ABSTRACT

THE ROLE OF UNIVERSITY PARTICIPATION IN INTEGRATED COASTAL ZONE MANAGEMENT: A CASE STUDY OF THE RIA DE AVEIRO

by
Amie Barbosa Figueiredo

The purpose of this investigation is to examine the efforts of the Universidade de Aveiro to create a public participation process and provide information for the management of the Ria de Aveiro, a lagoon system, in Portugal. This thesis examines whether universities are effective as coordinators and facilitators of Integrated Coastal Zone Management (ICZM). The Universidade de Aveiro, through the European Union-ICZM-Demonstration Programme, spearheaded two projects, MARIA and ESGIRA-Maria, in efforts towards moving forward with ICZM in the area. A framework was created and then applied through a series of pilot-projects. Examination of the results of these pilot projects reveals that Universidade de Aveiro fostered partnerships and a sense of ownership between stakeholders through many different levels of participation. The university was seen by the various actors as a neutral, trusted agent and thus in a good position to bring together actors with conflicting interests. These projects will hopefully serve as guidance for those trying to achieve Integrated Coastal Zone Management in similar areas.

THE ROLE OF UNIVERSITY PARTICIPATION IN INTEGRATED COASTAL ZONE MANAGEMENT: A CASE STUDY OF THE RIA DE AVEIRO

by
Amie Barbosa Figueiredo

A Thesis Submitted to the Faculty of
New Jersey Institute of Technology
In Partial Fulfillment of the Requirements for the Degree of
Master of Science in Environmental Policy Studies

Department of Chemistry and Environmental Science

January 2005

Blank Page

APPROVAL PAGE

THE ROLE OF UNIVERSITY PARTICIPATION IN INTEGRATED COASTAL ZONE MANAGEMENT: A CASE STUDY OF THE RIA DE AVEIRO

Amie Barbosa Figueiredo

Dr. Nancy Jackson, Thesis Advisor — Date
Associate Professor, Environmental Policy Studies,
Department of Chemistry and Environmental Science,
New Jersey Institute of Technology

Dr. Maurie Cohen, Committee Member — Date
Assistant Professor, Environmental Policy Studies,
Department of Chemistry and Environmental Science,
New Jersey Institute of Technology

Dr. Zeyuan Qiu, Committee Member — Date
Assistant Professor, Environmental Policy Studies,
Department of Chemistry and Environmental Science,
New Jersey Institute of Technology

BIOGRAPHICAL SKETCH

Author: Amie Barbosa Figueiredo

Degree: Master of Science

Date: January 2005

Undergraduate and Graduate Education:

- Master of Science in Environmental Policy Studies,
  New Jersey Institute of Technology, Newark, NJ, 2005
- Bachelor of Science in Environmental Science and Biology,
  Rutgers, The State University of New Jersey, Newark, NJ, 2000

Major: Environmental Policy Studies

This thesis is dedicated to the people of the Ria de Aveiro and to
my family who have taught me the importance of having true sensibility of that which you love

ACKNOWLEDGEMENT

I would like to express my sincere appreciation and gratitude to Dr. Nancy Jackson who not only served as my advisor, but provided me with valuable guidance, countless resources, insight, support, encouragement, determination, and lots of patience. I would also like to give special thanks to Dr. Maurie Cohen and Dr. Zeyuan Qiu for taking interest and their time to serve in my committee.

I would also like to give an extra special thanks to Dr. Filomena Martins of the Universidade de Aveiro, Departamento de Ambiente e Ordaneamento for all her invaluable knowledge and her important assistance; and also to the other faculty members for all their work and dedication.

Finally, I would like to especially thank my parents, Doris Caçoilo and Michael Nolan for their help, support and patience. Lastly, I would like to give the utmost appreciation to my Avó Maria who taught me to be strong and to believe in myself. Her strength will always be with me. This is for her.

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

1.1 Overview

Coastal zones are one of the most exploited areas in the world because of their diversity of resources. They contain a large portion of the economic activity and ecological wealth in some regions. Stress placed on these fragile areas with growth in industry, tourism and urbanization can lead to destruction of habitat, degradation of water quality, and coastal erosion (EC, 2001a). The coastal zone differs from other managed areas because: 1. the coastal zone represents the zone of transition between land and sea, 2. the coastal zone is governed by physical processes that are often more rapid than processes in other natural systems, 3. the coastal zone is subject to problems generated elsewhere, 4. the coastal zone is subject to a variety of natural hazards and risks to human activities, and 5. the coastal zone supports a large population that engage in a variety of different activities (Capobianco, 2003). Integrated Coastal Zone Management (ICZM) is a process to determine the mix of resource uses to be allowed within the coastal zone while maintaining the ecological values of the coastal environment. The process attempts to integrate activities vertically (national, state, local) and horizontally (catchments, land, sea).

Coastal zones are physically complex systems. Complex systems such as coastal zones need to be managed within a holistic framework. Holistic approaches such as watershed management, ecosystem management and integrated coastal management offer a framework to address coastal problems at various spatial scales and integrate physical and social processes. Many of the model frameworks generated, such as the UNEP coastal and river basin model (Figure 1.1) include similar phases: collection of information and identification of opportunities and conflicts lead to solution

formation and planning for management of the coastal zone. After the implementation phase it is necessary to continue to monitor management of the area. Figure 1.2 illustrates a working method for coastal conservation adapted from Osterman et al. (1989). Problem identification incorporates initiation and analysis of existing information and identification of conflicts/opportunities. Clear identification and mapping of goals is crucial in forming a framework for management and is the basis for activities to be performed. These holistic approaches are most successful when they build on information from the various stakeholders who are users of coastal resources (Kapoor, 2001).

Coastal zone management has been practiced in the United States for over 30 years, while initiatives of the European Commission to establish ICZM in Europe are more recent. Coastal zone management is extremely fragmented in Europe (Humphrey, Burbridge & Blatch, 2000). There are different entities from federal, state, and local levels responsible for managing activities in the coastal zone. These entities were previously created on an "as-need" basis without a larger management strategy in mind. A more holistic approach is emerging for the assessment and management of coastal waters using strategic models for linking science-based assessments of coastal ecosystems to socioeconomic benefits expected from achieving long-term sustainability of coastal resources (Sherman & Duda, 1999).

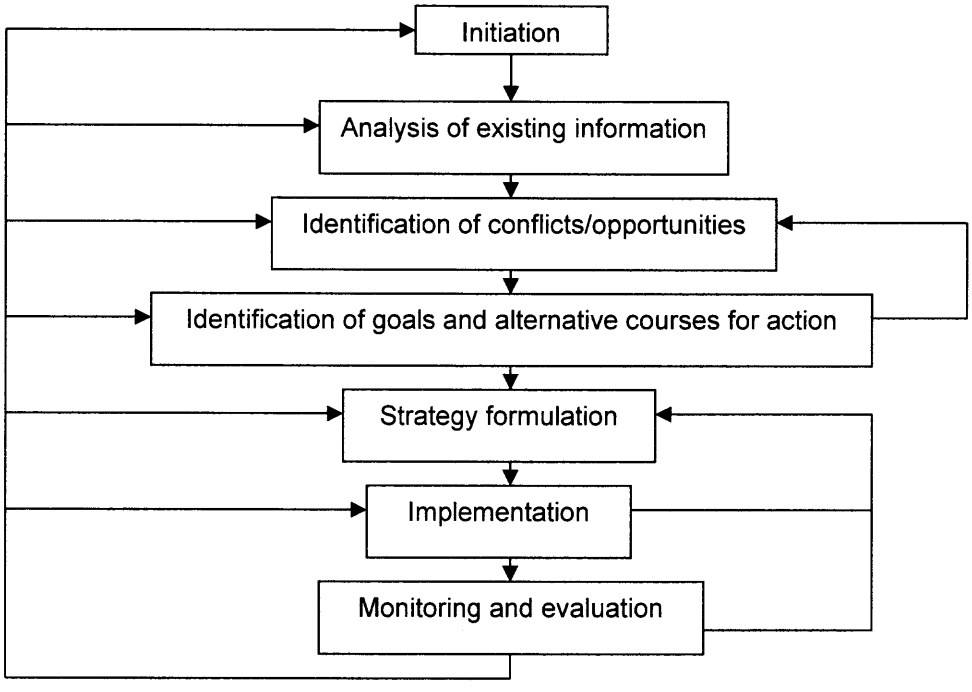

Figure 1.1 Planning process for Integrated Coastal Area and River Basin Management. Source: UNEP/MAP/PAP (1999)

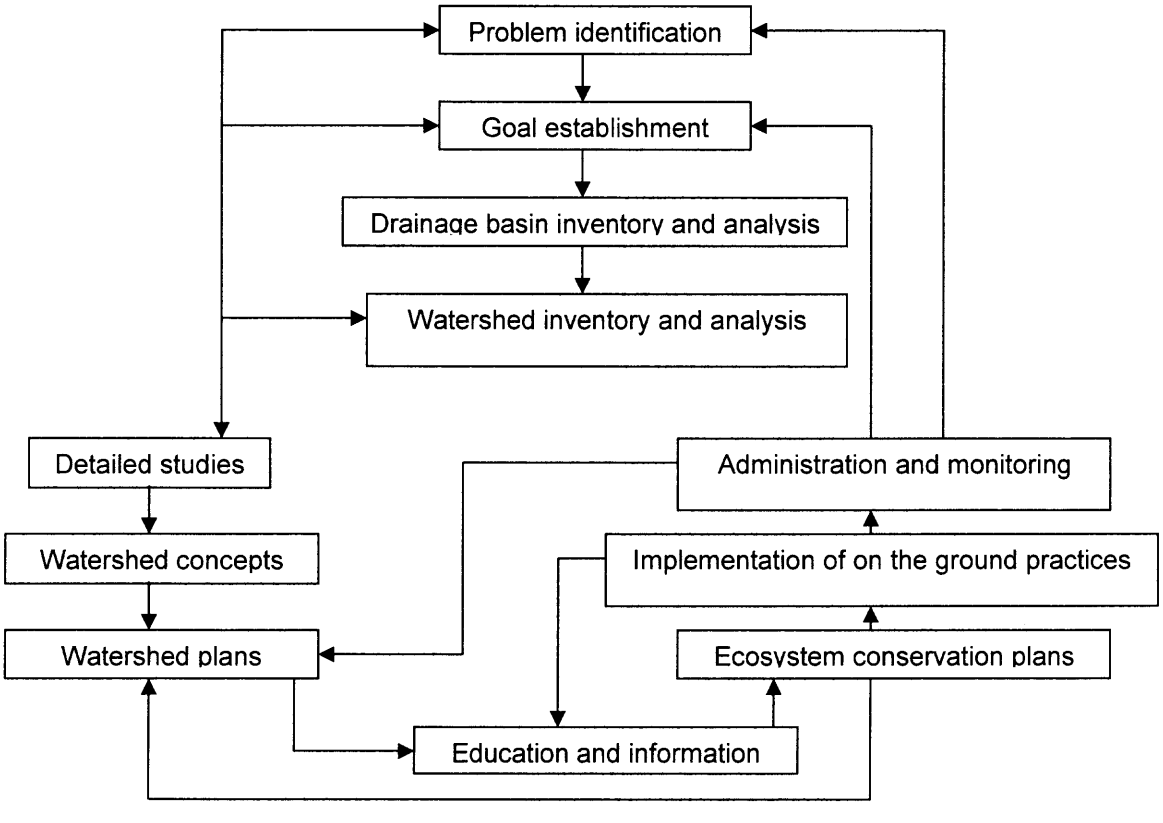

Figure 1.2 Working method for coastal conservation adapted from Osterman et al. Landscape planning working method for soil conservation (1989).

Participation is a large part of the ICZM process. Participatory actions from all individuals affected by coastal changes are necessary if ICZM is to succeed. Participation is not necessary at the same intensity for all participants throughout the process, but their presence is crucial none the less. Participants should feel like they are part of the process and in turn feel responsible for what will happen and that their presence is necessary. Participatory planning consists of cooperation and collaboration of individuals and groups involved in different sectors and levels of government, NGOs, and individuals affected by the management of the coast (King, 2003). Benefits of public participation and consultation according to Johnson & Dagg (2003) include: the opportunity to accurately convey the implications of a proposal to all interested parties; the ability to ensure full mitigation of significant impacts, including consideration of possible alternatives; and the opportunity to solicit the hidden knowledge of the wider community and their key concerns (in Budd, 1999). As discussed in Gough et al. (2003) the main justification for public participation is to lead to better policy decisions and implementation.

Public involvement is through actions such as networking, community mapping, consensus-building, citizen juries, conflict resolution, capacity-building and delegation. Through these participatory actions the hopes are to encourage ownership, commitment and accountability among the stakeholders (Kapoor, 2001). The principle of ownership will hopefully sustain the process and commitment of the stakeholders through implementation and beyond (Roe, 2000). "People who participate in decisions have a greater willingness to implement measures designed to solve problems" (Osterman, Steiner, Hicks, Ledgerwood & Gray, 1989). The hope is also that stakeholders will be empowered through the learning and consensus-building process to create programs which they can manage (Kapoor, 2001; Burroughs, 1999).

An important component of the ICZM process and participation is stakeholder involvement. Stakeholders can be defined as 'groups in a community having special interest of involvement in the use of resources as common property' (Johnson, 2003). Stakeholders can be politicians, businesses, farmers, universities, NGOs, etc. anyone that is involved in processes of the coastal zone. Coastal Management depends on the cooperation of a multitude of stakeholders; stakeholder participation and cooperation is critical for effective implementation (Davos, 2002). Cooperation is necessary because of institutional fragmentation which includes: gaps and overlaps in responsibilities within administrative organizations; lack of awareness of socio-economic and environmental benefits of effective coastal management; and conflicts between socio-economic needs and sustainability (Burbridge, 1999). In some cases, the lack of technical and organizational ability to carry out and enforce planning and environmental legislation requires a different approach.

Coordination of the numerous stakeholders within a coastal zone is generally undertaken at the local level. Coordination involves: horizontal integration of policies between different sectors and services; vertical integration of policies through all levels of government, from local to national; territorial integration through acknowledgement of the relationships and dependencies between terrestrial, estuarine, littoral and offshore components; and integration of sustainable development objectives through time (Humphrey & Burbridge, 2003). Stakeholder participation is gaining growing support, both as a theoretical subject and as an objective of actual management applications (Davos, 2002).

In a situation of institutional fragmentation special procedures and mechanisms are needed to promote consensus building and to bind all parties to sustained cooperation (King, 2003). Creating consultation and participation mechanisms that provide information (newsletters, media, GIS), establishing joint working arrangements

(steering groups, networking, community mapping), sharing decision-making (committees, partnerships, priority search) and empowering decision-making (facilitation, capacity building, delegation) are necessary and need to be specific to the initiative (King, 2003).

Participation helps clarify and stabilize communications and power relationships between stakeholders. Uncertainty and misinterpretation of the program, procedures and results are minimized; conflicts decrease when communication is transparent, and when a variety of viewpoints and information increase public understanding of the processes (Kapoor, 2001; Treby & Clark, 2004). Early identification of necessary parties is crucial and their involvement in planning decisions concerning proposals for development in the coastal zone can be advantageous (Johnson et al., 2003). For participation to be meaningful, it requires involvement by relevant stakeholders in all decision-making phases and throughout the program, from design, representation, consultation, and implementation to evaluation (Kapoor, 2001; Treby et al., 2004).

1.2 Participation Models

Models for public participation focus on the type and level of participation and behavior and attitude toward participation is as important as the outcome. The role of participation exceeds the outcome of the activity it becomes a process on it own, it can enable sustainable management through changes in behavior (Treby & Clark, 2004). Behavioral models, assess participants' likelihood to participate (Ajzen & Fishbein 1975; Renn, 1993). These models suggest that behavior can be changed by information or increased awareness and understanding alone. Critics of these models (Eiser, 1986; Eiser & van der Pligt, 1998; Malotte et al., 2000; McKenzie-Mohr, 2000; Prochaska et al., 1994) state that these attitudinal models are not sufficient to be used as models for participation (Treby & Clark, 2004). The Theory of Reasoned Action and the Three-Step

Model offer a structure for participation but are based on the end result (the decision) and leave out the subsequent participatory process.

There are also a few different models that have nonlinear structures (allowing for fluctuations). These models benefit complex programs and processes within public participation. The flexibility of these models allows management such as coastal management to change according to the phase or level the program is in. Coastal zones are extremely complex and their management encompasses many different participants at different levels.

There are several models that emphasize the types of participation and the level of participation by stakeholders (Bishop & Davis, 2002; Roe, 2000; Treby & Clark, 2004). These models include The Ladder of Participation, (Arnstein 1969), The Shand-Arnberg Participation Continuum (1996), The Wheel of Participation (Treby et al. 1999), Transtheoretical model of change (Prochaska & Clemente 1983); and the Multistage Participation Process (Roe 2000). These models place value on the procedure (conflict resolution, understanding, empathy, and improved communication) of participation (Treby & Clark 2004).

The Ladder of Participation (Figure 1.3) proposes that without the transfer of power true citizen participation cannot be achieved. Arnstein's model illustrates that not all participation is the same and that there are different grades of participation. It is also illustrated that not all forms of public interaction are true participation; some are not participatory actions but rather manipulation of public opinion (Bishop & Davis, 2002).

Like Arnstein, Shand and Arnberg suggest in The Shand-Arnberg Participation Continuum (Figure 1.4) that there are gradually increasing opportunities for participation (Bishop & Davis, 2002). Their model suggests that it is a continuum rather than a one-way process. It describes participation in government programs from the standpoint of public officials; that participation can only be reached if consultation occurs and that

transfer of power can only occur after the partnership stage is reached (Bishop & Davis, 2002). The continuum provides a model not towards a goal but rather towards an ideal for the project being carried out. It is also noted in Bishop & Davis (2002) that most countries operate on the second or third point of the continuum.

