

Bottom-up Environmental Decision Making Taken Seriously: Integrating Stakeholder Perceptions into Scenarios of Environmental Change

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Abstract

The longstanding quest for properly integrating stakeholder perceptions and attitudes into environmental decision making has not yet reached a definite answer. Particularly in a river basin context, the interaction of economic activities, ecological factors and social values contribute to an increase in the complexity of policy options and the likelihood of intervention failures. Conflicts between users, their relationship with the State and their interaction with the natural environment must be analyzed in depth. This paper attempts to analyze the active stakeholder groups in the river basin of Axios in northern Greece applying the methodological tools of stakeholder analysis and focus groups. Special attention is paid to their perceptions about risk, values of the coastal environment, and the role of State and individual responsibilities.

Keywords: integrated coastal zone management, environmental conflicts, risk perceptions

Facts and Values in Sustainable Coastal Management

There must be something special about coasts: throughout modernity, an ever-increasing number of people continuously inhabit the coastal or near-coastal part of the Earth.

Their historical importance in the development of human civilization is therefore beyond doubt. As meeting points of land, water, and air, coasts have provided food and security, industrial and commercial development, and, lately, leisure and conservation sites. As the process of industrialization and economic expansion has accelerated, coastal zones have come under heavy pressure from human activities. The pace of human relocation from inland towards the coast has been described as “one of the greatest human migrations of modern times” (Tibbetts 2002). The ensuing problems include physical modifications and habitat loss through coastal erosion, contamination and pollution, and depletion of fisheries. As a consequence, approximately 85% of the European coast is at high or moderate risk from development-related pressures (Bryant et al. 1995).

The problem is illustrated by the fate of coastal wetlands in the Mediterranean, a valuable source of natural capital that has been destroyed and degraded to a great extent. Their loss and/or degradation in this century amounts to 73% of the marshes in Greece, 86% of the most important wetlands in France, 60% of wetlands in Spain and 15% of lakes and marshes in Tunisia (MedWeT 1996). The situation is, as expected, crucial for island states and/or nations with a long shoreline. In Greece, for instance, a handful of indicators aptly demonstrate the importance of the coast and its vulnerability to human pressures: Coastal areas represent 72% of

total territory, 86% of population, 88% of employment in manufacturing, 90% of tourist activities and 90% of energy consumption (OECD 2000).

Though the loss of valuable assets, such as coastal resources, is well documented, this is not the case with the consequent, indirect or second order losses in economic values that this process entails. Efforts to highlight the economic or value side of the process of coastal change are scattered in a number of reports and studies addressing predominantly North American and to a lesser extend European and Third World coastal resources (David et al. 1999; Spurgeon 1999; Dunn et al. 2000; Turner et al. 2001; Ledoux and Turner 2002). In a recent meta-review of economic valuation studies of coastal wetlands, Brander et al. (2003) observed a wide range in estimated values, with GDP being the most important factor to explain the variance in the data set. Their findings (Table 1) confirm the notion of high private and social values generated by the coastal resources put forward by Ledoux and Turner (2002).

Table 1. Range of estimated values of coastal resources for four important functions generating goods and services (as US \$2000 ha⁻¹ y⁻¹)

Coastal Resource Function	Median Value (range; number of observations for each function)
Recreation	491 (5-200086; 52)
Water quality	288 (2-102300; 30)
Fisheries (commercial)	201 (0.05-55861; 72)
Biodiversity	214 (8-200086; 12)

Source: Brander et al. 2003

Trade-offs at the Coast and at the Margin

"It is best to view the coast as a common resource, available to all, however, we need to apply certain standards of resource allocation and use to the coast, in order to sustain its attractiveness" (Carter 1988, 2). The ideal of a natural resource common to all, echoing the above paragraph, is in obvious contrast with the realities of current environmental planning. The knowledge of ecosystem complexity and systemic interrelationships prompts the scientist to attach an *absolute* importance at the specificities of ecosystem processes and structures confounding the notions of functions and values per se (Toman 1997). A second thought, however, reveals the fact that modern ecological science does accept the notion of relative and therefore hierarchical importance referring to single species and ecosystem types (Perrings 1995). Notions like 'keystone species,' 'critical biotopes' or 'critical functions' reveal this fundamental fact, which *within a management perspective* allows someone to think about trade-offs

when designing effective and efficient conservation priorities.

