



**Rural resilience and vulnerability:
The rural as locus of solidarity and conflict
in times of crisis**

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Diversification of fishery activity: a cognitive approach

G. Vindigni, I. Peri, G. Carrà and C. Monaco¹

Abstract – In recent years many coastal communities of the Mediterranean show a high level of dependence on social and economic activity carried out by small-scale fisheries. At the same time, several Mediterranean areas are showing evident sign of distress as a result of habitat degradation and over-exploitation of resources, induced by semi-industrial overfishing. The current crisis is also influenced by growing factors such as illegal competition, reduced catches, rising costs and a lack of rational and efficient organization of the supply chain. This paper seeks to investigate the perception between different stakeholders regarding the effects of possible scenarios of diversification of fishery activity of small coastal communities of South Italy. Starting from a bottom-up perspective we made use of mental models and cognitive maps, to deal with the dynamic nature of the process for identify strategic objectives and policy actions. ¹

INTRODUCTION

Small-scale fisheries suffer many problems covering the increasing pressure on the aquatic resources, degradation of fish habitat, decline in fish catch per fisher, which cause the decline of the activity (Song et al., 2005).

Our study was based on the assumption that the diversification of fishing activities can support artisanal fisheries, with positive effects on the entire territory, wherewith is strongly linked by traditions.

The main objective of the paper has been how to develop a structured and personalized process that allows fisherman to organize and integrate their production activities within the context of existing diversification policies.

The study described in this article has developed in the framework of a project promoted by the Sicilian Region. It covers the Ionian coastal areas of eastern Sicily, including fishing communities of the cities of Messina, Catania and Siracusa as well as Marine Protected Areas (MPAs).

The project involved many integrated activities aimed at encouraging and strengthening the diversification of fishery activities in Sicily, through the

identification of strategic lines and related objectives.

The paper is structured as follows. The first section introduces the theories underlying concepts of mental models and cognitive maps. The second section discusses a case study on diversification of fishery activities based on a collaborative process, which is aimed at creating a shared visions of strategic actions directed to the policy makers. The third section presents results and conclusions on the potentials of this approach to deal with dynamic nature of the process for a future identification of strategies and action.

METHODS

In order to analyse the potential development of the diversification activities, we designed our work in two main interrelated phases. In the first stage we divided the research work in: (i) Study area and identification of local fleet activities; (ii) check-list of diversification activities making use of a "terrestrial approach"; (iii) qualitative interviews with stakeholders and fishermen. The players involved were divided into four categories: organisations that represent the interest of fishing industry, local authorities and administrative organisation, University and research associations.

By groups open-discussion on major challenges and concerns, each participant was asked to express fundamental point of view and concerns that could improve the adoption of diversification strategies. The practices, logics and constraints of diversification activities have been explored making use of cognitive mapping technique with the aim to identify the key issues and strategic options. Cognitive maps expresses values and concepts of open-discussions as means-end relation between them. They aim at capturing personal subjective data and resulting in particular perceptions leading to determine whether action is required (Vindigni et al., 2012). The form of cognitive maps here discussed in based on Kelly's Personal Construct Theory (PTC) (Kelly, 1955) and developed by Eden and colleagues (Eden, 1992): maps are a representation of how an individual or group members perceive a situation.

Using Decision Explorer® software, individual maps have been later congregated into an "aggregated map". Identical concepts (i.e. similar wording, same context but different maps, or both) have been merged into the aggregated map by combining the wording used in individual maps. This process gave each person a sense of ownership of the map.

¹ G. Vindigni is working at the University of Catania, Department of Agri-Food and Environmental Management Systems (DiGeSA), Catania, Italy (vindigni@mbbox.unict.it).

I. Peri is working at the University of Catania, Department of Agri-Food and Environmental Management Systems (DiGeSA), Catania, Italy (peri@unict.it).

G. Carrà is working at the University of Catania, Department of Agri-Food and Environmental Management Systems (DiGeSA), Catania, Italy (carra@unict.it).