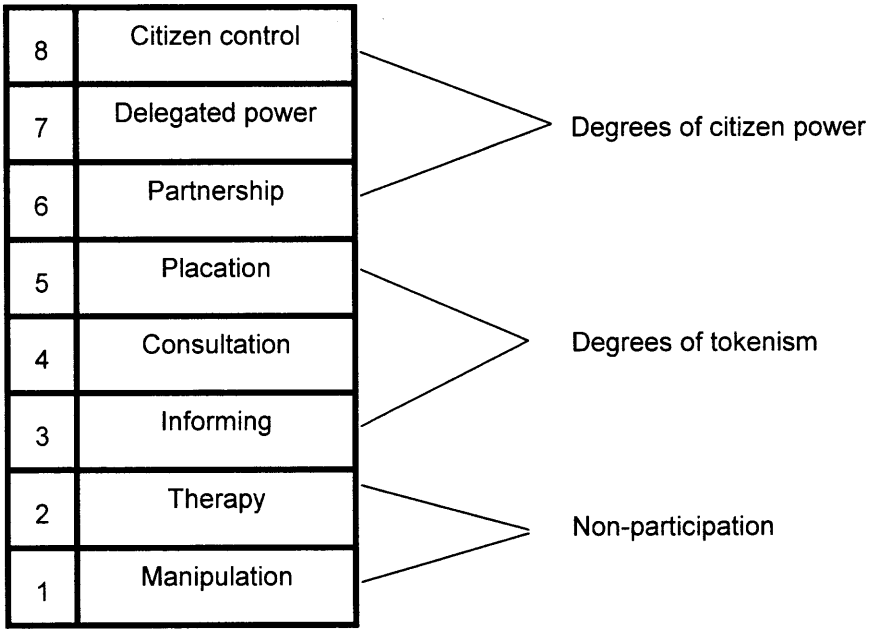

Figure 1.3 The Ladder of Participation.
Source: Arnstein (1969)

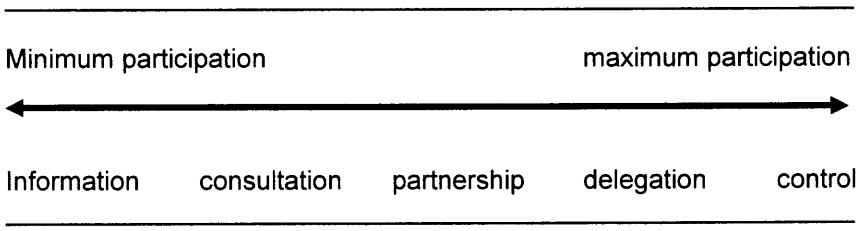

Figure 1.4 The Shand-Arnberg Participation Continuum.
Source: derived from Shand and Arnberg (1996)

Treby's (1999) Wheel of Participation (Figure 1.5) allows different options to come into focus at different stages of participation and uses categories (citizen control, delegated power, partnership, placation, consultation, informing, therapy, manipulation)

that Arnstein (1969) (Figure 1.3) proposed. In Arnstein's model opportunities for participation gradually increase but, what is assumed is that the highest rung is always the optimum participation level (Treby et al., 2004; Bishop & Davis, 2002). In Treby's model the optimum level of participation is that which best suits the phase or stage that a project is in. The Shand-Arnberg Participation Continuum (Figure 1.4) also suggests a shift in participation as Arnstein but what they do not posses that the Wheel of Participation does is, that it takes into consideration the fundamental cultural underpinnings of a particular group and incorporates them into the model. "With the circular model of participation, it is possible to move around the wheel to represent these changes of participation priority at different times and places, and in accordance with the prevailing cultural and economic needs or constraints" (Treby & Clark, 2004).

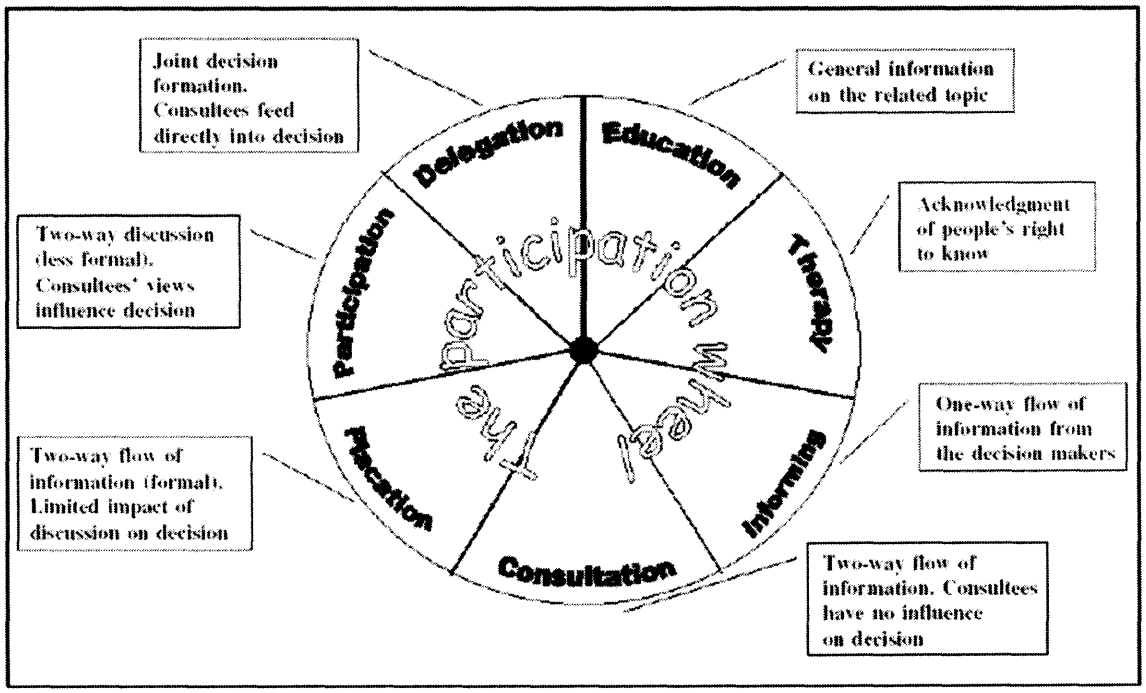

Figure 1.5 The Wheel of Participation (Treby, 1999).

Transtheoretical model of change, (Prochaska & Clemente 1983) or sometimes known as the 'stages of change model' defines the participatory process in multiple

stages: precontemplation, contemplation, preparation, action, and maintenance. In the first stage (precontemplation), participants are made aware of the issues. In the second stage (contemplation), participants consider change and offer their views. In the third stage (preparation), participants consider possible options for action. Action is the fourth stage where participants consider priorities for action so that a plan can be implemented. And the final stage is maintenance of the outcomes and long-term implications so that the change action can be maintained over time. These represent the stages along a scale of willingness to change a problem behavior. Each stage describes an individual's approach towards changing their behavior. This model proposes what actions are necessary for participants to achieve the established goal through actions that are instinctive and that are made personally not as a group.

Roe's (2000) 'multistage participation process' model seeks to achieve management planning (sustainability) not participant behavior change per se. It consists of five stages: information dissemination, public consultation, feedback, reaction and implementation. The latter three models advocate a new route for participation via a nonlinear, complex and stepped approach distinguished by innate flexibility (Treby et al., 2004).

The 'operational coastal zone management model' (Figure 1.6) encompasses the processes of Treby's model (Wheel of Participation) and superimposes the legal, regulatory and cultural systems that are involved in the coastal zone. The 'operational coastal zone management model' (Treby, 1999) represents these multistaged mechanisms with legislative & regulatory systems driven by cultural values; which is necessary when managing complex systems such as coastal zones. Evolved, nonlinear (oscillating) and complex models take into consideration the social value of the process as part of the action (Treby et al., 2004).

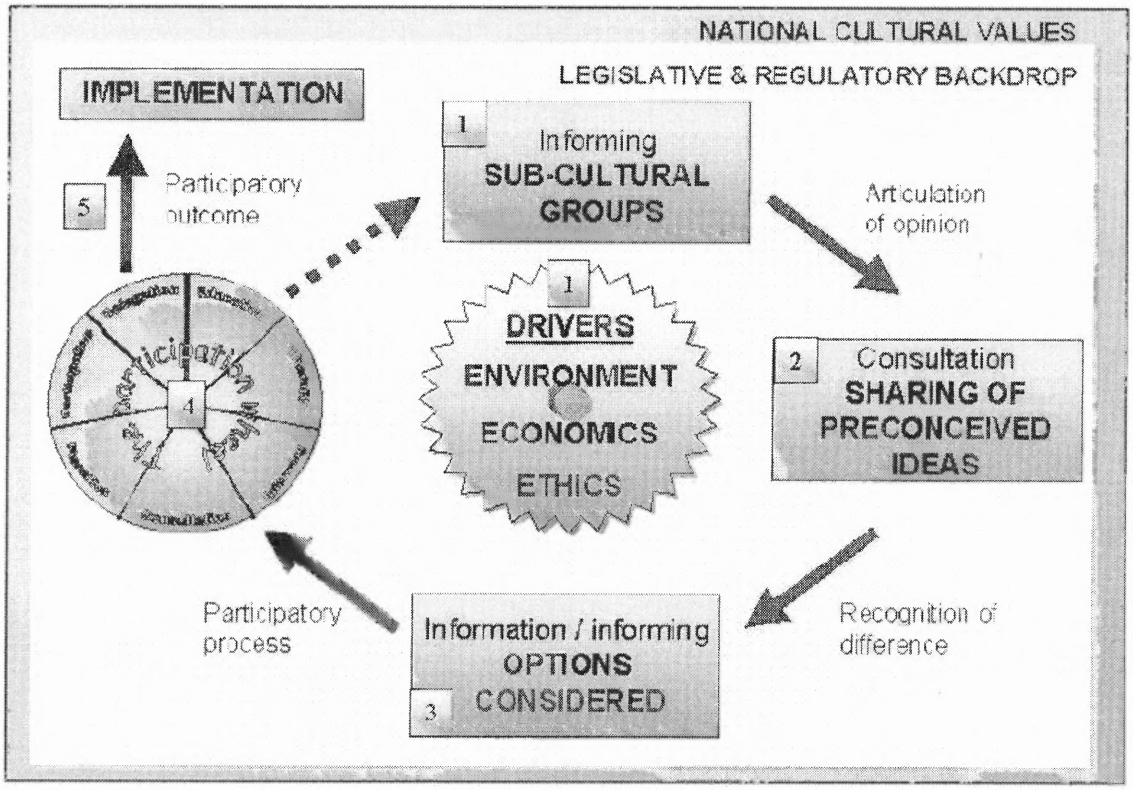

Figure 1.6 The 'operational coastal zone management model' (Treby, 1999).
Source: Treby 2004

1.3 Case Study: Ria de Aveiro

In Portugal, coastal resources are fundamental for economic and social development (Granja, 1995). The Ria de Aveiro, is of extreme ecological and economic importance, not only to Portugal, but also to the European Union. Resources within the Ria de Aveiro, like most of the northwest zone of Portugal, are exploited for economic reasons, but the consequences are not taken into consideration, even when resources that underpin the economy are put in danger (Granja, 1995).

There are many different types of human activities that affect the biological and physical conditions of the lagoon. Industrialization, a recent occurrence in the area, is poorly managed. Uncontrolled urbanization is leading to habitat destruction, water pollution, and loss of open space. The severe problem of organic contamination of the lagoon is devastating to the fragile ecosystem. Raw domestic sewage being discharged

into the lagoon and the effluents discharged from the pulp mills in the area are contributors to the high levels of organic contaminants. There is also contamination from agricultural activities (MARIA Pamphlet, 1997). Small farms are operating on the lagoon where land use is not being regulated. Transport of goods in and out of the port poses threats to the integrity of the lagoon.

Discussions of the fate of the lagoon started nearly 30 years ago, but only recently are efforts moving forward. Developing a method to produce successful decision-making is vital to manage large ecosystems such as the Ria de Aveiro. There are many different issues to examine when assessing the decision-making process in this area. Regulating bodies and their jurisdictions, leading agencies and their roles, best management practices, education level, economy, and industrialization are just some of the issues that must be evaluated.

In Portugal, the administration linked to coastal management has been very centralized and public participation is only slowly being integrated into the formulation of management strategies at the local level (Europa, 2003). Practical solutions to problems can only be recommended if all relevant aspects are taken into account, including capacity-building, environmental management, waste management, land-use, as well as scientific, technical, institutional, legal, social, economic and political factors (Akiwumi & Melvasalo, 1998). The Universidade de Aveiro, through several demonstration projects, coordinated efforts encompassing these factors.

The focus of this thesis is to examine the efforts of the Universidade de Aveiro (UA) to create a public participation process and provide data for the management of the Ria de Aveiro. The Universidade de Aveiro (UA) was the lead coordinating body for two Demonstration Projects that were carried out in the Ria de Aveiro in 1996 & 1999. The goal of these projects was to develop a framework for ICZM in the Ria de Aveiro.

Universities do not normally take the lead in ICZM initiatives. Usually a local authority leads the coordinating function because the management plans created immediately affects them. Universities are usually one of the stakeholders or experts in the ICZM process. In the case of Ria de Aveiro the university facilitated and coordinated local authorities and other stakeholders to develop a management framework. The role of the university in creating cohesion between the fragmented facets was crucial and is the focus of this investigation. Universities can play a pivotal role in the capacity-building process; they have access to different types of expertise and resources that are necessary to coordinate activities (Weinburg, 1999). The Ria de Aveiro project illustrates the preliminary investment, on the part of the university including time and commitment, to establish such a broad-based constituency for coastal zone management (Humphrey & Burbridge, 1999).

CHAPTER 2

INTEGRATED COASTAL ZONE MANAGEMENT IN THE EUROPEAN UNION

2.1 Integrated Coastal Zone Management

Integrated Coastal Zone Management (ICZM) should be thought of as an economic, social, developmental, and environmental policy. ICZM seeks to bring together all of the issues that influence coasts and the people who reside in the coastal environment. ICZM looks to meld the interests of all the actors and to promote coastal ecosystems that can sustain economic activities as well as protect its inhabitants. The intent of ICZM is to improve coordination and policymaking through an integrated concerted effort.

Policy-making based on stakeholder participation is a key element of the 6th European Union Environment Action Programme of 2001-2010. Extensive involvement of stakeholders should be present at every stage of policy-making, from determining goals to implementing management systems. Stakeholders can include businesses, citizens, and nongovernmental organizations. Stakeholder participation is viewed as a conduit for successful policy-making and management. The European Commission believes in the importance of public participation and that it should be encouraged in environmental decision-making (Johnson & Dagg, 2003). "The need to bring together all the local, regional, national and European policy-makers and other stakeholders whose activities affect coastal regions is central to ICZM[...]These stakeholders should include not only government officials and policy-makers but also other interested parties such as local residents, non-governmental organizations and businesses" (EC, 2001a, p. 5). Participation encompasses a wide range of activities of all those involved. Participation is "a continuum ranging from simple forms of information exchange through to wider degrees of involvement and decision sharing" (King, 2003, p. 137).

Information is fundamental to integrated management in the coastal zone and is one of the themes that drive the European ICZM Demonstration Programme (Figure 2.2). "Sound scientific knowledge and economic assessments, reliable and up-to-date environmental data and information, and the use of indicators will underpin the drawing-up, implementation and evaluation of environmental policy" (EC, 2001b, p. 5). Data and other forms of information on the environment of interest are key to successful collaboration among stakeholders (Doody, Pamplin, Gilbert & Bridge, 1998). Obtaining relevant data and information are important to collaboration among stakeholders because only with data and information can accurate and successful decisions be made.

In Europe, the multitude of stakeholders and multiple uses within the coastal zone require an integrated policy response. Beginning in 2000, the European Commission asked member states to put in place national strategies for Integrated Coastal Zone Management (ICZM). The Commission's aim in promoting ICZM was to bring together all the different local, regional, national and Europe-wide policies and actors that have an impact on the day-to-day life of the European Union's coastal regions (EC, 2001a). The hope was that coordinated decision-making could replace the ad hoc decision making of the past and lead to less temporary solutions. An example of a temporary solution is when the Port of Aveiro sought to improve their facilities and this initiative led to increased erosion of the adjacent shoreline because the improvements disrupted local tidal flows. The adverse impacts of the port improvements had not been adequately considered in the planning phase (EC, 2001a).

2.2 Demonstration Programme

From 1996-1999 the Directorate General of the Environment (DGENV) within the framework of the Life-Environment Programme of the European Commission established and carried out the Demonstration Programme on Integrated Coastal Zone

Management (ICZM) (Figure 2.1). The Demonstration Programme was designed to resolve many of the cultural, economic, and environmental issues affecting the coastal zone. A number of Demonstration Projects were funded as part of the Demonstration Programme. The aim of the Demonstration Projects was to: 1. provide technical information about sustainable coastal zone management and 2. stimulate a broad debate among the various actors involved in the planning, management, or use of European coastal zones (Europa ICZM, 2002). The hope was that the Demonstration Projects could facilitate consensus-building needed to achieve ICZM.

Figure 2.1 illustrates the hierarchical structure that supports the Demonstration Projects.