Ecologists argue that the main benefit of preserving natural ecosystems is related to the maintenance of critical ecosystem services and the integrity of the life-support systems (e.g. Costanza et al. 1997). Landscape functions change on several spatial and temporal scales that are of concern to conservation planning, particularly at the coast. Conservation in hotspot areas, where fast-moving changes are driven by spatially undifferentiated economic development policies, as is the case in the coastal zones of the European South, needs compelling conservation planning processes to enforce its claims and arguments.

Nevertheless, one should keep in mind that, even within the previously described framework, the prioritisation of conservation efforts remain of the highest importance since *ad hoc* procedures of allocation of nature, human resources and funds may seriously jeopardize the efficiency of conservation planning. Turner et al. (2001) have recognized the importance of the ecosystem value (primary value) as opposed to the value of the parts (secondary values) and the inability of the traditional economic valuation procedures to capture it. Whatever the perspective is, it is well established that biodiversity conservation planning should advance by combining ecological patterns with practical and political considerations.

Scaling down to an area that is typical of many European coasts (i.e. coastlines of 100s of km) requires testing the validity of general conservation planning protocols and methods. For instance, the major challenges for conservation planning at that scale are (1) the identification of 'core natural areas,' and (2) the identification of areas or landscape elements which facilitate the control of abiotic, biotic and socio-economic conditions for biodiversity within the 'core areas.' A decade after the Convention on Biological Diversity (CBD, UN 1992), the core issue of definition of biodiversity conservation priorities at a global scale remains unsettled. One of the main contentious issues is specifically related to differing perceptions and the operational definition of the intrinsic value of biodiversity. CBD includes the statement that "ultimately, all ecosystems should be managed for the benefit of humans." It also includes the principle of "benefit-sharing." According to these assumptions, the objectives of management of land, water and living resources are a matter of societal choice. Almost inevitably, conflicts arose over whether any framework policy text, such as the CBD, could legitimately say that all ecosystems must be managed, and if so, whether that should always be for human benefit or, on the contrary, whether it is ever legitimate to deny the right of humans to use living resources.

On the one hand, many stakeholders (countries, land

owners, producers, etc.) see the alleviation of poverty as the central issue for their societies and therefore view the prime function of natural resources (including coastal zones) as a means to reduce human misery. On the other hand, other stakeholders accept legislation that forbids any human activity in designated pristine lands and some others insist on the intrinsic value of biodiversity. In the international political arena, these conflicts are overcome through formalistic compromises such as: "Ecosystems should be managed for their intrinsic values and for the tangible or intangible benefits for humans, in a fair and equitable way" (CBD/COP V Decision V/6 2001).

Unfortunately, such compromises can never resolve practical problems at the local scale, where evaluation of alternative development paths depends on what is meant by 'choice' — and, for that matter, by 'society.' Societies rarely really choose which way they will develop. Individuals make choices that have a proximate effect on their lives. Many of these choices produce externalities that individuals do not know about, or prefer to ignore, and that have a major long-term influence on the 'choices' that society drifts into (Skourtos et al. 1999).

ICZM aims at preserving coastal resources, their ecological functioning and ultimately their values, by applying adequate land use planning within a social, institutional and economic context. So far, several categories of values have been defined: economic, aesthetic, ethical, scientific, evolutionary and ecological. The multidimensionality of the coast adds to the confusion about the different values of its components. The various actors may have different or even conflicting perceptions of the significance of these values because of cultural differences, difficulties in calculating benefits or placing a monetary value on living entities, products or services. Rational arguments that would strengthen the perception of the public and policy makers about the seriousness of threats to coastal resources need to be established through new methodologies to value and evaluate the various forms of coastal goods and services from the perspective of all societal actors.

What then can scientific method offer to the resolution of such conflicts, especially at local scales and within ecosystem entities that mediate multiple functions? To help "society" make informed decisions in using space and resources we have to start by quantifying ecosystem functions and identifying needs. We can then ask what kind of knowledge and information does the policymaking process need in order to comply with a sustainable use of spaces and resources. It is evident that besides data and predictive ability regarding changes in ecological parameters, there is a fundamental need to prioritise alternative uses by means of both 'objective,' ecological scores and 'subjective' economic values. It is through the combined use of both scoring systems that

ecosystem values can practically 'speak truth to power' (House and Howe 1999).

