined FLSs” those showing positive both first and second scores. They demonstrate to have a vocation for production as well as for processing and for wholesaling and retailing distribution which is calculated to be above the regional average. Three LLSs, located on the western shore of the island, belong to this category of FLSs: Alghero, Carbonia e Torralba (pink in the map). They show some similar characteristics. First, in all these zones the fisheries systems of production are characterised by a strong identification with territory, because in each one a local specialty is produced: in Carbonia, more precisely in San Pietro little island, the tuna’s botargo (i.e. dried eggs); in Terralba (as well as in the neighbour Oristano LLS) the mullet’s botargo and the world-wide exported mussels, produced by a cooperative in Arborea; in Alghero the lobster, which is a characteristic course of the local cuisine. Second, in these three zones the fisheries vertical

system of production coexists with other vertically and horizontally integrated agri-food sectors, such as cooperation-based wine growing and producing: in Carbonia LLS one can find two wine growers' cooperatives (located in Calasetta e Sant'Antioco island); in Terralba there is the Marrubiu cooperative; in Alghero the Santa Maria La Palma cooperative is the greatest wine producer. Third, the three "filierés inclined FLSs" account on tourism and on the thick network of its relationships for their development . Forth, they boast a large-medium sized port equipment: in Carbonia FLS there are two commercial and industrial ports (Sant'Antioco and Portovesme) and three tourist ports (Calasetta, Carloforte and Portoscuso); Terralba FLS can account on the neighbour industrial and commercial port of Oristano, which have recently intensified the traffic of commodities, especially agri-food goods; in Alghero, not far from the important site of Porto Torres, one can find a large tourist port. These infrastructure equipments, in the future, can play a decisive role for production concentration and control.

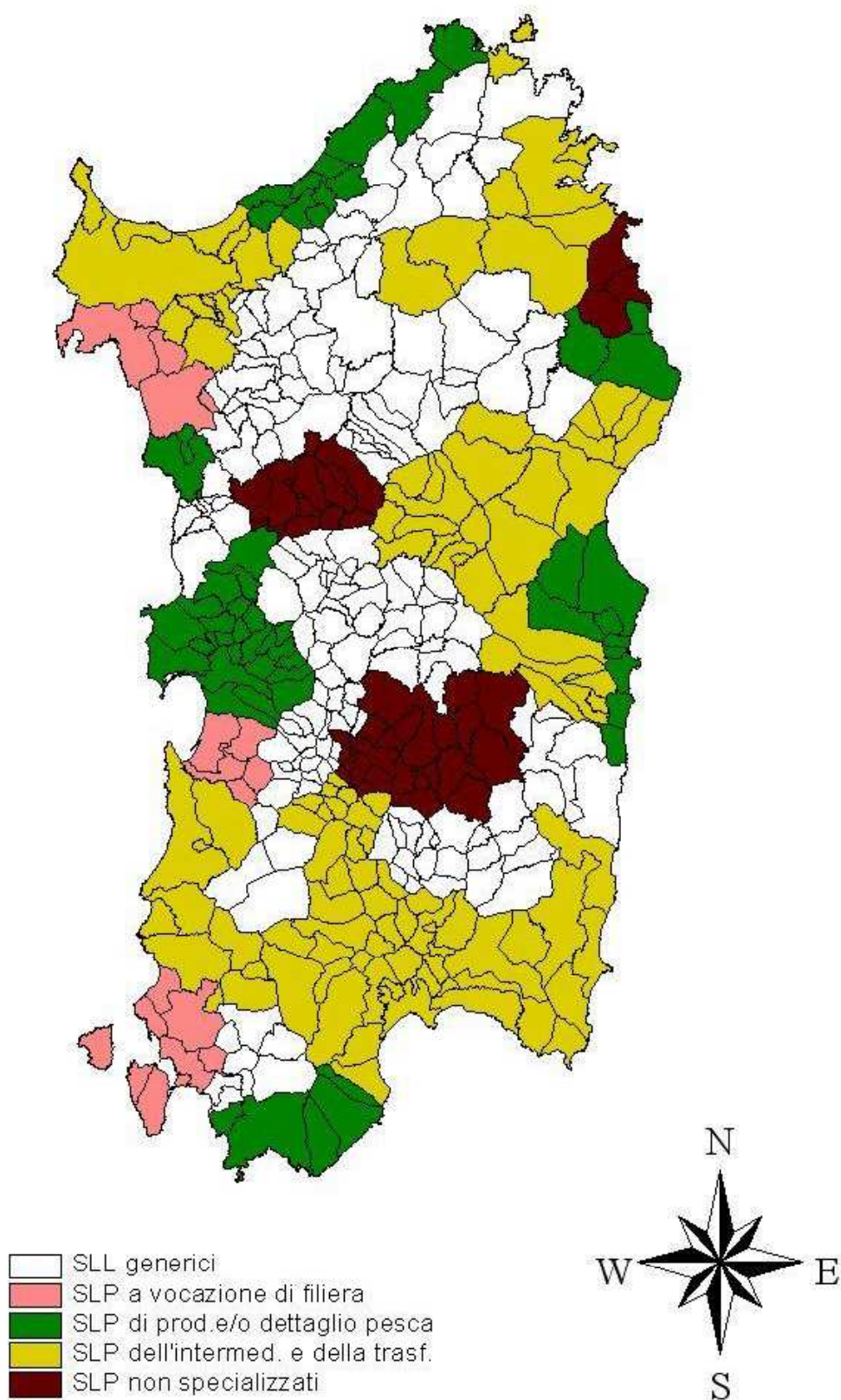
In these FLSs the political intervention has to be oriented mainly towards the strengthening of the linkage between products and territory. With specific reference to fishing, the attention must be focused, on one hand, on the rules and mechanisms governing the relationships between the different stages of the vertical production-distribution process and on the reinforcement of the infrastructure equipment, on the other. More in detail, the actually dispersed system of land services has to be made functional by new operating spaces (such as wharves, loading and deposit areas, parking places), equipments and easy access from outside.