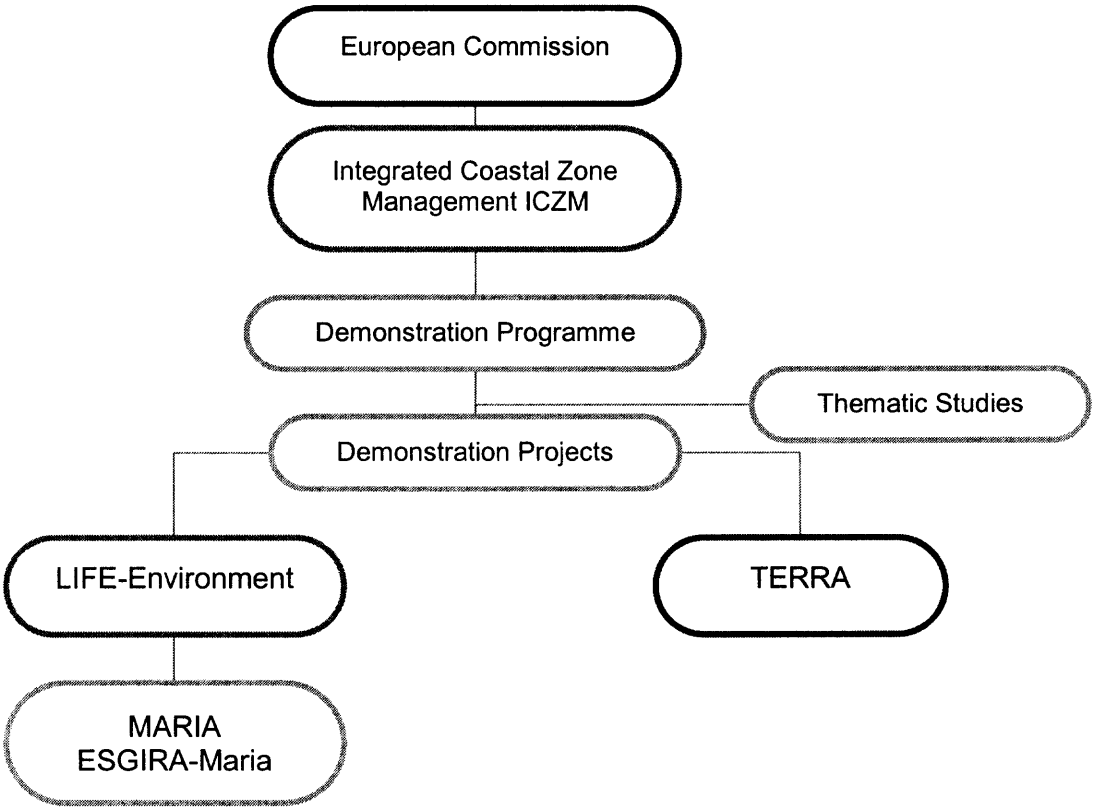

Figure 2.1 Hierarchical Structure that Supports the EC's Demonstration Projects.

The ICZM Demonstration Programme was created by the many Directorate Generals (DG) (which are the different areas (divisions) responsible for policy and priorities of the European Commission) of the European Commission: DG XI (Environment), DG XIV (Fisheries) and DG XVI (Regional Policy and Cohesion), with the support of DG XII (Research), JRC (Joint Research Centre) and the EEA (European Environment Agency). The hope of this venture was that problems that face coastal management would be assessed from an integrated perspective with this diverse collective of DGs.

In addition to the Demonstration Projects, six thematic studies (Figure 2.2) were funded based on key factors identified as important to ICZM.

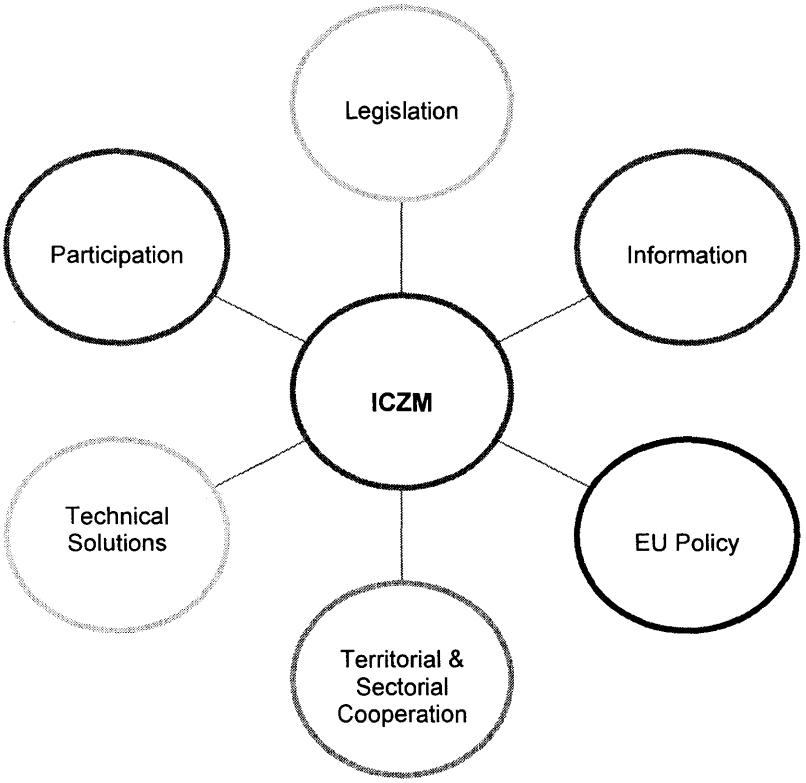

Figure 2.2 Six Key Factors that Drive European Union ICZM.

Demonstration Projects to extract relevant experiences. Data were collected by administration of a questionnaire to all the Demonstration Project leaders. The experts also worked closely among themselves to ensure that their studies complemented each other and did not overlap. The studies were used to assess the role of the European Commission in ICZM (Europa, 2004).

There were thirty-five Demonstration Projects and six thematic studies carried out during the Demonstration Programme. The large number of projects funded was to insure that there were many different areas studied so that an accurate assessment of the coastal zone could be made. The 35 Demonstration Projects that were part of the Demonstration Programme were chosen on the basis of two criteria: 1. potential contribution of the project towards evaluation of the six key factors believed to influence the success of Integrated Coastal Zone Management; and 2. the degree to which the geographic area was representative of the full range of physical, socio-economic and cultural conditions in the coastal zones of the European Community. The methodology for all projects was: description, analysis, planning and implementation.

The European Commission adopted two documents based on the results of the Demonstration Programme: A Communication from the Commission to the Council and the European Parliament on "Integrated Coastal Zone Management: A Strategy for Europe" (COM/00/547 of 17 Sept. 2000) and "A Proposal for a European Parliament and Council Recommendation concerning the implementation of Integrated Coastal Zone Management in Europe" (COM/00/545 of 8 Sept. 2000). These documents outlined the approach that the commission recommended to implement ICZM and what steps member states should take to put ICZM into practice in their countries. There were two projects carried out in the Ria de Aveiro as part of the Demonstration Programme. The first, called MARIA, was initiated in 1996 and the second, called ESGIRA-Maria, started in 1999. The second project carried out the proposed program that was established in

the first project. Both of these projects were led and coordinated by the Departamento de Ambiente e Ordenamento-DAO (Department of the Environment and Planning) Universidade de Aveiro-UA (University of Aveiro).

CHAPTER 3

COASTAL MANAGEMENT IN PORTUGAL AND THE RIA DE AVEIRO

3.1 Background Information

3.1.1 Geographical Description

The continent of Europe has 89,000 km of coastline, on almost half of the European Union's population lives within 50 km of the coast. The coastal zone is also the location of some of the most valuable habitats in Europe. Coastal areas contain many diverse types of economic, social, and natural conditions of Europe. "The coastal zone is a major component in global budgets and global resources availability and utilization" (Borrego, 1996, p. 23).

Figure 3.1 Map of Portugal.
Source: The World Factbook

The Ria de Aveiro is a lagoon situated in northwestern Portugal in the central region of the country. This lagoon is of European importance for nature conservation and of national importance for its economic value. It is a shallow and branched lagoon that is influenced by the tides. The lagoon exchanges from 25 to 90 million m^3 of water with the sea during the changing tides (OECD 1993b). The Vouga River discharges freshwater into the lagoon. There are salt marshes and mud flats throughout the lagoon (Luis, Margalha & Borrego 1995). The lagoon serves as a natural

reservoir for the area. Its canals and tributaries extend much farther than the actual 110 km^2 that constitutes the physical lagoon. The main city of Aveiro, through which several tributaries flow, is also near several smaller municipalities.

The geographic history of the lagoon has evolved greatly through the centuries. In the 10th century the lagoon was little more than a shallow bay. A sand barrier began evolving on the north end towards the south in the 11th and 12th centuries; this protected the inner area from the sea. The Vouga River and its tributaries carried sediments into the lagoon. Sediments were deposited and with time islands, salt marshes, and mudflats began to form (Luis, 1995). By the beginning of the 18th century, the mouth of the lagoon was located south of Aveiro. During the second half of the century the mouth was closed off from the sea. The closure resulted in growth of island surfaces, siltation of existing channels and circulation of water was reduced (OECD 1993b). In 1808 an artificial mouth (channel) was constructed and the lagoon was again connected to the sea. Two jetties were constructed at the mouth of the lagoon to maintain the connection to the sea.

Since the channel is relatively narrow in width (400m), the influence of the sea is not significant throughout the lagoon. Marine life is concentrated near the mouth where the salinity level is the highest. The water progressively becomes brackish and then becomes freshwater with distance from the mouth (Luis, 1995). There is a wide diversity of habitats in this relatively small area. The lagoon's many wetland ecosystems provide essential habitat, shore stabilization, and flood control. Wetland vegetation provides water purification by removing toxic materials and excess nutrients from estuarine waters (OECD, 1993b).

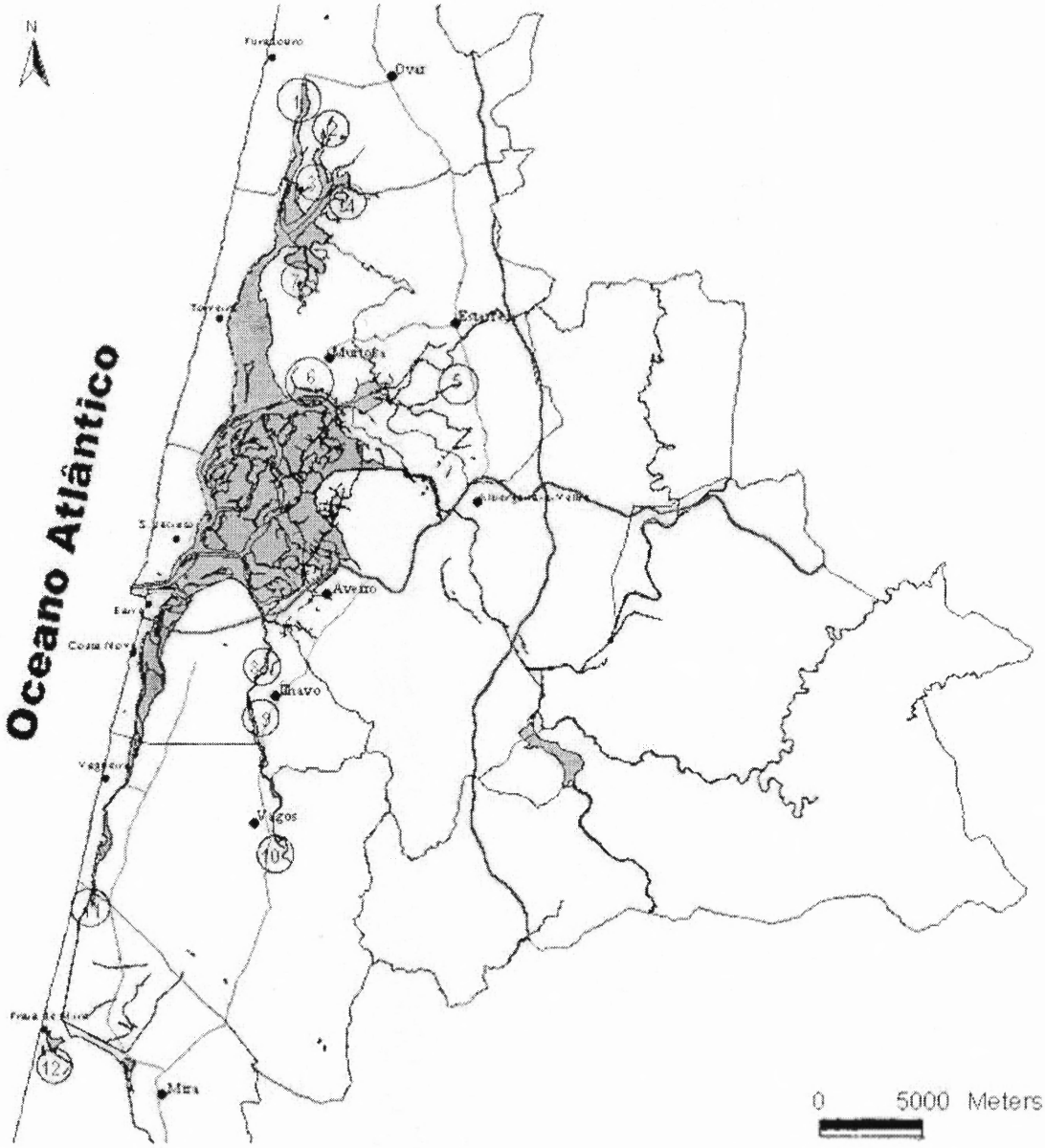

Figure 3.2 Map of the Ria de Aveiro.
Source: Martins 2004 Presentation

Many of the species that inhabit the Ria are protected under various directives and conventions. All 12 species of amphibians are protected under the Berne Convention. The majority of the 173 bird species are protected by the Berne Convention; forty-six percent are 'strictly protected'. This site was not classified by the Ramsar Convention as a 'wetland of international importance', but it has great

ornithological importance as seen in its classification as a 'Special Protection Area' under EC directive 79/409. "Many of these species are dependent on human manipulation of the lagoon water levels for the maintenance of their preferred habitat" (Luis, 1995, p. 500). The project area where the two demonstration projects were undertaken (MARIA & ESGIRA–Maria) covers 600 km^2 which encompasses the area surrounding the actual 'Ria de Aveiro' (Aveiro lagoon) (110 km^2).

3.1.2 Economic Activities

Important economic sectors in the area are aquaculture, agriculture, tourism, and industry. The main threats to the area are the expansion of the port and harbor area, the construction of dams and tourist developments. The major problems include: erosion of soils inland, erosion of the lagoon structure, water pollution, water circulation pattern changes, and salinization of soils.

> There was always a strong relation between men and Ria, because his habits and the ways of life, developed as the result of a direct and continuous contact with this changing environment, became progressively more adapted and slowly grew to constitute a unique culture – a "culture of the Ria" and despite its socio-economical value the lagoon still has very important protective function as a natural ecosystem (Borrego, 1996, p. 29).

The lagoon houses many of the economic activities of the area and there are constant negative and positive influences from these activities on the lagoon and its inhabitants. Approximately 400,000 people live in or near the Ria de Aveiro. Most of the industrial, agricultural, and fishing activities depend on the integrity of the lagoon. "The characteristics of the lagoon and the socio-economic activities developed inside and around the area during the last decades are strictly dependent on the navigability

conditions of the several branches [of the lagoon] showing a strong link between the different activities and the lagoon" (Alves, Martins, & Coelho, 2002, p. 630).

3.1.2.1 Industry. One of the largest pollution sources is industrial pollution that contributes to poor water quality and sediment contamination. The major types of industrial activity in the area are non-metallic minerals, paper and pulp, chemicals, metal goods, engineering, and transport. These thrive because of raw materials (i.e. timber), accessibility to markets, good road and rail links, a seaport, and the availability of a fairly well trained workforce (OECD, 1993b).

In 1985 Aveiro District had about 11% of the total industrial output and 12% of the total industrial employment in Portugal (OECD, 1993b). The rate of development is up to 70% higher in this area than the whole country. Estarreja, a municipality on the lagoon houses one of the major chemical parks in the country. Many of the products manufactured there are highly toxic, but the industry is fundamental for the economy of the country (MARIA pamphlet, 1997). In a neighboring municipality Cacia, PORTUCEL one of the major pulp and paper factories in the country, also has a strong environmental impact on the area. Treated effluent from the factory is returned to the Vouga River and the odor can be detected towns away.

3.1.2.2 Tourism. A more recent addition to the local economy is tourism. "More and more the Portuguese coast is one of the preferred beach resort areas for a large European population" (Borrego, 1996, p. 26). Construction of housing, mainly for summer use, contributes in a significant way to the degradation of the coast. On average each summer the local population surrounding the Ria de Aveiro jumps 40% because of the influx of tourists. Conflicts between tourism and industry are limited because of the distance between locations most industry is kept offshore where as the

majority is located on the actual coast or in the city itself. Conflicts arise when the influx tourists disturb inhabitants of coastal communities and cause congestion.

3.1.2.3 Port Activities. Due to its location the lagoon provides access to main key cities on the Iberian Peninsula. It is the third largest port in the country behind Leixões and Lisbon. It moves many of the commercial products in and out of the area as well as assists the other two major ports in the country.

The lagoon is constantly dredged to keep up with demand. The port areas are kept at eight meters deep (OECD, 1993b). Silting problems in the canals are also occurring due to the dredging and the increasing development of the port. "Many fear that the greater depths in the main channels and port areas are bound to facilitate the inland progress of the salt water boundary, threatening the availability of fresh water for irrigation, thus causing further salinisation of soils and changing patterns of salinity and the living conditions throughout the lagoon" (OECD, 1993b, p. 56).