Methodology

Behavioural decision research and decision analysis give a basic structure for research into how prescriptive techniques can be used to improve the quality of group decision processes. Recent research (O'Riordan 2001; Kontogianni 2001) indicates that stakeholder values are the key to a structured decision approach to public involvement.

Stakeholder values identify what matters to participants, and, in turn, highlight the consequences that require most careful attention, and the tradeoffs that matter most (Gregory 2000). According to Hammond (1999), meaningful involvement in the decision making process, requires not only an invitation to participate, but also a forum for careful deliberation, and a mechanism for incorporating the results of technical analysis. Focusing on stakeholder values within Axios basin, two *major* stakeholder groups were identified and selected: (a) community residents; and (b) state and local resource managers/technical experts. The focus group technique for eliciting preferences and tracing conflicts between community residents was applied to three professional groups: farmers, fishermen/shellfish producers and industrial producers. To interpret the focus groups' results, the content analysis methodology was employed. The second stakeholder level (local and state resource managers) was approached in two different ways: (a) a pre-constructed questionnaire was dispatched to representatives of state agencies followed by a first round of discussions; and (b) the focus group technique was engaged for local resource managers. Useful input was received from all stakeholder groups approached for public involvement. The values elicited from stakeholders will be fed into multi-criteria analysis in a later stage. Stakeholders were invited to enter the consultation process by interpreting factual scenarios. As Gregory (2000, 35) states: "Disagreements in the expressed values of participants or differences in their interpretation of factual evidence are welcomed and examined in the context of what they can show decision makers about the links from stakeholders' support of, or opposition to, specific options to their underlying preferences."

The Study Area

The Axios River basin is located in the central Balkan Peninsula and drains mainly the Former Yugoslavian Republic of Macedonia (FYROM), parts of Bulgaria, the Federal Republic of Yugoslavia and Greece, the latter occupying the delta area (Table 1). The catchment covers an area of approximately 25,000 km² and hosts a population of about 1.96x10⁶,

where $\sim 1.8 \times 10^6$ reside in FYROM (census 1994) and ~ 158.000 in Greece (census 1991). Average population density in FYROM is 77.8 p/km^2 , where 60% of the population lives in urban areas. The average population density in Greece is 53.7 p/km^2 . The climate varies between continental in the northern part of the catchment and Mediterranean towards the coastal zone. Mean annual air temperatures vary between 9°C and 17.5°C , while annual rainfall ranges between 400 mm and 1300 mm.

The western and southwestern part of the catchment is mountainous and the highest altitude is $\sim 2400 \text{ m}$, whereas at the eastern boundary altitudes reach 1800 m. The Gulf of Thermaikos is located in the northwestern part of the Aegean Sea; its northern part is named Thessaloniki Gulf, after the city of Thessaloniki. The bottom relief is smooth as a result of continuous sediment input from four rivers, namely, the Axios, Aliakmon, Loudias and Gallikos Rivers.

Drivers

Socio-economic drivers, which are adopted here, remain on broad issues, i.e. the political situation in the Balkans, Greek development policy for the area, and the citizen's lifestyle, driven by major EU/national legislative framework. In other words, driving forces are translated here as the back up forces, which 'drive' the society to enforce or decrease the pressures to the environment. The major socio-economic drivers that affect the total Axios catchment area (FYROM and Greece) can then be summarized as follows: (a) the wider political and economic destabilization of the Balkans region leading to uncertainty, delay in the rate of growth and difficulty in tackling environmental degradation; (b) the new Greek Development Strategy for the role of Thessaloniki as the new Metropolitan centre of the Balkans (Balkan and Black Sea area Cooperation Pole); and (c) the European Union Policies, especially the Common Agricultural and Fisheries Policies, the Water Framework Directive, and the Habitat Directive.