The FLSs with only one positive factor score can be distinguished by the meaning of the factor. So, when the first factor score is the positive one, then we call the system "production and/or retail FLS". In the other circumstances we can find the so-called "processing and/or wholesale FLSs".

The most important characteristic of "production and/or retail FLSs" (green in the map) is the lack of the processing and wholesaling stages of the vertical system of production. The Sardinian FLSs labelled in this way have all a great vocation for tourism. The most part of the production is sold directly to consumer (on docks) or through retailers. The fleet is quite exclusively composed by small-sized aged boats: in Oristano they account for 93% of total boats and are on average 29 years old. Particular attention has to be paid on Oristano, where the high quality production cannot find appropriate market outlets. In these circumstances, policy makers' duty is to strengthen the structural arrangement and the land services equipment.

The "processing and/or wholesale FLSs" (yellow in the map) are mostly either metropolitan zones, such as Cagliari, Sassari, Olbia and Nuoro, or internal regions (Guspini and Sanluri). Although small fishing is predominant, one can observe a significant weight of trawling boats in the fleet in Cagliari (18%), Olbia (23%) and Porto Torres (10%), where the fleet is on average 30 years old.

ALLEGATO 2 - Caratterizzazione dei Sistemi Locali di Pesca



These local systems are characterized by a better economic performance, overall due to trawling fisheries. The policy intervention in these FLSs have to guarantee the exploitation of local resources, especially considering the pushing competition made by extra-regional agents (such as French and Adriatic producers) on summer, when the demand raises and local wholesalers are forced to enter into agreements with external suppliers. The regional distribution network of fisheries products and the promotion of backward linkages become priorities for policy makers in these zones.

The fourth category defined by factor analysis is that of “unspecialised FLSs” (brown in the map), whose factor scores are both negative. Here the policy intervention requires a preparatory analysis of the specific present and foreseen economic and social state of the activities connected to fisheries and aquaculture.

5. Concluding remarks

In this work the existence of Sardinian fisheries local systems differentiated by productive vocation and orientation in the value creation process has been demonstrated. This variety has to be considered as a resource exploitable by regional fisheries in a development strategy strongly linked to territory characteristics. At the same time, the analysis suggests to diversify policy actions by specific measures for each one local system, where the role played by production and distribution activities has to be precisely defined. Each local system has to be also given a specific task in the organic regional plan of fisheries development. With reference to this argument, the actual state of marine stocks, as it is observed and determined in each fishing zone, has to be laid on the mapping proposed here. Fisheries districts, recently introduced, can be seen as a historical opportunity for integrating sustainability and development objectives on a local scale.

These arguments make economic planners persuaded of their need to find an equilibrium between the push towards devolving decision responsibilities on local resources management and the willingness to keep the government and coordination power of fisheries policy and development strategies for the central authority, the only one able to benefit by a comprehensive vision of the fragmented mosaic of local situations.

Factor analysis has depicted the diversification of productive vocations of Sardinian fisheries zones and suggested a corresponding differentiated basket of fisheries government tools. The Regional Fisheries Law n.3/2006 has introduced the fisheries districts with the only aim of making rational the marine resources management. Fisheries districts, on the other hand, can be seen as opportunities for starting a process of spatially modulation of fisheries policy. The economic agents themselves have to participate to this process, taking management and programming

responsibilities, in compliance with the Principle of Subsidiarity, sanctioned by the Italian Constitution, which inspires Agricultural and Fisheries Common Policy programming and intervention.

Although its meaning has been limited to specialization, the analysis demonstrated the opportunity of shifting the policy maker's attention towards the territorial conditions in which economic agents work. In other terms, the fisheries policy has not to be interested only in what happens on the boats off shore, but it must consider what fishermen find when they land: port infrastructure equipments, markets, institutions, fellow citizens. This is the most important message for regional planners: today fisheries requires an effective and comprehensive policy action which goes beyond sectorial issues and consider the several and complex relationships with the local economy.

References

ARRIGHETTI A. - SERAVALLI G. - WOLLEB G. (1999): *Istituzioni e Sviluppo locale: uno schema interpretativo*, Università di Parma, Dipartimento di Economia, mimeo.

GRANOVETTER M. (1999): *La forza delle relazioni deboli*, Liguori, Napoli.

PORTER M.E. (1991), *Il vantaggio competitivo delle nazioni*, Milano, Mondadori.

PUTNAM R.D. (1993), *Making Democracy Work*, Princeton University Press, Princeton.

SFORZI F. (2000), *Il sistema locale come unità d'analisi integrata del territorio*, in GORI E. - GIOVANNINI E. - BATIC N. (eds.) (1999), *Verso i Censimenti del 2000*, Atti del Convegno della Società Italiana di Statistica, Udine, Forum.