3.1.2.4 Agriculture. In this area agriculture is mostly in the form of micro farms. Major production is of corn, onions, beans, potatoes, meat and milk. Most farms are rather small (on average 2.5 ha) and produce crops which farmers consume and a small portion is sold. Farms do not provide huge profits, but supplement the livelihoods of the family that owns it.

Most farms are not the sole income for the family. "The subsidiary nature of the agricultural sector is shown by the larger number of units (61%) whose agricultural income represents less than 50% of the total family income" (OECD, 1993b, p. 57). There are several reasons attributed to the small percentage of agriculture in the region, one is the "structural constraints" (the water diffusing throughout the lands) another is that the sector of agricultural laborers "is aged and, partially connected, it has a very low level of education" (OECD, 1993b, p. 57). The Baixo Vouga Lagunar agricultural fields

suffer from soil salinization which gravely impacts agricultural production as well as biodiversity. The Pateira of Fermentelos is of importance to fauna and flora, but suffers from eutrophication from the excessive use of fertilizers in agricultural fields.

Another agricultural use of the land is for timber production, primarily eucalyptus. The timber is used for various uses, but one of the most important is the production of pulp and paper which is one of the region's largest industries. Timber production in this area represents 10% of the total timber production in Portugal (OECD, 1993b).

3.1.2.5 Fishing

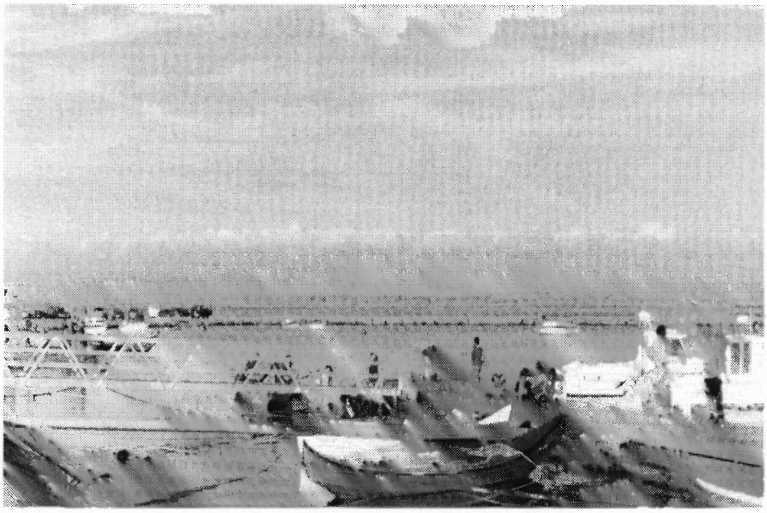

Figure 3.3 São Jacinto-Traditional fishing boats in marina.

Some of the revenue generating activities in the area have been the same for many centuries. Fishing has been a means of survival for many centuries in this area. Where the water infiltrates through the land and creates salinated soil, fishing was their major economic activity. Both coastal and long distance fishing have strongly contributed to the region's economy.

The port district is also of great importance to the fishing industry of the area. There are three types of fishing that are carried out in this area: local, coastal and deep sea fishing. Thirty percent of the country's fleet of ships for fishing is in the port of Aveiro. It has the highest percentage (88%) of the deep sea fishing fleet (OECD, 1993b). Fish production from 1970-1986 increased from 13%-19% (annual tonnage)

(OECD, 1993b, p. 58). This may be attributed to the expansion of the port area and more fishing vessels. Ten percent of all Portuguese fishermen live in the Ria de Aveiro region and nearly 10% of the fish caught locally come from the lagoon (Luis, 1995). Pollution of water systems from industry and public waste are extremely detrimental to fish stocks.

3.1.2.6 Saltpans. Salt production is one of the traditional activities of the area. The saltpans were a large contributor to the local revenue for a long time, but in recent times the production of salt has diminished and many of the saltpans have been abandoned or transformed for aquaculture. Approximately 50 saltpans are still operating.

3.1.3 Social Context

The people of the Ria de Aveiro have a deep cultural sensibility. This body of water influences everyday life for not only those that inhabit the area now, but has for many generations. People adapted their lives to the changing water. The majority of people now do not make a living off the land (selling their goods i.e. fish, crops). Industry and the service sector are now the dominant activities. Many of the agricultural uses of the land are for small farms that supplement livelihoods. Fishing also has long been a way of living for the people in the area. Many goods (livestock, seaweed, etc) are transported by water because of its ubiquity in the area surrounding the lagoon.

People in the area primarily have a grade school education but several do not even have that. With the expansion of the industrial sector, the workforce is moving towards blue collar workers and skilled laborers. In 1999 the unemployment rate was 4.4%, lower than the OECD average of 6.6% (OECD, 2001). In 1999, GDP per capita was 15.2 (1000USD/capita) lower than the average of 21.3.

In 1998, 20.1% of people 25-64 had an upper or secondary (high school) education (graduates), far below the OECD average of 61.2%. In 2003, it was 19.9%

and the OECD average was 64.3%. The expenditure in 1997 was only 5.8% of GDP where the US was 6.9% and France 6.3% (OECD, 2001). The percentage of the population that has a tertiary education was only 6.6% in 2003, far below the OECD mean of 15.3%. The general public is not well educated in comparison to other European countries, but in recent years education has been on the rise. In many families only certain children were allowed to go to school, while siblings would stay and work the fields. With the availability of people able to attend universities, high levels of education are no longer looked at as a luxury, but as a means to gain a better job.

The Universidade of Aveiro was created in 1973, not one of the oldest universities in the country, but one that is on the forefront of science and technology in Portugal. Primarily focused on engineering, science and technology, its 11,000 students studies range from majors in economics and accounting to environmental and chemical engineering. The university is regarded by the public as a center of knowledge and the idea of only the elite attending university has changed over the years as more children are able to attend. It is regarded as an unbiased source of information in an area where political tensions run high.

The people of the Ria de Aveiro have a close connection to the water and the land where they live. The Ria de Aveiro, in essence, sustains them and done so for hundreds of years. They are intimately tied to the Ria's changes. The deterioration of the Ria has led many to look for other ways to sustain themselves.

This is not a very rich area and people cannot afford to lose the activities for which they rely on the Ria. They do want to stop the deterioration of the Ria, but they are wary of those activities that might hurt their livelihoods. The lack of an institutional framework to carry out recuperation activities and the unawareness of how to acquaint themselves with those entities that may be able to assist contribute the deterioration. They are open to listening so long as options are made that will not financially hurt them.

"Society may also regard nature or some of its attributes as socio-culturally, historically or symbolically valuable; and for some people such value cannot be meaningfully expressed in monetary terms" (Turner, Paavola, Cooper, Farber, Jessamy & Georgiou, 2003, p. 495). They live with the Ria and want to continue to live with it.

3.2 Summary of Activities

The region produces about 11% (in 1990) of the national industrial output which per inhabitant is 70% more than the rest of the country. It also produces about 25% of the national fish production. Tourism in the region in 1990 was 15% of the total service output, though small in relation to the other economic activities it still draws many (Borrego, 1996). Sectoral contributions to gross value in 2002 for the service sector rose from 63.3% (1992) to 67.4% where the value for agriculture dropped from 6.5% to 3.8% (OECD, 2004). The area became progressively less dependent on agriculture (due to many factors such as the rise in the education level and the influx of new companies) and more on the service sector this gives some reason as to why the integrity of the Ria has deteriorated quickly.

These activities bring revenue to the area, but also cause great destruction if they go unmonitored. The mechanism of agriculture is a continuous and inevitable process in economic development, but one whose speed and direction can be altered by public policies and programs (Firmino, 1999). "Population growth and urbanization are the most important cause of the observed degradation, together with uncontrolled industrialization, agricultural practices and deforestation as well as over fishing" (Borrego, 1996, p. 26). In addition to overall ecosystem degradation, water and air quality create the most concern.

3.3 Coastal Management in Portugal

Coastal zone management in Portugal has been a subject of intensive study over the past ten years (OECD 1993b). Traditionally, management of the coastal zone was the responsibility of many different agencies. The resulting fragmented system led to continuous deterioration of the Ria de Aveiro due to the lack of coordination between regulating agencies. In addition, the ever-changing political system in Portugal contributed to the problems of managing the Ria de Aveiro.

"With respect to vertical coordination, it may be difficult to achieve appropriate and consistent representation of stakeholders (including those in central government) based outside the area, and vertical links have been largely established through individuals representing decentralized services or line agencies" (Humphrey & Burbridge, 1999, p. 34). The activities of the lagoon were monitored by wholly separate agencies that never had a history of coordination even though they were all using the same resources. This is a product of solutions being created on an as-needed basis and not thought of with a larger vision. An example of this is seen in the management by the Ministry of Agriculture, Rural Development and Fisheries (MADRP) that issues industrial permits while the Ministry for the Environment and Territorial Planning (MAOT) issues discharge permits for activities in the lagoon at the same time, the Ministry of Health is in charge of water quality from a public health standpoint.

A large part of the Ria de Aveiro ecosystem is wetlands. "Wetlands all over the world have been lost or are threatened in spite of various international agreements and national policies. This is caused by: (1) the public nature of many wetlands products and services; (2) user externalities imposed on other stakeholders; and (3) policy intervention failures that are due to a lack of consistency among government policies in different areas (economics, environment, nature protection, physical planning, etc.)" (Turner, R. Kerry, van den Bergh, J., Soderqvist, T., Barendregt, A. van der Straaten, Maltby, E. & et

al., 2000, p. 7). These factors are important in analyzing the management of the Ria de Aveiro. The direct contact to Ria de Aveiro for daily activities such as farming, fishing, paper and chemical production influences the lagoon and the segmented policies that monitor these activities have placed this area in jeopardy.

The Ria de Aveiro is used for a plethora of different activities over which its inhabitants have certain control. The multitude of different stakeholders and inhabitants carrying out daily activities places stress on the area. Alleviating the stress can not be achieved by one person acting alone but requires collaboration of all users of the Ria de Aveiro. These collaborative efforts are necessary not only on the stakeholder level, but are necessary at the administrative level, (described later as part of the problem with the management of the lagoon).

The need for concerted efforts in the Ria de Aveiro was imperative if integrated management was to succeed. Coastal zones can be criss-crossed by several administrative borders. This means coastal improvement policies are often very disjointed, with different districts putting in place different and uncoordinated measures (EC, 2001a). There are seven ministries (20 agencies/bodies) with a role in coastal management in Portugal. On the marine side, the Ministry of the Environment is the main actor with licensing responsibilities on all issues except for ports that fall under the Ministry of Planning and Public Works (Humphrey & Burbridge, 1999). These responsibilities should be under the same agency or the relevant agencies should have a cooperative relationship when it comes to the issuance of permits.

3.3.1 Management History-Portugal

Portugal has instituted many environmental policy and management changes during the country's short history as a republic. Since Portugal gained independence in 1974, the composition of the government has continuously changed. The first Constitution was

voted by the Republic Assembly in 1976 and the I Constitutional government was formed. Portugal most recently swore in the XVI Constitutional government on July 17, 2004, due to the ascension of Prime Minister Durão Barroso head of the XVth Constitutional government to head the European Commission. A new Constitutional government (XVIth) with Prime Minister Santana Lopes and new ministers was formed, two years before the regularly scheduled change by the same political parties (PSD-Social Democratic Party & PP-Popular Party).

The Ministry responsible for the environment has evolved over the years since its inception in 1990. The name of the ministry has changed as well as its responsibilities and administrative structure. In 1990, during the XIth Constitutional government, the ministry was called the Ministry of the Environment and Natural Resources (MARN). MARN was headed by Carlos Borrego, the current head of the UA-DAO; he was assisted by one secretary of state (Secretary of State for the Environment and Consumer Defense). During the XIIth Constitutional government, MARN was assisted by two secretaries of state (Secretary of State for the Environment and Consumer Defense and Secretary of State for the Environment and Natural Resources).

In the XIIIth Constitutional government (1995-1999) the political party changed from the PSD to the PS-Socialist Party. In 1995, when the XIIIth Constitutional government was formed, the name was changed to just the Ministry of the Environment (MA). Different political parties brought a new name and with it a different restructuring of the administrative organization as is usually seen with a shift in political power. MA was assisted by one Secretary of State for the Environment. During the XIVth Constitutional government (1999-2002) the PS was still in power, but the name of the ministry was changed to Ministry for Environment and Territorial Planning (MAOT-Ministério do Ambiente e do Ordenamento do Território) that was assisted by three secretaries of state (Secretary of State for the Territorial Planning and Nature

Conservation, Secretary of State for the Environment and the Secretary of State for Local Administration).

In the XVth Constitutional government (2002-2004) the PSD and the PP were both in power and the name of the ministry changed once again. The parties merged the Ministry for Cities into MAOT to create the Ministry for Urban Affairs, Territorial Planning and Environment (MCOTA). MCOTA was also assisted by three secretaries of state (Secretary of State for Regional Progress, Secretary of State for the Environment and Territorial Planning and the Secretary of State for Local Administration). The minister was replaced six months later and the ministry became MAOT and the Ministry for Towns, Local Administration and Housing was its own ministry when the current XVIth Constitutional government took over in July of this year. This current ministry (MAOT) is back to the original one secretary of state, Secretary of State Assistant to the Minister for Environment and Territorial Planning.

In a short span of time, the ministry for the environment has evolved into many structures and has possessed many different responsibilities. Responsibilities for development of cities changed, as did responsibilities for local administration. There are many difficulties due to the constantly changing structure. With every change comes the delay in getting programs started again and in many cases programs never get completed and new ones are initiated depending sometimes on what the political agenda is. With the changing responsibilities of the ministries it becomes more difficult to delegate responsibilities when the support also changes. Not only do the ministers change, but also the number of people that assist him or her. Progress is slow because of the constant change of ministry responsibilities and resources available, and continual political realignment.

The Ria de Aveiro, in particular, has also had a shifting administrative organization. The Ria is a valued resource that sustains much of the region's economy,

not to mention all of its ecological value. It possesses much of the industry, as well as maintaining the third largest port in the country and its biodiversity is extremely important to not only the country but to all of Europe. "Despite its importance, the lagoon is not currently managed according to its conservation resource value. Management of the area depends on a relatively large number of administrative departments with different aims, making it difficult to implement coordinated actions and planned and well adapted strategies" (Luis, 1995, p. 501).

MAOT also had five regional administrative directorates within it that assisted with and had responsibility for activities within the region. The Ria de Aveiro fell under the jurisdiction of Direcção Regional do Ambiente e do Ordenamento do Território do Centro (DRAOT-Centro) which in 2001 had the Departmento da Ria de Aveiro (DRIA). The DRIA was a paper organization; the department was never staffed or funded and no activities were ever carried out. DRAOT has been replaced by the Comissão de Coordenação e Desenvolvimento Regional do Centro-CCDR-C. The ex-DRAOT acts as part of the CCDR-C which carries out the functions (i.e. inspections, collection of pollution charges) of coordination and supervision for the region. The change from DRAOT-Centro to CCDR-C was made without a no referendum held on the matter - the change was just made and was not seen by the public as favorable (Martins, personal communication, 2004).

There are also several institutes that are under the supervision of MAOT: The Water Institute (to deal with both quantity and quality issues; river basin and national water councils), The Waste Institute, Nature Conservation Institute, Regulatory Institute for Water and Waste (manages the private water and waste companies), the Institute for the Environment (IPAMB) (focuses on environmental information and awareness, and the Institute for Portuguese Geography. There are also several other ministries that have a role in the protection of the environment. The Ministry of the Economy; Ministry

of Agriculture, Rural Development and Fisheries, which issues industrial permits (to operate facilities) while MAOT issues discharge permits (discharge effluent), (this ministry also manages public and communal forests). The Ministry of Health is in charge of water quality from a public health standpoint (OECD, 2001).

Aside from being divided into five regions, Portugal is also broken up into eighteen districts. Within those districts there are approximately 305 municipalities. These municipalities have regulatory and managerial roles in urban planning and development, land use, local infrastructure management, and public health. Some municipalities form plurimunicipal (one entity containing several municipalities joined together) systems to develop and implement tasks such as wastewater treatment, solid waste disposal, and management of protected areas (OECD, 2001). AMRia (Association of Municipal Districts of the Ria) is one of these plurimunicipal systems. The association is composed of the eleven Municipal districts of the lagoon (with members from each municipality in the association), namely Águeda, Albergaria-a-Velha, Aveiro, Estarreja, Ílhavo, Mira, Murtosa, Oliveira do Bairro, Sever of Vouga, and Vagos. The Associated Municipal Districts seeks to identify common interests to promote environmental quality of the Ria de Aveiro, as well as the elaboration of projects and studies that contribute to its development (AMRia, 2004).

3.3.2 Management History-Ria de Aveiro

In 1975, there were discussions between stakeholders and municipalities about the fate of the Ria de Aveiro. There were several proposals to turn the Ria de Aveiro into a national park, but lacking a strategy or structure nothing was accomplished. Before the 1980s, the Ria was very autonomous and each municipality acted alone. Many actions were undertaken by autonomous municipalities and most of the time these actions were

performed in a vacuum. Most action was taken at the local level coordination at the regional level was not strong.

The Aveiro Harbor (APA) had authority over those ports of the port area that were outside the administrative authority of other governing bodies. In 2001, a contract gave jurisdiction of the port to DRAOT. This was a move in the right direction. DRAOT, with authority over matters of the port area, could insure better monitoring of activities.