Destabilization of the Balkans Region-FYROM Policy

The Former Yugoslav Republic of Macedonia (FYROM) is in a period of transition, moving towards a market-based economy. Within this framework, it is apparent that FYROM is seeking to make progress in the field of environmental protection, and is very keen to comply with EU environmental requirements and standards (NEAP 1996). Nevertheless, the adoption of new environmental legislation and the creation of new institutional structures by FYROM need to be supported by investment, implementation and enforcement. Specific environmental management recommendations given by UNEP

(2000, 61) for the water sector in FYROM include the following: "an integrated river basin management plan should be developed and implemented for the Vardar (Axios) River. The approach should be consistent with the EU Water Framework Directive and take full account of trans-boundary considerations."

The Kosovo conflict placed an additional burden on the already overstretched resources of FYROM, although the direct environmental impacts of the influx of 261,000 refugees were found to be minimal (UNEP 2000). With regard to UNEP's conclusion, two key areas of environmental improvement have been identified for the state of FYROM: (a) the implementation of environmentally acceptable industrial processes, including measures for adequately controlling the use of chemicals; and (b) adequate handling, storage, treatment and disposal of waste, whether solid or liquid, hazardous or non-hazardous, municipal or industrial. According to Krstic et al. (1999), the Axios River is heavily polluted, primarily due to lack of wastewater treatment facilities.

UNEP identified a chronic lack of investment in environmental protection although the economic context of the last decade in FYROM has led to decreased industrial output and consequential reductions in pollution (Industry is the dominant sector accounting for about 35% of the Gross National Product (GNP) and 39.9% of employment in 1994 (NEAP 1996).

Greek Policy

According to the new Greek development policy for 2000-2006, the general development goal for the region is the new metropolitan role of Thessaloniki in the Balkans area, along with the reinforcement of intra-regional balance and sustainability. The main strategic objectives for achieving this goal according to Konsolas et al. (2002) are: development of transportation, communication, culture, urban infrastructure, sustainable use of natural environment, reduction of intra-regional disparities, upgrading of health services, modernization of the railway network, improvements in infrastructure of regional sea ports, decrease of unemployment and provision of equal opportunities in education and skills. Emphasis is given to integrated employment programmes for emigrants, repatriates and socially excluded groups to enter the labour market. Within the third Community Support Framework 2000-2006, the Central Macedonia Funding Programme, which will finance the above-mentioned actions, has a total public expenditure of 1.2 billion €.

European Union Policies

On a European scale, the recent Water Framework Directive (WFD) stands prominently in offering tools in support

of an integrated management of watersheds. In this line, adopting the 'wise use' imperative of the European Union is a prerequisite, as is also taking explicitly into account a number of factors considered to affect specifically the management of Mediterranean catchments, as: (a) developmental needs and economic inequality; (b) pressure from population growth, immigration and mass tourism; and (c) social and cultural conflicts.

Stakeholders Mapping

Stakeholders mapping in the Greek part of the Axios River catchment has allowed us to define in more detail the groups involved. It is rather difficult to analyse completely the pressures and the corresponding stakeholder groups of the Axios catchment-coastal zone, mainly because the dynamics of the river flow affect largely the activities in the delta. Many occasional human activities become intense or stop, according to the river flow, as for instance, sand extraction. Additionally, some stakeholders are multi-professional, e.g. plenty of rice farmers (practicing intensive agriculture) are also engaged in aquaculture (shellfish farming). These two stakeholder groups are greatly interested in freshwater and their interests have been contradictory many times in the past.

Farmers

Farmers constitute the principal interest group in the Greek part of the Axios basin. The primary crops that make up more than 85% of the total crops are wheat, maize, tobacco, barley, and rice. Fruits and vegetables are also cultivated. A particular characteristic is that in the Axios delta area, almost solely rice is cultivated, and the production of this area amounts to ~60% of the entire Greece. The farming community is the largest consumer of Axios water. There is no direct control by the Ministry of Agriculture or any other state agency referring to the maximum allowed quantity of fertilizers and pesticides that can be used in the rice cultivation. However, in Greece as a whole, fertilizer consumption decreased from 696,000 t in 1990, to 457,500 t in 2000 (FAO 2002).