C. Monaco is a PhD student at the University of Catania, Department of Agri-Food and Environmental Management Systems (DiGeSA), Catania, Italy (clamonaco@unict.it).



In the final step, we carry out several analyses to identify key issues. Cluster analysis was performed to find groups of closely linked concerns. Each cluster can correspond to one or more key issues according to some parameters introduced into the software, namely the target and the minimum size of the cluster (Fig. 1).



Figure 1. Cognitive map which shows interview participants perception of the adoption of diversification activities.

RESULTS AND DISCUSSION

At national level, the Sicilian fishing fleet is one of the most representative of small-scale fishery, both in terms of capacity and activity. The artisanal component characterizes the regional fisheries sector, representing the largest segment in terms of units of fishing.

Despite small scale fisheries is considered a well-advanced activity for social and environmental sustainability, it is a declining activity, due to different economic, social, environmental and policy influences. It includes those small boats that use selective gear, such as nets, hooks, creels and other traditional tools; moreover, the environmental variability, due to the type of seabed and the seasonality, determines the presence of boats that change their type of fishing practiced several times during the year. Although it would appear that fishery is severely depleted in the area, artisanal fishing persists in formal and informal ways. Diversification is perceived by fisherman to make an important contribution to family income. The dearth of income linked to traditional fishing activities, makes fisherman interested in other income earning options and/or relatively sustainable economic return.

However, social, economic and cultural factors are significant real determinants of success in the adoption of income strategies.

After reviewing the results of cognitive map analyses, we clearly identified, besides the overall objective (diversification of fishery activities) the strategic lines. Those lines are the results of the selection of objectives grouped by their nature and similarity. The greed (table 1) allows us to determine which activities has a contribution to the goals identified in the framework on each strategic line.

Table 1. Vision of the promotion of fishery activities diversification.

		Actions												
		Fish tourism	Ichthyic tourism	Museum and naturalistic guided tours	Diving, snorkeling, dolphin watching	Human capital training	Passengers transport	Marine district tours	Research activities support	Eco-activities in marine environment	Participation in tenders	Direct sales	Product processing and quality brands	
Strategic Lines	Regrouping and mobilization of existing activities	Goals												
		Growth of tourism demand	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Increase of market oriented companies		✓			✓					✓	✓	✓
	Improving local fishing knowledge	Modernization of equipment and boats efficiency	✓		✓	✓		✓			✓	✓		
		Increase of enterprises		✓		✓			✓		✓	✓	✓	✓
		Increase of profitability and employment	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
	Marine environment protection	Creation of cultural events		✓					✓	✓	✓	✓	✓	✓
		Improvement of social conditions	✓				✓			✓	✓	✓	✓	✓
		Awareness of marine resources	✓		✓	✓	✓			✓	✓	✓	✓	
		Intensify environmental knowledge	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	
		Safeguard of the sea	✓	✓	✓	✓				✓	✓			
	Networking	Biodiversity protection	✓	✓	✓	✓			✓	✓	✓	✓	✓	
Reduction of fishing effort		✓			✓		✓		✓	✓	✓	✓		
Preservation of marine structures and seaside villages		✓	✓	✓			✓	✓	✓	✓	✓	✓		
Expand research activities							✓			✓		✓	✓	
		Development of cooperation		✓			✓	✓	✓	✓	✓	✓	✓	
		Advancement of competition	✓		✓	✓		✓	✓		✓	✓	✓	
		Support services enterprises			✓		✓				✓		✓	

CONCLUSION

This paper provided an overview of the phases and tasks involved in structuring and defining the problem, identifying key stakeholders, existing activities in the areas, to develop strategic lines within the context of an intervention directed to strengthen the diversification on fishery activity in the Ionian coast of Sicily. The cognitive approach allows us to identify and display the complex options of the groups of players involved. It also raises the awareness and the perception of small artisanal fishery producers of rural community respect to the present conditions of fishing industry.

Finally this study may support policy makers and researchers interested in this field to develop strategies to maintain traditional fishery activity and to enhance its diversification.

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