In 1988, the GRIA (Gabinete da Ria de Aveiro) was initiated to study pollution problems in the lagoon and to provide information and data to support a program of action to create an appropriate management structure for the Ria (Borrego, 1993). Initially, it was set up to meet international obligations that were not being met, namely water pollution. GRIA's aim was to identify sources of pollution and to propose solutions to reduce pollution. "The work is oriented towards obtaining information and data (in collaboration with the University of Aveiro, Hydrographic Institute, and the University of Oporto) to allow decisions to be taken in the context of the co-existence of the numerous lagoon activities" (OECD, 1993b, p. 65).

Several agencies were committed to collaborating with GRIA: municipalities, the University of Aveiro, CCDR-C, DGs for several agencies, etc. This collaboration was meant to identify problems and potential solutions that affected both public and private players. The GRIA, however, did not have any enforcement powers, so the implementation of the action program was left to the Secretary of State of the Environment and Natural Resources (OECD, 1993b) who in 1995 was replaced by the XIIIth constitutional government Ministry of the Environment (MA). There political changes brought a different Secretary of State for the Environment.

On April 22nd and 23rd, 2004, at the Congresso da Ria, the Prime Minister gave the order for the creation of another Gabinete da Ria (GRIA) which was somewhat like the 2001 DRIA that never came to fruition. This cabinet will hopefully oversee the

activities of the Ria and concentrate activities in one place so that progress can be monitored and become more effective. The structure for this cabinet has not yet been put forth but the hope is that it will provide the concerted effort necessary to rehabilitate the Ria, as well as continue moving forward with management activities.

CHAPTER 4

DEMONSTRATION PROJECTS AND THE ROLE OF THE UNIVERSITY

4.1 MARIA - Integrated Management Programme for the Ria de Aveiro

MARIA (LIFE-96 ENV/P/000601) was established in 1996. It was established as part of European Commission's ICZM initial demonstration projects designated LIFE96. The main objective was to develop a coastal zone management program that would lead to an integrated approach for the lagoon. The aims of the project were to detect deficiencies between various levels of administration, in legislation and in communication between different users of the coastal zone. There was a need to combine socioeconomic development with the conservation of the lagoon. The duration of this project was from January 1, 1997 to January 1, 1999. The total budget for the project was 440,692 euros with about half from a contribution from LIFE of 208,995 euros. Money was spent on their operating activities, administrative costs as well as information dissemination as well as many other activities.

The goals of the MARIA project were to create better lines of communication between the users of the lagoon and those who are developing the lands surrounding the lagoon (i.e., industry). Better communication would hopefully lead to better cooperation between the different groups. The main objective of defining an integrated management structure required cooperation between all of the interest groups. The project area has countless different interests, with a complicated system of jurisdictional divisions. There are farmers, fisherman, factory workers, businesspeople all sharing the same resource. There are municipalities, regional authorities, and the port authority that have different responsibilities that affect the lagoon system.

This complex organization needs a unique system of communication. The first task was to bring together as many different people as possible to create a new

partnership. This did not operate without some difficulties. The reality was that there were some serious conflicts of interests and a lack of experience in participative planning and cooperative responsibility (Europa, 2003). These conditions set the foundation for the difficult task ahead and provided guidance as to how to approach the partnership.

There were four phases to the project (see Figure 4.1). The first phase included identification and systemization of information on the lagoon system. Data collection and analysis of natural processes and human activities were from existing data. A database was constructed in the form of a GIS for communication by the university to the stakeholders. The different technologies (Access database generation, Arcview GIS) that were used in the two projects undertaken in the Ria de Aveiro and other demonstration projects provided tools to analyze the coastal zone; as well as tools for implementing requisite policies in the coastal zone.

Information and technology must be part of society along with policy, planning and organization. They all need to work in coordination. "Technology and technology innovation in particular, introduces new capabilities or allows old functions to be performed with 'greater efficiency'" (Capobianco, 2003, p. 146). The GIS provided a more accurate characterization of the actual conditions of the lagoon than what previously existed. There were data available in many different GISs with repeated information; this effort brought it together. This information led directly to the evaluation of programs, plans and projects through open discussions and coordinated discourse of options. Participants in these discussions were primarily those on the local level. Technology is a tool to increase the number of available options and to enlarge the freedom of action of society to achieve certain objectives (Heaton et al., 1994).

The second phase was to detect the success and failures of existing management programs through analysis and evaluation of existing management

activities and to identify thematic areas for further investigation. The third and fourth phase was to define the integrated management structure and to identify future pilot areas and programs, as well as to define the development of ICZM.

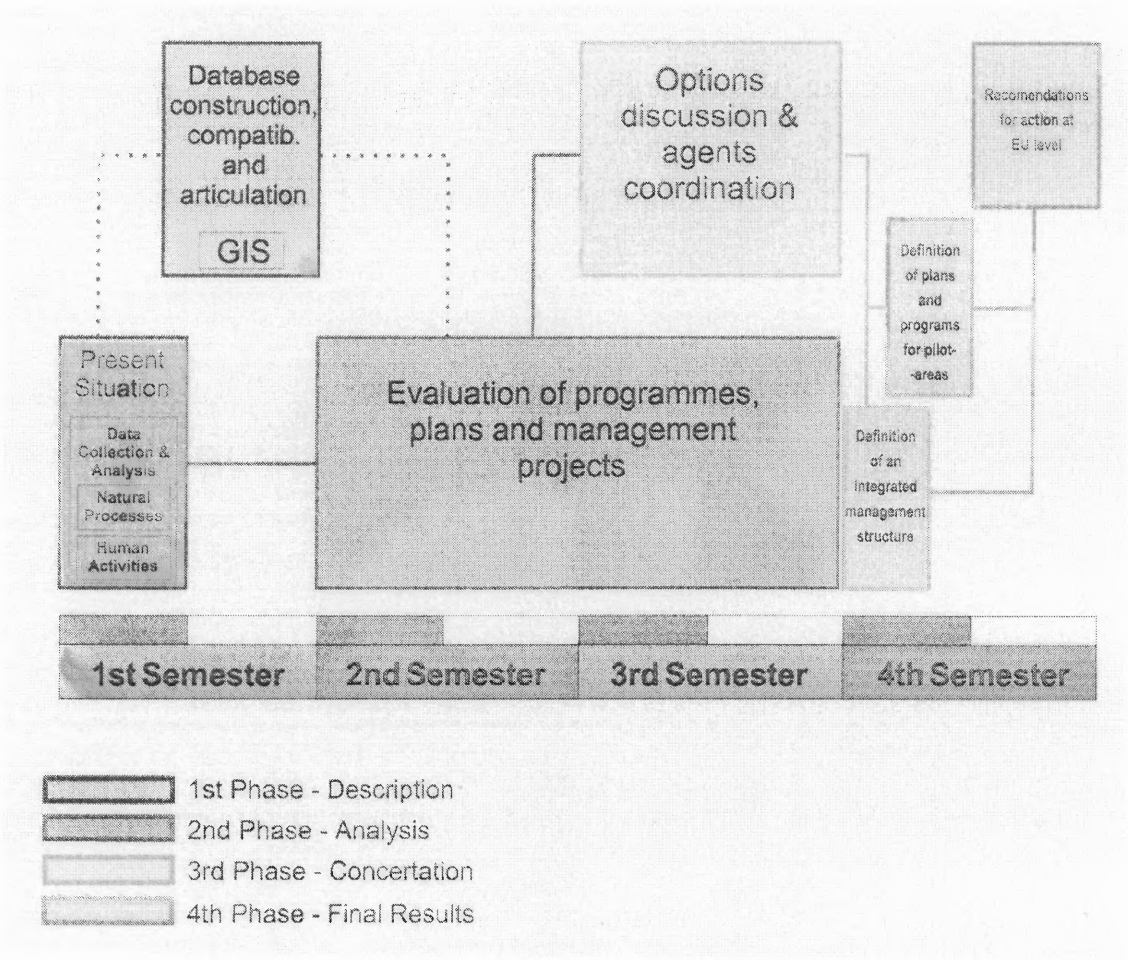

Figure 4.1 Methodology of the MARIA Project.
Source: MARIA-Relatorio Final 1999

The project identified five areas that directly related to sustainable development and the role of participation in ICZM. These areas were identified based on discussions by stakeholders in a series of meetings. The meetings focused on: Territorial Planning, Infrastructure and Equipment, Environment and Environmental Education, Agriculture and Tourism, and Geographic Information Systems and Digital Cartography. Meetings were held between May and October 1998. Issues discussed are shown in Table 4.1.

These areas gave rise to working groups to focus more closely on each area and provided the basis for the four pilot projects undertaken in the second Demonstration Project. A general conclusion of these discussions was that the poor current state of the environment of the area was a result of a set of interrelated factors (coastal erosion, urban pressures, destruction of sensitive ecosystems) (Alves et al., 2000).

Table 4.1 Thematic Meetings & Discussions from the MARIA Project

Territorial Planning	- Strategies and measures - Evolution of the territorial planning in the Ria de Aveiro's area - Territorial measures already adopted - Conflicts identified in the definition of criteria of land use classification - Conflicts related to the scattering of responsibilities by several departments/ institutions
Infrastructures and Equipments	- Creation of more open spaces for leisure - Rehabilitation and optimization of the Ria de Aveiro's border - footpaths and bicycle paths - Rehabilitation of several quay for leisure - Conflicts related to the overlapping of responsibilities by several departments/institutions - Compatibilities the responsibilities
Environment and Education	- The importance of the ongoing works of dredging and clearing from pollution - The necessity of integration the environmental studies in the different plans - The necessity of a higher public perception of the Ria de Aveiro's value and the importance of its preservation - Positive evolution of the importance done to the environmental programs
Agriculture and Tourism	- Promotion the activities of leisure and rural tourism - Inclusion the agriculture into the Municipality Master Plans revision - Absence of interests, by local authorities, in the forest development and lack of coordination between General Direction of Forest (DGF) - Behavior changes between local population and the rural space - Increased the role of local authorities in the agricultural promotion
GISs and Digital Maps	- Lack of actualized maps - Training the human resources - Definition of a responsible entity for the homologation of the digital maps - Rapid growth of several efforts to a resembling aim

The MARIA project led to formulation of an initial methodology for ICZM in the Ria. The project was a crucial first step to establish participation and coordination. It was important to identify and to involve all of the key stakeholders right from the beginning. Early identification of the different perspectives and interests helped to determine which projects would encompass both the overall environmental priorities and traditional economic activities of the Ria de Aveiro.

Other factors that influenced the selection of the pilot projects were: the interest shown by the various stakeholders for the assessment (done by integrating or articulating them) in other projects from their agenda; factors from the intervening entities, the scientific community and from the different levels of decision-makers, to use the acquired knowledge on the area under discussion in study (Martins, 2000). The program selected four pilot projects that involved the whole geographic area of the Ria as possible settings for participation. These pilot projects were carried out in the ESGIRA-Maria project.

At the end of the MARIA Project all partners signed a "Letter of Principles" that committed the partners to "'maintain and intensify' the initiated partnership process through the generation of joint programs and an advancement in the management process" (Europa, 2003). A procedure was put in place for the acceptance and implementation of a formal Integrated Management Structure. "Recommendations were made on the need to conciliate trust in the partnership through joint educational and informative activities, the importance of political will and commitment to the process and the need to reinforce such a partnership through more formal organizational structure, appropriately financed" (Europa, 2003).

The MARIA project provided substantive results for which decisions were made on both the administrative and programmatic structure of the management of the area. MARIA brought together international, national and local partners for the first time to

discuss the management of the Ria. The basis for this partnership approach was to bring together public and private interests together, to form cohesion in the same project so that this partnership it could be used in all levels of ICZM. The partners had many different viewpoints on the usage of the Ria and its dynamics (social and physical). This new alliance provided an instrument for them to communicate with one another with a common goal in mind, the sustainable development of the lagoon. This new vehicle for discussion between different individuals, as well as different entities, fostered new alliances and partnerships within the larger partnership. Dialogue between different stakeholders was essential to the management of the area. Before this time, many bordering municipalities did not discuss their initiatives and they operated independently of each other while sharing a common resource.

The partnership that was created is invaluable. The experience that the partners now possess will facilitate further discussions on the management of the lagoon. This partnership between many levels of government and stakeholders will hopefully continue to foster new relationships and collaborations among activities in the lagoon. The hope of this project was that it could serve as a model for similar coasts in Europe, involving the participation and collaboration of a wide range of interest groups. MARIA created the program for the integrated management of the lagoon by establishing an alliance between those that effect and are affected by the lagoon. The structure for it was then determined in the ESGIRA-Maria program.

4.2 ESGIRA-Maria-Integrated Management Structure of the Ria de Aveiro

ESGIRA-Maria (LIFE99 ENV/P/000673) was established in 1999. The duration of this project was from September 1, 1999 to November 1, 2001. The total budget for the project was 553,166 euros with about half funded by LIFE 259,773 euros. The ESGIRA-Maria project aimed to establish the framework for integrated management of the Ria de

Aveiro. The fundamental objective was set on consensus and informal participation of the different actors with interests in the Ria de Aveiro (Alves, Martins, & Coelho, 2002).

The Ria de Aveiro project invested a substantial amount of time and effort to develop and to refine the case for a more integrated approach to management (Humphrey & Burbridge, 1999). The methodology to test the structure (Figure 4.2) was based on the pilot projects. This was done to test the functionality of the structure while keeping in mind the many decisive factors of the lagoon region (Martins, et al. 2002). ESGIRA-Maria took place in three phases culminating in a final seminar. The three phases were: preparatory actions, implementation, and evaluation.

The pilot projects identified were: 1) Recovery and valorization of the quays, which were once the only means to transport people, cattle and merchandise between places; 2) Recovery of the former salt-pans, "Salgado de Aveiro", which were part of a fundamental activity in the region; 3) Management of the Agricultural *Baixo-Vouga* Fields, that contain diverse resources for birds of prey; and 4) the Management of *Foz do Cáster* landscape protected area, a region that possesses a great diversity of bird species and nesting sites. These four projects were to encompass the geographic areas of the lagoon, as well as the activities carried out in the area. The pilot projects were used as tools to answer the challenge of finding a management structure for the lagoon (Martins et al. 2002).

Each of the projects had their own working team to address issues and to promote higher interaction between those in the partnership. This facilitated the diffusion of information between the partners. Information was passed on to the general public to promote awareness of the environmental condition of the lagoon and the activities of the projects. The first two projects focus on the anthropocentric values of the lagoon, whereas the latter two focus on species preservation. It seems that there was an integration of the social aspects of the lagoon with the natural processes. The pilot

projects were used as scenarios by which participation could then take place to facilitate the recuperation of the areas. A working group was created for each pilot project to address issues specifically relate to each case.

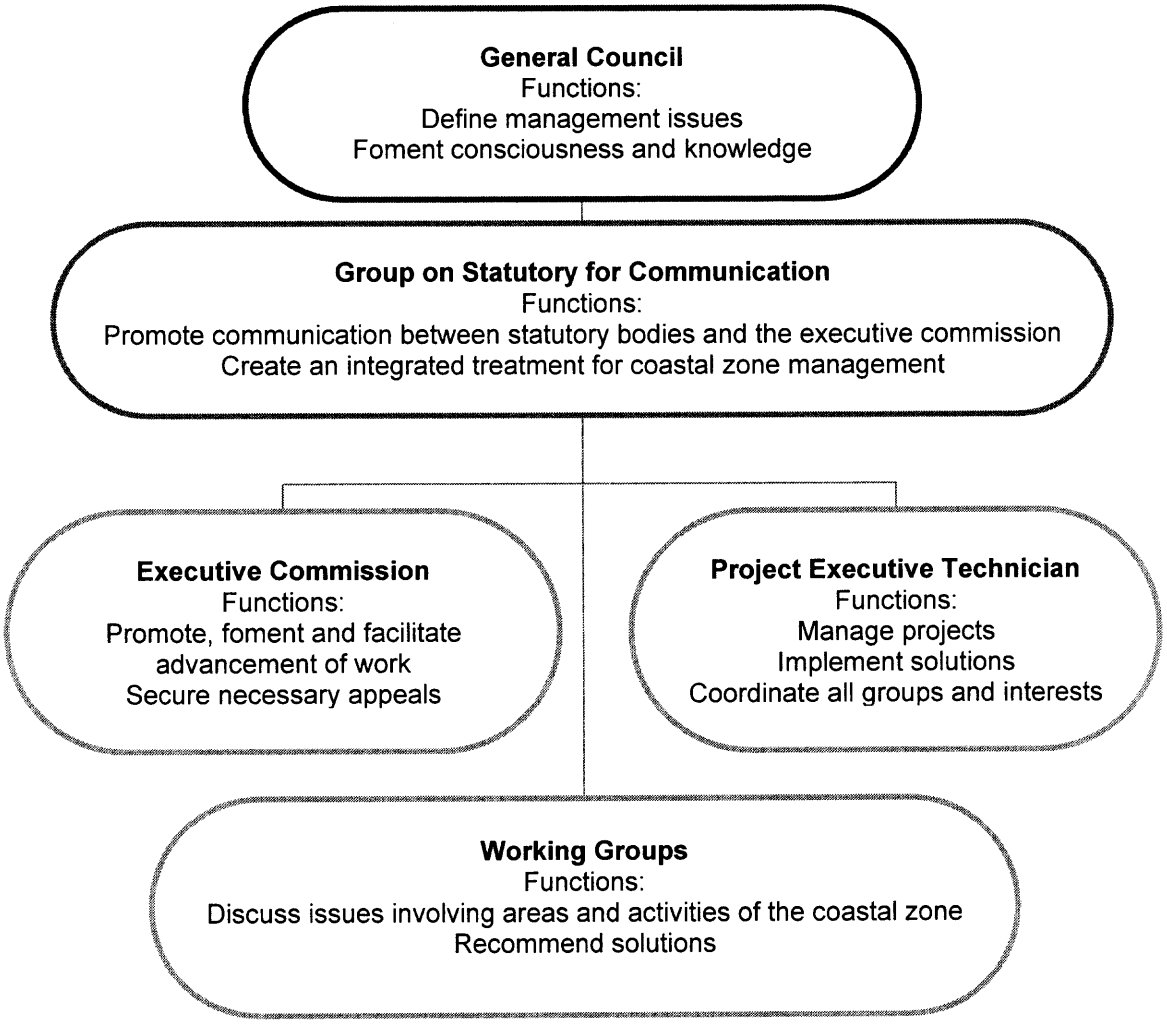

Figure 4.2 Framework for integrated management for the Ria de Aveiro.