Shellfish Farmers

The second important user group is shellfish (mussel) farmers, a group strongly dependent on the freshwater of the Axios River, and in fact, the particulate matter supplied by the river. It has been estimated that a single shellfish filters ~70 g yr⁻¹ of particulate matter, and uses 50% of it for growth (Widdows et al. 1977). The shellfish farming activity in the Axios delta is a profitable activity comprising 85% of the total Greek shellfish output. The abundance of freshwater and

particles near the Axios River mouth suggests that shellfish grow faster, resulting in larger profits for the shellfish farmers. On the contrary, a scarcity of freshwater (and particulates) or potential contamination, severely affects shellfish farming, decreasing productivity.

Industrial Sector

Industry plays an important role in the economy of the area. Enterprises situated within the Axios River watershed total 3,735, which are mostly very small units (personnel less than one). There are 182 small units (personnel 10-49) with a turnover of 300 million €, whilst medium and large units do not exist. The enterprises are activated mostly in textiles and apparel production, food and beverage industries, and a few metal and chemical industries.

At this point, we should point out that the Axios catchment is relatively not industrialized, compared to the entire Thessaloniki County (57,260 very small enterprises, 1,696 small enterprises, and 229 medium/large enterprises, turnover of ~10 billion €). Out of these, ~1,300 units require wastewater treatment (Tsagarlis 1998). The major industrial sector of the county is located in the western part of Thessaloniki, in the so-called 'National Industrial Site of Thessaloniki Prefecture,' which houses more than 100 small-medium-large industrial units. Inside the site, wastewater treatment facilities are provided. The WWTP was constructed in 1978. The industrial wastes are processed and discharged in a channel, actually an older course of the Axios River. It has been estimated that large food industries, located within the Industrial Site of Thessaloniki, can fully treat their wastes before discharging them into the river. However, many small and/or medium size enterprises situated in the Thessaloniki and other counties drained in the Thermaikos Gulf, have no wastewater treatment facilities and their wastes are directly released into the river(s).

Analysis of Focus Groups

The stakeholder analysis was designed for identification of conflicting uses of environmental assets, the conceptualisation of conflicts on the basis of property rights allocations among social groups, regions and nations, and last but not least, the understanding of the institutional mechanisms by which costs and benefits are appropriated (Munasinghe 1992; Brouwer et al. 1999; Langford et al. 1999)

Three focus group interviews were undertaken in the summer of 2001, comprising representatives of local farmers, fishermen/shellfish producers, and industrialists in the Axios catchment area. A series of general questions relating to the catchment and its coastal zone was prepared for each group,

and the following formed the focus of the group discussion: degradation of water quantity and quality, the Axios delta values, State/stakeholders' relationship, economic activities and resulting conflicts, and their attitudes towards the future of the area. The focus groups were organized in accordance with guidelines given by Morgan (1988), Morgan and Kreuger (1997) and Stewart and Shamsardani (1990). Fishermen and shellfish producers were interviewed both within a group discussion because they were identified as a cohesive set of individuals. They rely not only on fishing as a main source of income, but also on shellfish production.

Representatives of Local Farmers

Farmers of the Axios catchment are organized in local and national cooperatives and unions, representing a very dynamic sector, not only for the region but also for Greece as a whole. They are considered the main users of Axios water, be it for purposes of irrigation or for releasing agricultural runoffs into the river. Farmers are in the position to influence any future management scheme of the region through their strong lobbying position. In our research, this group comprised seven individuals between 40 and 50 years old. They were mostly concerned about water quantity and quality problems being generated by the general development of the watershed. In this respect, they recognized as main causes for the water quality degradation: industrial waste dumping (especially in FYROM), overuse of fertilizers and pesticides, lack of control measures both in FYROM and Greece. Concerning the water quantity: climate change, increased irrigational needs due to intensive agriculture in the catchment area (Greece), which (they recognize) leads to non sustainable use of water by farmers, and the unsuitability of irrigation network, were identified by the group as factors leading to changes in the state variables.

Farmers stated that overuse of pesticides and fertilizers, is not their fault, as they are acting under the scientific guidance of the state/private sector agriculturalists. Concern was expressed about the future of the water quantity in Axios River. Their trend scenario for the area included prosperity through the dynamic economy of the region, environmental consequences constrained through technological advances, generalization of intensive agriculture, although they recognize an increasing farmers' tendency to adopt organic farming methods.

Unwise use of water by farmers is caused by their risk aversion behaviour: in trying to reduce the risk of irrigation water shortage for July and August, they over pumped water earlier in an attempt to make personal water savings. They asked for a water management plan, which through sustainable use would ensure the existence of irrigation water for summer months. They were concerned that both agriculture

and nature protection should be considered in future plans, and there were trade-offs to be made between the two.

The group commented slightly on delta values focusing on wild fauna, which they think is positively linked to agricultural activities. They apparently were not conscious about the risks for the delta area. Farmers' representatives stated that they demand more information on best agricultural practices, financing opportunities and environmental state of their area. Distrust to the State was obvious throughout the discussion. Participants also declared that they would allow no management plan to be designed for the area without their participation. The worst conflict, revealed through this focus group, was control measures taken by FYROM for municipal and industrial wastewater dumping.

Representatives of Local Fishermen/Shellfish Producers

Twelve representatives of local fishermen/shellfish producers were invited to the group discussion, however, only six attended. This is a rather weak group in terms of social and economic weight but an important one in terms of ecological vulnerability. Discussion focused on the productive value of the Thermaikos Gulf and issues surrounding it, such as the development of aquaculture and the problem of pollution from agricultural (pesticides), industrial and municipal discharges. The representatives acknowledged that bad fishing practices had led to depletion of fishing stock in the past, and accepted that the state had passed laws to make fishing activity more sustainable. While on the one hand they felt the need to address the water quality issues, on the other hand, they felt the designation of the delta area as a Ramsar site was a potential threat to the economic activities and were ready to oppose it decisively.

Their perceptions of the impacts were framed in terms of the uncertainty in the markets for shellfish under the present conditions. The ensuing risks for the economic viability of shellfish production in the Gulf were perceived to be very high. The main reason for the expressed fear of loosing the market was negative advertisement. They did not believe that their production was threatened by quantitative and qualitative reduction due to eutrophication. Consequently, they also foresaw large economic losses in the future; a fact that made them reluctant to let their ancestors enter the sector. This pessimist attitude was substantially enhanced by both the lack of definite scientific answers concerning water pollution and shellfish production as well as the widespread belief in the inability of the state to confront the problem.

Representatives of Local Industry

This is the most powerful interest group in the watershed, and they participated in the focus group with seven peo-

ple. Its power derives from its financial status, institutional representation, and ability to lobby successfully for its interests. Its importance derives from being the explicit target of criticism by other groups for the discharges this group emits into the Gulf. Though most of the industrial plants are located away from the Axios River, they nevertheless are located within the wider catchment area influencing the coastal zone.

This group provided the most vivid discussion, mostly about the potential for the development of industry and the problems of waste disposal regarding the coastal zone and Thermaikos Gulf. Some of the group members pinpointed their own responsibility for water pollution, but did not acknowledge that the pollution problems of the Gulf were overall severe. They linked existing problems to use of agrochemicals and illegal dumping of municipal waste. Overall, the group perceived the problems of the Thermaikos Gulf area in terms of development potential, and in some respects considered the ongoing urbanization and intensive infrastructure building in the region as an outmost national priority given Greece's arbitrator character in the Balkans.

At this point, we may refer to a study on the structure of social preferences for improving water quality in Thermaikos Gulf (Kontogianni et al. 2003) in order to complement the insights gained from the focus groups. In this study, a sample of 480 Thessaloniki inhabitants were surveyed in order to analyse qualitatively the determinants of social preferences for a clean water environment in Thermaikos and at the same time quantify the willingness of respondents to pay in order to finance it. Among other things, the respondents emphasized the aesthetic deterioration of the Gulf as a main impact of uncontrolled discharges. The motivations for agreeing to participate in the clean up scheme are complex and can be categorized as both 'consumer' and 'citizen' motivations. (Sagoff 1988; Brouwer et al. 1999). Hence, the impacts on human welfare of a eutrophic and unpleasant Thermaikos Gulf, besides being linked to productivity losses, rest also on wider considerations referring to aesthetics and intergenerational justice.

Typology of Conflicts

The conflicts that are studied here are categorized in three distinct groups (Warner and Jones 1998; Grimbale and Wellard 1996):

- A micro — micro level (conflicts between users)
- A micro — macro level (conflicts between users and external organizations)
- A macro — micro level (conflicts between state organizations and locals) and,
- A macro — macro level (conflicts between states)

The typology of the conflicts is presented in Table 2 below.