The Ria de Aveiro partnership proposed a management structure to oversee the next phases of the coastal management initiative. The structure calls for a General Council of appointees for agencies and local authorities that are responsible for setting policy and overseeing the management process and a Liaison Group – a broader discussion forum that would also include representatives of local interests. The policy

groups will be supported by an Executive Committee, Technical Group and Working Groups.

4.2.1 Pilot Project-A Recovery and Optimization of the Quays

Quays (canals) were once used to transport people, cattle and merchandise. Of the once 107 quays there are only 37 now in use. The pilot project focused on revitalization of the waterfront of the Ria, identification of the causes for quay deterioration and identification of quays that could be recovered. Defining the physical, social, and environmental prerequisites, as well as defining strategies for revitalization, was necessary for physical improvement.

Through this pilot project, it was intended to create a forum of discussion of new strategies, globally accepted by all the partners involved. Models of revitalization were created for certain quays in the Ria de Aveiro (see Figure 4.3) (Martins et al., 2002). Three types of typologies of intervention were identified in this pilot project: cultural heritage, landscape and ecological significance, and leisure and recreation sports. These interventions were to be set in the fluvial beaches, the waterside roads and paths, and the quays (Martins et al., 2002).

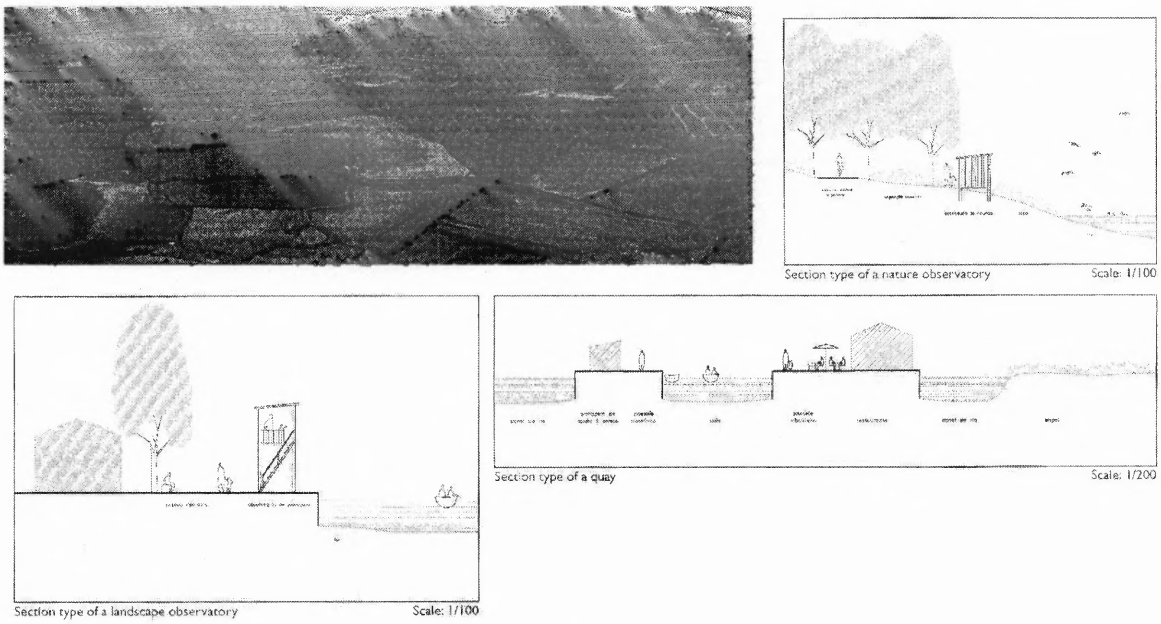

Figure 4.3 Models for revitalization of the quays
Source: ESGIRA-Maria Pamphlet, 2002

4.2.2 Pilot Project-B Recovery of Aveiro's Salt –pans

Salt collection is an old tradition that was once fundamental to the economy. Salt-pans occupy almost 1,500ha, but few are still used for their original purpose. They are now mostly used as aquaculture tanks though this activity is restricted due to water pollution.

There are certain migratory birds have been affected by the stop in salt collection in this area, do to the loss of habitat and feeding sites; most of these areas are now protected because of their importance as feeding and nesting sites for these birds.

Figure 4.4 Photo of Salt-Pans
Source: Martins Presentation 2004

Data was collected on the delimitation and uses of the saltpans (salt production and aquaculture abandonment, survey of processes in action) and of the socio-economic characteristics of the salt producers and owners (age, level of education, etc.) (Martins et al., 2002). This information was fundamental because it became possible to gain real knowledge of the physical context of the saltpans (conditions of the protection-walls, development of aquaculture activities, environmental conditions and nature protection). It enabled the formulation of proposals for the study area. The main objective of this pilot-project is to guarantee that these salt pans continue to be used for economic activities, as well as to preserve the landscape.

4.2.3 Pilot-Project-C Integrated Management of *Baixo-Vouga* Agricultural Fields

This area is of importance because it is home to many protected wetlands, as well as species under the RAMSAR Convention and Bird and Habitats Directive respectively. The Baixo-Vouga Lagunar agricultural fields exist as a natural and non-natural habitat, which makes possible the existence of a high floristic and fauna biodiversity (Martins et al., 2002). This area, along with housing wetlands and different species, has many agricultural fields, approximately 3,000 ha which are unique in their composition (halomorphic, non-salt, low salinity level). Preservation of this area involves controlling the salt infiltration and continuing the diverse agricultural (crops & livestock) use of the land. This area is distinct because it possesses a sanctuary for certain species, as well supports extensive agricultural production. It is important to keep a balance between the two so that the many functions that the land is used for can continue.

A database was created, of the producers/owners of the land and the cartographic actualization of the land (see Table 4.2). Visual assessment of the fields was undertaken with the help of local residents. A survey was created to identify opinions of farmers on agricultural activity and maintenance (Martins et al., 2002). A

conclusion of this effort was that "productive function and nature conservation function are only possible with the participation and negotiation of the farmers, showing that they still play an active and fundamental role to the production and maintenance of this space" (Martins et al., 2002, p. 444).

Table 4.2 Example of Part of the Database of the Baixo-Vouga Lagunar Fields

Database – Unity 2, Perimeter of River of Mós extract (the totality of Unity 2 comprises 282 land properties)

Nº. Section	Nº. Parcel	Unity 21	Nº of Owner	Owner's Name	Address	Place	POS Code	3 Number	4 Owner's Name	5 Alteration	6 Tenant farmer Name	7 Exploited	8 Exploited	9 Exploited	10 Alteration
2	2268	2268	223	João Barbosa Rodrigues Soares	R. de Santa António	Vilarinho - Cacia		223	João Barbosa Rodrigues Soares	No		Yes			No
2	2269	2269	389	Maria Luisa Rodrigues Gonçalves	Bloco da Caixa 4 - A S.Pedro	Vila Bras			Idalisio da Silva Caião	No	Mário Marques Vilar	No	Yes	Yes	No
2	2269	2269	132	Idalisio da Silva Caião	R.25 de Abril	Póvoa do Paço			Idalisio da Silva Caião	No	Mário Marques Vilar	No	Yes	Yes	No
2	2270	2270	436	José da Silva Soares		Vilarinho			José da Silva Soares	No		Yes			No
2	2272	2272	86	Rosa Rodrigues Pardinha e Costa	R. Dr. Marques da Costa	Sarrazola - Cacia		86	Rosa Rodrigues Pardinha e Costa	No		Yes			No
2	2271	2271	86	Rosa Rodrigues Pardinha e Costa	R. Dr. Marques da Costa	Sarrazola - Cacia		86	Rosa Rodrigues Pardinha e Costa	No		No			No/ Abandoned
2	2254	2254	23	António Rodrigues Neto	R. Dr. Marques da Costa 25	Sarrazola - Cacia		23	António Rodrigues Neto	No		Yes			No
2	2253	2253	215	António Rodrigues da Silva	R. da Constituição	Sarrazola - Cacia			Herdeiros de	António Rodrigues da Silva		Yes			Inheritance
2	2182	2182	384	Manuel Rodrigues Carapinheira	R. Dr. Marques da Costa	Sarrazola			Manuel Rodrigues Carapinheira	No		Yes			No

4.2.4 Pilot Project-D Classification and Management of the *Foz do Cáster* Landscape Protected Area

The *Foz do Cáster* possesses one of the most important wetlands in the Ria de Aveiro. The Cáster River is located north of Murtosa and Estarreja and south of the limits of Ovar. This area was used primarily for agriculture, though it contains "important areas of reed plot and humid grassland, mainly due to its high productivity and high ornithological value as its forests protect fields and fauna" (Alves, et al., 2000, p. 11). The objectives of this pilot project were to: protect native fauna and flora, recover migratory species habitats, enhance the landscape and to develop a site for environmental education and scientific investigation.

Fieldwork and interviews with local actors were conducted by the university in support of a proposal to classify the area as a protected area. Architectural and cultural heritage studies were also done and assembled into a database to identify intervention priorities. Historic buildings and transportation routes were classified and placed into a database to catalogue areas to cultural importance which was also maintained by the university.

An environmental education program was started with some of the primary schools in the area. This program was divided into four phases: Phase 1 (Preliminary works)- designing of nature discovery pathways and production of support materials for teachers and for students (exercise books, guide for plant identification, mascot pins); Phase 2 (Training of Monitors)- these monitors give support to teachers and give added resources to study trips; Phase 3 (Developed Topics on the Program)- Activities for classrooms, school playgrounds, field trips, world day celebrations, identification of support programs for environmental education; Phase 4 (Conclusions)- seminar on classification and management of the area, exhibitions by pupils, prize ceremony to recognize involvement.

4.3 The Role of the University

Creating partnerships in ICZM is fundamental to success. In the Ria de Aveiro, coordination of partners was extremely important, the pilot-projects cultivated new partnerships. The partnership approach is the most comprehensive seen by the European Commission in the Demonstration Programme, and can be used for coordination in all the dimensions required for ICZM (Humphrey & Burbridge, 1999). The appendix lists the partners for both the MARIA and the ESGIRA-Maria projects. The partnership is made up of many different levels of administration as well as different stakeholders.

Local authorities and stakeholders ought to know the real problems facing them since they have intimate interaction with the lagoon. Local stakeholders were represented in the Association of the Ria Municipalities (AMRia), Industrial Association for the Aveiro District (AIDA), The Aveiro's Harbor Administration (APA), SA and the public through their municipalities as well as through public meetings. AMRia is the association of the municipal districts of the Ria de Aveiro. The objective of the association is to seek economic, social, and cultural development of the people of the districts mainly with a focus on environmental quality of the Ria de Aveiro (AMRia 2004). "The support of AMRia was critical in getting the Ria de Aveiro project started" (Humphrey & Burbridge, 1999, p. 35). In addition, regional bodies (like in the Ria the CCRD-C and AMRia) can provide focus for coordination, while national policies and programs provide the legal and institutional framework to facilitate actions (EC, 2001a). These participatory actions are to define a sustainable common goal and to amalgamate the interests of the entire range of users of the Ria de Aveiro (Alves et al., 2000).

Bringing together different levels of government, as well as many different stakeholders, was one of the larger tasks in the MARIA project. The initial strategy was to bring together key players to discuss what was happening and what needed to be done through the different mechanisms. There were different stages of coordination in the voluntary management initiatives. At the beginning, the MARIA project served as a catalyst to foster partnerships and coordination and was facilitated by a smaller group of key players (University de Aveiro, AMRia) who carried out preliminary issue analysis and basic identification of needs (Humphrey & Burbridge, 1999). Humphrey & Burbridge (1999) state that a group that facilitates coordination should maintain a neutral stance and develop a compelling message to broaden the coastal management constituency and that the Ria de Aveiro took this approach.

Initially, the strategy was to discuss the information that was gathered by the university in the context of ICZM for the Ria de Aveiro. The strategy quickly changed when it was realized that a more basic information transfer was needed. Identification of key players, their concerns and desires was needed between all participants before any decisions could be made. Discussions between neighboring partners and alliance building needed to occur. This process took a long time, but proved to be essential and extremely gratifying to those participants that took part (Martins, personal communication, 2004). "Without full participation of local stakeholders, coastal management strategies will never succeed. If people do not feel involved in decisions that affect their region, they come to resent policy-makers and reject plans to improve coastal zones" (EC, 2001a, p. 26).

An Associate Professor of UA-DAO and Project Coordinator for both MARIA and ESGIRA-Maria stated that, "Developing a sense of participation among the players is important to realize that each potential partner is likely to see participation differently, some seeing it as a passive process" (Europa Workshop, 2002). Those partners that put more into the project benefited more than those that did not. Many of the first meetings were more like ice-breakers between those that never had interacted and those that did not want to interact. Many interacted and, those that saw the benefit of this interaction gained the most from these sessions where some did not gain as much. Most sessions were informal networking meetings.

The meetings were crucial in capacity-building of the project and of the area. It placed the participants on the same level. Some of the participants were not familiar with others and others were familiar but did not ever interact. "The lack of a tradition of ICZM or of integrated wetland management in Portugal was also noted- it was attributed to the tradition of a top-down approach to planning in general, with little involvement of the general public in planning or in the debate of issues, as well as to a traditionally

sectorial approach" (Europa Workshop, 2002). Historically, there was lack of coordination on the local level this needed to change in order for ICZM to succeed in the Ria de Aveiro.

The facilitators of the programs from the university strived to eliminate intimidation and personal agendas and to foster participation from all to create one agenda. As Berry (1998) states, "everything is one big collage with everyone pushing their own agenda". The goal was to create one agenda that everyone could 'push'. The university created the structured interaction between experts and stakeholders. It was noted in the demonstration workshops that there is a need for accuracy and political correctness in reporting projects and in disseminating information concerning ICZM (Europa Workshop, 2002). ICZM is a very slow process in the Ria because of the resistance from many contributors (stakeholder, public, governments, etc.) and the lack of education and awareness of the local people. ICZM allows for local conformities which is extremely important as every area is different. This is quite necessary because the Ria de Aveiro is extremely populated and sustains the area.

The university was viewed by the various actors as a neutral, trusted agent and thus was in a good position to bring together actors with conflicting interests. Both demonstration projects were initiated by the university and proved to be beneficial in this area. If a local council had spearheaded this initiative (many of the demonstration projects were led by local councils) it might have been seen as trying to gain advantage over others. Information sessions were successful because there was a mediator that did not favor any one stakeholder; their interest was to develop a management framework for the ecosystem. This was necessary to motivate people to attend the sessions and to allow the players to listen to what was happening and being proposed. For the first time, concerns from all participants were heard and this is fundamental to those that share this resource. The need to raise awareness and promote

understanding represents a key stage in developing local agreements on the need for more integrated approaches to management (Doody, 2003).

The UA-DAO-Project Coordinator noted that the funding of the LIFE projects acted as a stimulus and also helped to bring in associated interests. Observing that a 'topic' was needed as a means of building the partnership, she stated that they were employing land planning as the 'topic' (Europa Workshop, 2002). The issue of land planning as the 'topic' would hopefully entice people to take part in discussions since most users of the land want to know what they can and cannot do with the land.

The university, as the coordinating body of the MARIA and ESGIRA-Maria Demonstration Projects, sought to bring together data (what the university collected) and the information that society would need to make decisions on policies affecting the coastal area. The university was in the middle instead of on the side of this complex organization. It was important to be at the focal point in coordination because this complex organization of different levels of government, resource users, and the public needed a mediator to listen to all sides and to keep priorities focal. The university tried to translate their information into a language and format that could be understood by the majority of people. This translation was essential because the key players were for the most part not academics, but resource users and politicians (see Appendix). Discussions were possible because many participants had the same information and tried to understand it for their own edification to comment on the actions.

Coordination of these projects was not quickly achieved but was slowly mobilized via informal networking sessions where different information (municipal management plans, scientific data, etc.) was exchanged. Placing everyone "on the same page" was important to allow all key players to have fair play. "There is often a problem in making the understanding gained available in a form that is accessible to those non-academics

who would benefit from it. Therefore, it can be difficult to apply the results of research studies to policy formation and practical management" (Doody, 2003, p. 168).

As part of the MARIA project, information was diffused through informal networking sessions. These sessions were held with local stakeholders as a way for them to air what their issues were and also to hear the issues that others had. It was an exercise in people-moving, getting key players to attend meetings, and then to do things to promote ecosystem management of the Ria. The meetings focused on activities in different municipalities. Many of the municipal governments never communicated before and the previous lack of exchange between the municipalities was the principal problem discovered in these sessions.

At the beginning of the project, each municipal government had a fear of giving up too much information about its agenda. It was all about what each one did to benefit itself and they did not think about the common resource that they shared. This basic premise was difficult to tackle, but they did begin to see the benefits of coordinated actions. It was imperative to recognize the persistence of human habits and how understanding them will help in planning how to break them (Berry, 1998). An example given by UA-DAO Project Coordinator (2004, personal communication): two adjacent municipalities, one with an existing bike trail and the other with plans to create one around their area of the lagoon, never spoke to each other before these sessions. What was discovered was that the second municipality was going to end their trail 500 meters east of where the other one started. With the dialogue created in these sessions the two municipalities joined their bike trails so that cyclists could have a continuous path. Discussions this basic were cultivated and the dynamic transformed from one in which everyone was out for themselves to what could be done together. This was not unanimous across the board, but the gap was made smaller with the help of the project leaders and cooperating players.

The project was a learning experience for both the university, as well as the stakeholders says the UA-DAO Project Coordinator of ESGIRA-Maria and professor DAO-UA (2004, personal communication). She said that it was an extremely rewarding experience to have very different people come together and exchange ideas and information. The information sessions were not initially the way their strategy had been planned. This exercise became reactive, responding to stakeholder concerns and not proactive, getting to business which is what had been initially intended. There were many underlying issues that needed to be focused on before management of the Ria could be discussed. .

The public was also apprised of what was discussed at these meetings and was invited to attend. Information was disseminated through local newspapers and radio stations, as well as on the internet, with the coordination of the university. Though the latter was not sought as a means to get information out to the general public, as many people do not have access, a website was set up for academics looking for information.

4.4 Summary

Some positive and negative results from the demonstration project ESGIRA-Maria are listed below in Table 4.6. These are the result of the pilot projects that were carried out.

Table 4.3 Positive and Negative Results in ESGIRA-Maria

Positives	Negatives
Capability of dialogue and creation of the projects with the transfer of knowledge and experience; Recognition of the social partnership	Irregular flux of information transfer from speakers and their intensity
Large collective of diverse interest groups	Nonexistence of a legal figure in the partnership
Largest representation of public users	Weakness in the recognition of political decision-makers as social partners

The aim of the ESGIRA-Maria project was to test the efficiency of an integrated management structure formed through negotiation among the various groups of the partnership created within the framework of the MARIA project (Alves et al., 2000). Each pilot project formed a working group which then, in the form of workshops held primarily at the university, discussed issues of the partners. The discussion forums were also for the advancement of economic, tourist, and social development of the lagoon. Figure 4.5 shows the structure for the forum discussions:

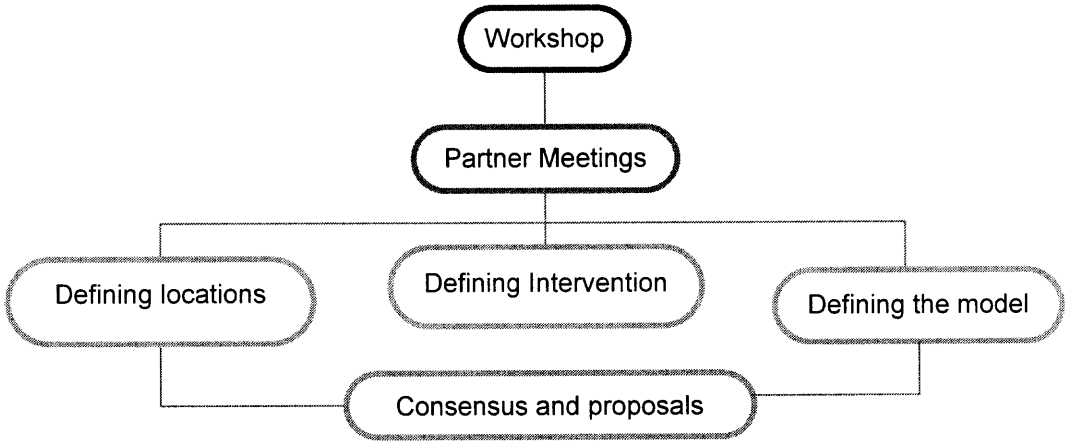

Figure 4.5 Key elements for Forum Discussion Structure.

The ESGIRA-Maria project was supplemented by the partnership that was created in the MARIA project. This partnership was essential in carrying out the pilot projects because of the diverse political and economic interests that characterize the area. The partners are representative of not only the diverse interests, but also the different legal levels that give decisions in the Ria. "The importance of this partnership is therefore huge, as every participant is willing to co-operate in order to achieve the sustainable development of this region" (Alves et al., 2000, p. 12).

The ESGIRA-Maria project carried out pilot projects that were determined in the MARIA project and where the goal was "to find forms of management orientated to integrated and collaborative development" (MARIA, 1998). This goal was achieved in the development of the pilot projects. "The inherent difficulties and risks to this project increase when the social, institutional and political context in which the project is developed is considered, due to the agents' weak tradition of planning, participation and collaboration in Portugal and the low involvement level in partnership (legally conditioned by the political calendars)" (Alves, 2002).

The pilot projects allowed for the analysis of the partners involved in the pursuit of sustainable development of the Ria de Aveiro. The work developed on specific groups aggregated to each pilot project promoted a higher interaction between the partners directly involved, rousing a higher capacity to transfer knowledge and practices that are reflected directly on the final results of each pilot project (Martins et al., 2002). It is important to recognize, the integration and synthesis of collecting knowledge, especially its interpretation with respect to specific places and problems (Berry, 1998). Different partners possessed different interests with regard to the management of the lagoon, due to the vagueness of the laws for the lagoon areas. They did, however, give emphasis to the consensus of interests; this change surpasses any formal model of management and planning of the Ria de Aveiro...." (Alves et al., 2000, p. 8; Martins et al., 2002, p. 441).

By and large the successes of the MARIA project were somewhat downplayed by the lack of interest in the ESGIRA-Maria project. Some key players were enthusiastic but many caught on late and some not at all. All in all participants that put in the effort got the most out of the project (Martins, personal communication, 2004). One of the key differences in the project was that the technical person (vereador) (who was appointed by the CCDR) involved in the first project was extremely knowledgeable in the area and

genuinely interested in bringing people together. This was very good in disseminating information. This technical person was another key person working with the university in transferring data to information that the stakeholders could use. There was a change in the technical person responsible for the projects due to it being an election year in 1997 (MARIA, 1999). This was important because the vereador in most cases was the official connection between the partnership and the municipalities and he had the political decision-making capability. The second technical person was somewhat disinterested and was not as supportive which did not motivate the key players.

There are a variety of different results that have come out of the two demonstration projects. A 'Letter of Principles' was signed by political figures to solidify their commitment to the progress in the Ria de Aveiro. The outcomes of these projects have extended to other areas of environmental policy of the region. The BioRia initiative realized in 2004 is just an example of this. This project strives to reveal the cultural heritage of Estarreja (one of the municipalities in the area) and to form and elicit people's sensibilities for conservation and preservation. This is to be achieved through ecological studies in the hopes of gaining more knowledge about the area's flora and fauna in the Baixo-Vouga Lagunar area (Moliceiro, 2004).

The university and the demonstration projects have served as a much needed initiator to action for the deteriorating Ria de Aveiro. The partnership allowed the easy exchange of information and common goals and opened new areas of specialization that continued and reinforced the strategic partnership. This partnership was based on consensus and in a global vision of the Ria de Aveiro, as a whole indivisible, emphasizing visibility, identity and unity (Martins et al., 2002).

CHAPTER 5

SUMMARY

Through the EU Demonstration Programme the Universidade de Aveiro, as the coordinator/facilitator, led the two demonstration programs in the Ria de Aveiro. The role of the university was crucial in spearheading activities for the revitalization of the Ria de Aveiro. With many problems affecting the Ria (ever-changing political climate, lack of administration, economic needs, and low education level) the university was able to facilitate the exchange of information between stakeholders, build partnerships and stimulate public participation through the pilot-projects that were carried out in the area.

Pilot project-A Recovery and Optimization of the Quays, tested the capability of the participants to have a partnership to promote sustainability in the Ria. It also confirmed the capacity of the different stakeholders to change their attitude in the face of a lack of legal structure in the area, by creating an informal attitude of concerted interests to deal with the issues (ESGIRA Relatorio Final, 2002). A proposal for a strategic model for the development of the margins of the Ria was created as a result of this project that will hopefully be a useful instrument for effective actualization in the Ria.

In pilot project-B Recovery of Aveiro's Salt–pans, it was noted that the area needed to be zoned correctly so that less stress was put on the salt-pans. Salt-pans workers were supplied with the knowledge and tools for them to recuperate the salt-pans. This project can be used to evaluate similar projects where producer isolation can be broken and where autonomy can be stimulated for the activity; by promotion of education and integration on the local level.

Pilot-project-C Integrated Management of *Baixo-Vouga* Agricultural Fields contributed to testing of the operation and efficacy of the negotiation and partnership behavior for the management structure for the Ria. It also identified the different

stakeholder groups and programs that conform to the principles of the management plan for the area. It was noted that the conservation of the area is without fail dependent on the partnership and negotiation with farmers. To produce and maintain the area flexibility in the treatment of issues that arise must continue.

Pilot-project-D Classification and Management of the *Foz do Cáster* Landscape Protected Area involved many different stakeholders (schools, associations). It was concluded that there was willingness from the local community to create protected passages along the Ria. There existed a need to create a system for coordinated action of local agents with local, regional and national administrations. The results of this project can be used as an example to show the potential for sustainable development in the Ria de Aveiro, by maintaining the natural environment without forgetting the economic issues; taking into account future possibilities for tourism and environmental education development.

The creation of the framework by the participants also led to increasing political acceptability (Humphrey, Burbridge & Blatch, 2000), an important achievement in an area that experiences an ever-changing political climate. The Bill of Principles that was signed by politicians at the end of the MARIA project demonstrated commitment by the partners and was widely publicized by the media (Humphrey & Burbridge 1999). Despite the lack of trust and confidence in governments there is general hope for the future (Gough et al., 2003).

The 'operational coastal zone management model' (Figure 1.5) adapted from Treby's (1999) 'Wheel of Participation' best describes the participation process in the Ria case study because the model accounts for different levels of participation in different times and phases of a project. The model is applicable to the case study because of the cultural significance of the Ria de Aveiro to its inhabitants; the constant change in legal entities and regulating bodies in Portugal; and the many different stakeholders that are

involved in the area. The cultural values of the area are ubiquitous in the pilot projects especially in projects A & D. The participatory process is driven by the legal entities in the area, in that collaboration is necessary for progress. With the participation of many different stakeholders it is necessary to take into consideration: informing them consistently, the economics of the area, and their preconceived ideas and opinions (Treby & Clark, 2004).

Other models best describe levels of participation but omit the need for change in participation at different phases in the process (Renn, 1993; Shand & Arnberg, 1996; Arnstein, 1969). Treby's model allows different optimum levels of participation depending on the phase of the process. The MARIA and ESGIRA-Maria projects had many different phases and levels throughout their evolution each requiring different degrees of interaction from the participants. Modeling of key environmental and socio-economic processes is a vital tool, required to structure coastal management institutions and practice (Turner 2000).

The MARIA project had four phases (description, analysis, concertation, final results); the second part of the second phase was where the participatory process became stronger and continually changed throughout the other following phases. This project required more exchange of ideas between participants and the proposal of management plans. In the MARIA project, the initial phase consisted of the 'education' level where identification and systemization of the existing information was done. The second phase consisted of evaluation of the programs and plans in progress or completed; in this phase the level shifted from the 'education' to 'consultation' and back again to obtain knowledge of the activities in the area. The third phase consisted of 'informing' the public that was not involved in the previous phase; 'consultation' with stakeholders for the goals that were to be achieved; and 'placation' between stakeholders in efforts to reach a consensus. The final phase of the project still

consisted of the 'consultation' from certain stakeholders but more so a level of 'partnership' where the definition of the framework was created and the pilot projects were identified.

The Treby model was particularly fitting in the ESGIRA-Maria demonstration project because the different pilot projects required specific levels of participation. The ESGIRA-Maria required different levels of public participation because not only was there an analysis phase, the pilot projects in this project were being carried out; therefore requiring participants in the actual locations taking more managerial roles. In ESGIRA-Maria there were levels of 'partnership' and 'delegation' but there was also continuous change to levels of 'consultation' and 'informing'. 'Partnership' and 'delegation' were observed in the tasks carried out and 'informing' and 'consultation' were observed on new issues that arose. Moving to and from the level 'placation' was constant due to the many stakeholders involved.

The cultural values of the Ria pervaded through the participatory process and were exemplified in the pilot-projects. There are many traditional activities and elements of patrimony in pilot project A, which were taken into consideration. The cultural heritage of the Ria was regarded with as much importance in the development of the quays as the landscape and its ecological significance. In pilot project A the cultural value was pervasive because it involved creating leisure and recreation in places with cultural characteristics. In pilot project D cultural values were also apparent in the focus of architectural studies and cultural patrimony studies.

In pilot project B the level of participation oscillated between all the levels of participation, it involved helping salt-pan workers in the recuperation of the pans to minimize loss of the area. Some of the levels involved 'delegation' of tasks to salt-pan workers as well as 'informing' them how to use equipment and the repercussions of their actions. Pilot project C had similar levels of participation to pilot project B where farmers

in the Baixo Vouga agricultural area were 'consulted' and 'delegated' tasks to promote sustainable farming in the area as well as preserve bird populations. The project also had levels of 'placation' on the part of legal authorities, farmers, and NGOs to reach agreements. Pilot project D involved 'education' and 'informing' in its methodology as well as 'delegation' in the environmental education program that was created.

It is essential to recognize the context of the participants with respect to the problem when determining optimum participation (Treby et al., 2004). Identification of issues and concerns of all participants was essential in determining what needed to be done to achieve goals. "Local stakeholders will always be at the centre of moves to improve the lot of coastal regions, but in order to ensure the best possible deal for coastal zones, there is a need to coordinate the activities of grass-roots actors with regional, national and European policy-makers" (EC, 2001a, p. 29). The voluntary approach of participation in the MARIA and the ESGIRA-Maria projects enabled participants, though initially not as frequently, to take part in discussions and decisions. Many partners realized the benefits of being part of the creation of the framework. Benefits of open dialogue were illustrated in the collaboration of recreation plans and environmental education programs.

The social recognition of the partnership is an important factor, it is intended to establish a whole society that could feel co-responsible in its implementation and maintenance) (Martins, Alves, et al., 2002). Cultural sensibility is great in European countries; the loss of the landscape, as in the Ria de Aveiro case, is not only loss of land, but a loss of heritage and identity. People of the Ria have a deep connection to the water and to the land. The knowledge that the university brought and the coordination role it assumed helped stakeholders realize the state of deterioration of the lagoon. Knowledge of the damage that has occurred sounded the alarm and hopefully ICZM will halt further deterioration.

Doody (1998) writes about the Irish Dunes project where early approaches by academics undertaking the project needed to be modified in order to gain acceptance of their involvement. The University of Aveiro sought to gain the acceptance of those involved by providing coordination through facilitating the exchange of information between themselves and the stakeholders. The exchange and transfer of information is central to achieving integration. Not only are scientific data necessary as a means of information, but also what issues and concerns there are in the coastal area are important as information. The information exchange of the MARIA project led to partnership formation between the stakeholders.

The partnerships that were created in the MARIA project were to carry through to the ESGIRA-Maria project. For many different factors, the ESGIRA-Maria project did not maintain the high level of partnerships reached in the MARIA project. Perhaps it was due to the fact that many pilot projects were running concurrently and that there were limited resources to maintain the level of participation necessary. Significant progress of these pilot projects has not been realized due in part to the changing political climate as well as to the lack of a coordinating entity. It was acknowledged that there were different intensities in interaction between each project and the partners. The result was that the project suffered from irregularity in terms of intensity and continuity that was reflected in the final presentations (ESGIRA-Maria Relatorio Final, 2002). The framework that was created is not totally operational, it cannot fully respond to all of the needs in the area; partners need give their input to refine different structural elements and behaviors.

A participatory process ensures that different social groups are represented and that programs are created for their needs and interests (Kapoor, 2001). Different stakeholders possess information that must be assimilated into a format that can be used by all and thus participation is important to integrated management. As Laird

(1993) states, "The education that needs to take place is helping people make linkages between issues in their lives and scientific or technological policy choices" (in Gough et al., 2003). Assuring that the science is put in a form that everyone can understand is an enormous task when there are many different people involved. The inverse is also true, assuring that the 'experts' understand the 'lay' public knowledge (Gough et al., 2003). It is necessary for everyone to understand each other. Effectively communicating complex ideas to lay persons is important; assuring an understanding of science will facilitate debates about issues like risk and risk mitigation (Rowe, 2000). Public participants bring an invaluable resource that can be found anywhere else, their experiences and the issues affecting them. "Through meetings, citizens become important sources of information" (Burroughs, 1999). The connection between science and participation is that the exchange of information that is created assists participants in making a educated and knowledge determination and helps in making participants feel like they are being supplied with the same information that so called 'experts' possess. Making them become more willing to offer consultation and participation.

The information developed in each pilot project in the Ria de Aveiro was transferred to the local level by the working groups. Van der Meulen (1996) agrees that universities should take a role in transferring information and states that, "universities should pay much more attention in transferring their knowledge and experience to other people working in the coastal zone" (p. 409). Information dissemination promoted a higher level of knowledge and appropriation by the public about lagoon problems and the solutions under study or in execution (Martins, et al. 2002).

Granja (1995) wrote that many Portuguese universities wanted to develop scientific research for decision-makers. However, conflicts based on philosophical and practical preferences in coastal management made it difficult. The coordinating effort, as well as the information dissemination that was achieved by the Universidade de Aveiro,

was essential to the success of creating a framework for ICZM in the Ria de Aveiro. In the new support framework that the University has helped create through coordination, their role will be reduced (Humphrey & Burbridge 1999).

The university's role in the ICZM process of the Ria de Aveiro was that of a translator of not only scientific information, but of the concerns of the participants. Their task was to engage all the participants so that activities moved forward with everyone having the same understanding of the issues at hand. It was not known how much effort this would entail and this process initially took a long time. The work and language of each of the participants differed significantly from each other. The primary role of the convener is to translate the needed information into a usable format for the participants (Schmandt, 1998). Universities are repositories of expertise, have professional networks which facilitated acquiring knowledge of existing programs, and have research and teaching skills needed to convey information and implement programs (Weinberg, 1999).

In leading the effort in the Ria de Aveiro the Project Coordinators were able to put many stakeholders on the same page. And also to make all feel like they were welcome to comment and give input. The coordinators had knowledge of the region and the cultural as well as the ecological importance of the area and this knowledge assisted them in translating data and information. Universities are better positioned than nonprofits, government agencies and private sector agencies to do capacity-building (Weinberg, 1999).

Most of the people in the area do not have a high level of education and therefore regard academics as truthful. There is a certain level of uneasiness in confidence in political officials, because of the continuously changing political structure and political corruption. Community leaders are sometimes publicly silenced by being referred to as naïve and being accused of having a hidden agenda (Weinberg, 1999). The lead role assumed by the university was accepted because they were a "more

widely representative interagency group" and their leadership role ensured that no single agency was predetermined to inherit the program at a later date (Cicin-Sain & Knecht, 1998).

The university's capability as a mediator proved to be beneficial in getting key players to come together. "The university may be seen as an 'honest broker' of impartial information or as a 'mediator, and hence can help create dialogue between competing sectors" (Doody, 1998, p. 26). In the thematic study on the role of information, Doody (1998) commented on the Ria de Aveiro project and that the university was perceived by some partners as "distant academics". This exemplifies the importance of ensuring that knowledge brokers, such as university academics and other scientists, are integrated into the information collection, collation and validation process (Doody, 1998). Not all partners felt this way, but it is important to note that not everyone has the same opinion when so many different people are involved.

The Universidade de Aveiro succeeded in bringing together stakeholders and different levels of government that would have perhaps been more difficult to do if a local government agency had taken the lead because of the political complexities and also because of the facilities and resources available to the university. Due to the background and ideas of the inhabitants of the Ria more trust can be placed in the university. The university took the lead in an area that needed an impartial honest broker to facilitate interactions between all those affected. The university initiated the much needed process of ICZM in the Ria de Aveiro. It might have taken another five years before the country got aligned to employ efforts for the management of the Ria. The efforts of the Universidade de Aveiro are well noted they cultivated partnerships that will hopefully foster management plans for the Ria de Aveiro.

University-coordinated efforts like those carried out in MARIA and ESGIRA-Maria are beneficial in countries/areas where political climates are constantly changing

and creating uncertainties and where academics are seen as neutral and unbiased. The European Commission has extended the LIFE III programme through 2006 where newly added countries can apply for financing to carry out projects to create an ICZM framework. New countries (i.e. Romania) with a similar economic evolution, environmental policy structure and education levels might benefit from the results from MARIA and ESGIRA-Maria. Hopefully these projects will serve as guidance for those trying to achieve Integrated Coastal Zone Management. The knowledge and experience gained in these projects are crucial in halting the deterioration of coastal zones. It may take many processes to achieve a system where everyone becomes an active participant in their environment but is it necessary to have a sense of ownership and responsibility to the ecosystem which one lives in.

APPENDIX

MARIA AND ESGIRA-MARIA PROJECT PARTNERS

This appendix contains the partners that were involved and participated in both the MARIA and ESGIRA-Maria Demonstrations Projects.

MARIA	ESGIRA-Maria
Coordination ▪ Department of Environment and Physical Planning-University of Aveiro **UA-DAO** **European Level** ▪ European Commission **EC DGXI** **National Level** ▪ Ministry of Environment - Regional Direction for the Environment of Central Region **DRAC** ▪ Institute for Nature Conservation **ICN** ▪ Institute of Hydraulic and Rural Structures and Environment **IHERA-Projecto Vouga** **Regional Level** ▪ Central Region Planning Board **CCRC** ▪ Association of the Ria Municipalities **AMRIA** ▪ Industrial Association for the Aveiro District **AIDA** **Local Level** ▪ The Aveiro's Harbor Administration **APA, SA** ▪ Municipality of Águeda ▪ Municipality of Albergaria-a-Velha ▪ Municipality of Aveiro ▪ Municipality of Estarreja ▪ Municipality of Ílhavo ▪ Municipality of Mira ▪ Municipality of Murtosa ▪ Municipality of Oliveira do Bairro ▪ Municipality of Ovar ▪ Municipality of Vagos **Consulting Council** ▪ National Association for Nature Conservation **QUERCUS** ▪ The Fund for the Protection of Wild Animals **FAPAS** ▪ Tourism Region of Rota da Luz **Região de Turismo da Rota da Luz**	**Coordination** ▪ Departamento de Ambiente e Ordenamento -Universidade de Aveiro **UA-DAO** **European Level** ▪ A Comunidade Europeia **EC** **National Level** ▪ A Direcção Regional do Ambiente **DRAC** ▪ A Direcção Regional do Ambiente e dos Recursos Naturais do Centro **DRARN Centro** ▪ Instituto de Conservação da Natureza **ICN** ▪ Instituto de Estruturas Agrárias e Desenvolvimento Regional - Baixo Vouga **IHERA** ▪ Direcção Regional de Agricultura da Beira Litoral **DRABL** **Regional Level** ▪ A Comissão de Coordenação da Região Centro **CCRC** ▪ A Associação de Municípios da Ria **AMRIA** ▪ A Associação Industrial do Distrito de Aveiro **AIDA** **Local Level** ▪ A Junta Autónoma do Porto de Aveiro **APA,SA** ▪ A Câmara Municipal de Águeda ▪ A Câmara Municipal de Albergaria-a-Velha ▪ A Câmara Municipal de Aveiro ▪ A Câmara Municipal de Estarreja ▪ A Câmara Municipal de Ílhavo ▪ A Câmara Municipal de Mira ▪ A Câmara Municipal da Murtosa ▪ A Câmara Municipal de Oliveira do Bairro ▪ A Câmara Municipal de Ovar ▪ A Câmara Municipal de Vagos **Consulting Council** ▪ Associação Nacional de Conservação da Natureza **QUERCUS** ▪ Fundo de Protecção para os Animais Selvagens **FAPAS** ▪ Região de Turismo da Rota da Luz

REFERENCES

Akiwumi P. & Melvasalo T. (1998). UNEP's Regional Seas Programme: approach, experience and future plans. *Marine Policy,22*(3), 229-234.

Alves, Fatima L., Martins, Filomena, & Coelho, Celeste. (2002) European Life Project to the Revitalization of the Urban Waterfront in a Coastal Lagoon: A case study from Portugal." Coasts at the Millennium, Proceedings of the 17th International Conference of The Coastal Society, Portland, OR. USA, 630-634.

Alves, Fatima L., Martins, Filomena, Coelho, Celeste & Fonseca, Hugo. (2002) "Recuperation and Optimisation of the Ria de Aveiro's Quays: An example of ICZM in Portugal". Livro de Actas da VII National Conference on the Quality of the Environment April 18-20 2001 - Universidade de Aveiro, 737-745.

Alves, F., Martins, F., Ferreira, Isabel, Cunha, Luisa, Hermoso, Juana & Coelho, Celeste. (2000). "European Life Project: a Global Strategy for the Responsible Use of Coastal Lagoon. A Case Study From Portugal. International Congress Litoral 2000, Drubovnic - Croácia." *Periodicum Biologorum, 102,* 385-390, Supplement I.

AMRia. Retrieved November 15, 2004 from http://www.amria.pt/default.asp.

Berry, Joyce, Brewer, Gary D., Gordon, John C. & Patton, David R. (1998). Closing the gap between ecosystem management and ecosystem research. *Policy Sciences, 31,* 55-80.

Bishop, Patrick & Davis, Glyn (2002). Mapping Participation in Policy Choices. *Australian Journal of Public Administration, 61(1),* 14-29.

Borrego, C. (1996). "Integrated coastal zone strategy: need for a more quantitative approach". In AJ Ferrante & C A. Brebbia (Eds.), *Environmental Problems in Coastal Regions,* 23-32. UK: WIT Press.

Burbridge, Peter & Humphrey, Sarah (2003). Introduction to Special Issue on the European Demonstration Programme on Integrate Coastal Zone Management. *Coastal Management, 31,* 121-126.

Burroughs, Richard (1999). When Stakeholders Choose: Process, Knowledge, and Motivation in Water Quality Decisions. *Society & Natural Resources, 12,* 797-809.

Capobianco, Michele (2003). Role and Use of Technologies in Integrated Coastal Zone Management: Lessons from the European Demonstration Programme. *Coastal Management, 31,* 145-154.

Cicin-Sain, Biliana & Knecht, Robert W. (1998). *Integrated Coastal and Ocean Management: Concepts and Practices.* Washington, DC: Island Press.

Davos, Climis A., Jones, Peter J.S., Side, Jonathan C. & Siakavara, Katy (2002). Attitudes toward Participation in cooperative Coastal Management: Four European Case Studies. *Coastal Management, 30,* 209-220.

Doody, J.P. (2003). Information Required for Integrated Coastal Zone Management: Conclusions from the European Demonstration Programme. *Coastal Management, 31,* 163-173.

Doody, J.P., Pamplin, C.F., Gilbert & Bridge, L. (1998) Information required for Integrated Coastal Zone Management. Retrieved October 12, 2003 from http://europa.eu.int/comm/environment /iczm/themf_rp.pdf

Douglas, Peter M. (1997). Politics and other realities of coastal management. *Proceedings of the Conference on California and the World Ocean, 1.*

ESGIRA-Maria Pamphlet. 2002. Ria de Aveiro – A successful Partnership. Belgium: European Communities.

ESGIRA-Maria Relatorio Final Ria de Aveiro (2002).

ESGIRA-Maria Home Page. Departamento de Ambiente e Ordenamento Universidade de Aveiro. Retrieved October 7, 2004 from <http://www.dao.ua.pt/esgiramaria/index.html>.

EUROPA - Environment - ICZM The Projects. EUROPA European Commission. Retrieved April 6, 2002 from <http://europa.eu.int/comm/environment/iczm/projects.htm>.

EUROPA - Environment – Life Projects. EUROPA European Commission. Retrieved November 11, 2003 from <http://europa.eu.int/comm/environment/life/project/Projects/ind ex.cfm.

EUROPA - Environment - ICZM -THEMATIC ANALYSES. Retrieved November 1, 2004 from http://europa.eu.int/comm/environment/iczm/themanal.htm.

EUROPA - Environment - ICZM –Project Leader Workshops. Retrieved April 2001 from http://europa.eu.int/comm/environment/iczm/themanal.htm.

European Commission (EC). (2001a). *EU Focus on Coastal Zones: Turning the tide for Europe's Coastal Zones.* Belgium: European Communities.

European Commission. (2001b). *Environment 2010: Our Future, Our Choice, 6th EU Environment Action Programme, Executive Summary.* Belgium: European Communities.

Fabbri, Karen P. (1998). A methodology for supporting decision making in integrated coastal zone management. *Ocean & Coastal Management, 39,* 51-62.

Firmino, Ana (1999). Agriculture and landscape in Portugal. *Landscape and Urban Planning, 46,* 83-92.

Gibson, John (2003). Integrated Coastal Zone Management Law in the European Union. *Coastal Management, 31,* 127-136.

Gough et al. (2003). Contexts of citizen participation. In Kasemir, Jager, Jaeger & Gardiner (Eds.), *Public Participation in Sustainability Science: A Handbook,* 37-61. Cambridge, UK: Cambridge University Press.

Granja, H.M. (1995). Some Examples of Inappropriate Coastal Management Practice in Northwest Portugal. In Healy & Doody (Eds.), *Directions in European Coastal Management,* 541-546. Cardigan: Samara Publishing Limited.

Holland, G.L. (1998). The role of intergovernmental organizations in coastal zone management. *Ocean & Coastal Management, 39,* 25-31.

Humphrey, Sarah & Burbridge, Peter (1999). Thematic Study D Planning and Management Processes: Sectoral and Territorial Cooperation. Retrieved November 24, 2004 from http://europa.eu.int/comm/environment/iczm/themd_rp.pdf.

Humphrey, Sarah & Burbridge, Peter (2003). Sectoral and Territorial Cooperation in the European Demonstration Programme on ICZM. *Coastal Management, 31,* 155-162.

Humphrey, Sarah, Burbridge, Peter, & Blatch, Caroline (2000). US lessons for coastal management in the European Union. *Marine Policy, 24*, 275-286.

Johnson, D.E. & Dagg, S. (2003). Achieving public participation in coastal zone environmental impact assessment. *Journal of Coastal Conservation, 9,* 13-18.

Kapoor, Ilan (2001). Towards participatory environmental management? *Journal of Environmental Management, 63,* 269-279.

King, Graham (2003). The Role of Participation in the European Demonstration Projects in ICZM. *Coastal Management, 31,* 137-143.

Luis, A., Margalha, J. & Borrego, C. (1995). Ria de Aveiro: A Framework for Environmental Statutory Protection. In Healy & Doody. (Eds.), *Directions in European Coastal Management,* 499-501. Cardigan: Samara Publishing Limited.

MARIA-Integrated Management Programme for the 'Ria de Aveiro', (1997) Pamphlet. Belgium: European Communities.

MARIA Relatorio Final (1999).

Maria Programme Home Page. Departamento de Ambiente e Ordenamento Universidade de Aveiro. Retrieved April 6, 2002 from <http://www.dao.ua.pt/maria/index.html>.

Martins, Filomena, Alves, F., Hermoso, J., Fonseca, H., Jean-Bart, M., Ferreira, I., et al. The (In) Formal Partnership Management Model for the Ria de Aveiro (Portugal). In EUROCOAST-Portugal (Ed.), *Littoral 2002, The Changing Coast* 439-447. Porto-Portugal: EUROCOAST/EUCC.

Martins, Filomena, Alves, F., Hermoso, J., Jean-Bart, M. Fonseca, H., Ferreira, I. & et al. "Inovar na Tradicao...em busca das relacoes perdidas". Presentation at Congresso da Ria de Aveiro, April 22-24, 2004.

Moliceiro.com. October 10 2004. www.moliciero.com/estarreja/artigo/3089. Retrieved November 19, 2004.

OECD (Organisation for Economic Co-operation and Development) (2001). *OECD Environmental Performance Reviews. Portugal.* Paris: Organisation for Economic Co-operation and Development.

OECD (2003). *OECD Environmental Performance Reviews. Water.* Organisation for Economic Co-operation and Development, Paris.

OECD (1993a). Coastal Management, Integrated Policies. OECD, Paris.

OECD (1993b). Coastal Management, Selected Case Studies. OECD, Paris.

OECD (2004). OECD In Figures – Volume 2004 Supplement 1. Retrieved November 2004 http://www1.Oecd.Org/Publications /e-book/0104071E.PDF

Osterman, Douglas, Steiner, Frederick, Hicks, Theresa, Ledgerwood, Ray & Gray, Kelsey (1989). Coordinated resource management and planning: The case of the Missouri Flat Creek watershed. *Journal of Soil Conservation, 44,* 403-406.

Roe, Maggie (2000). Landscape Planning for Sustainability: community participation in Estuary Management Plans. *Landscape Research, 25(2),* 157-181.

Rowe, Gene & Frewer Lynn J. (2000). Public Participation Methods: A Framework for Evaluation. *Science, Technology & Human Values, 25,* 3-29.

Schmandt, Jurgen (1998). Civic Science. *Science Communication, 20,* 62-69.

Sherman, K. & Duda, A.M. (1999). An ecosystem approach to global assessment and management of coastal waters. *Marine Ecology Progress Series, 190,* 271-287.

Tuler, Seth & Webler, Thomas (1999). Voices from the Forest: What Participants Expect of a Public Participation Process. *Society & Natural Resources, 12,* 437-453.

Treby, Emma & Clark, Michael (2004). Refining a Practical Approach to Participatory Decision Making: An Example from Coastal Zone Management. *Coastal Management, 32,* 353—372.

Turner, R. Kerry (2000). Integrating natural and socio-economic science in coastal management. *Journal of Marine Systems, 25,* 447-460.

Turner, R. Kerry, van den Bergh, J., Soderqvist, T., Barendregt, A. van der Straaten, Maltby, E. & et al. (2000). Ecological-economic analysis of wetlands: scientific integration for management and policy. *Ecological Economics, 35,* 7-23.

Turner, R. Kerry, Paavola, T., Cooper, P., Farber, S., Jessamy, V. & Georgiou, S. (2003). Valuing nature: lessons learned and future research directions. *Ecological Economics, 46,* 493-510.

UNEP/MAP/PAP (1999). *Conceptual Framework and Planning Guidelines for Integrated Coastal Area and River Basin Management.* Split: Priority Action Programme.

van der Meulen, F., & Udo de Haes, H.A. (1996). Nature Conservation and Integrated Coastal Management in Europe: Present and Future. *Landscape and Urban Planning, 34,* 401-410.

Weinberg, Adam S. (1999). The University and the Hamlet. *American Behavioral Scientist, 42,* 800-813.

The World Factbook. Retrieved October 15, 2004. http://www.cia.gov/cia/publications /factbook/geos/po.html.