Table 2. Conflicts.

Conflicts	Intensity	Impact on management schemes
Micro-micro level		
1) Farmers—illegal sand extractors	++	2
2) Farmers—Local; Union for Reclamation	+	1
3) Farmers Thessaloniki—Farmers Kilkis	+	3
4) Farmers—Water supply to Thessaloniki	+/-	2
5) Municipalities—Urban agglomeration in Thessaloniki	++	2
6) Municipalities—Illegal sand extractors	++	4
7) Municipalities—industry	++	4
8) Municipalities upstream—K Municipalities downstream	+	4
9) Fishermen—Industry	+++	4
10) Inshore fishermen—Middle fishermen	+/-	2
11) Amateur fishermen—Professional fishermen	+	2
12) Mussel farmers—Fishermen	++	2
13) Mussel farmers-Thessaloniki water supply	+	4
14) Local NGOs—illegal sand extractors	+++	1
15) Local NGOs Industry	+++	5
16) Big constructions—Small industries	+	2
17) Cattle raisers—Farmers	+/-	
18) Farmers—Industry	+++	4
Micro—macro level		
1) Workers—NGOs+++	5	
2) Farmers—Agronomists	+++	5
3) Farmers—Ministry of Environment	+++	5
4) Farmers—Skopje++	4	
5) Other municipalities	++	4
6) Municipalities—NGOS	++	2
7) Industry—European Union	++	4
8) Industry—State ++	4	
9) Fishermen—NGOs	+++	3
10) Fishermen—Ministry of Environment	+++	5
Macro—micro level		
1) Ministry of Environment—Local population	+++	5
Macro—macro level		
1) Greece—FYROM	+/-	5

Legend

Intensity:

+/-, small
+, medium
++, important
+++, very important, critical

Impact

1 2 3 4 5
Too small Too big

In Table 3, the results of the discussions in the focus groups concerning the severity of the risks are presented. According to the content analysis, qualitative/quantitative degradation of water bodies has dominated the focus groups' discussions (23%). The relationship between the stakeholders and the state apparatus was raised most frequently after issues of water degradation (18%). Economic activities occupied 13% of discussions while the conflicts followed with 12%.

Table 3. Risk assessment through focus groups.

RISKS	Farmers	Mussel-Farmers	State representatives	Industry representatives
Fertilizers	+	+	+	++
Urban waste	+/-	+/-	-	0
Industrial waste	+	++	++	+/-
Drinking/irrigational water quantity reduction	++	+/-	++	+/-
Aggregate disposal	+	0	++	+
Underground water overpumping	0	0	++	+/-
Mussel farming waste	0	+	0	0
Overfishing	0	++	0	0
Underground and surface water pollution (for Axios river)	++	++	++	+/-
Thermaikos Gulf pollution	0	++	-	+/-
Insufficient legal framework	+/-	0	++	++
Illegal construction	0	0	0	0
Industrial expansion	+	++	++	-
Road construction	0	0	-	0
Aesthetic deterioration	0	+/-	+	++
Morbidity due to water/air pollution	+	0	++	+/-
FYROM	++	0	+/-	+
Bird population reduction	-	-	0	+/-
Lack of information	++	++	++	++
Lack of participatory management schemes	+	0	++	++
Insufficient State Intervention	++	++	++	++
Pressure groups	0	0	+	++
Natura 2000 constraints	0	++	++	-
Illegal sand extraction	+	0	++	0

legend:

++		very important risk
+		important risk
+/-		small risk
-		no risk
0		not mentioned

Conclusions

The use of socio-economic qualitative research methods to analyze environmental conflicts and to assess stakeholders' perceptions is growing rapidly. Through the use of the above mentioned methodology, we have gone some way in uncovering some of the environment — society complexities and collected information on the preferences of individuals and focus groups, which we believe are of genuine use to policy makers. The results from this study have been accepted by the Ministry of Environment, Urban Planning and Public Works in Greece as input to the planning of zoning activities regarding NATURA 2000 sites — policy makers are obviously interested in societal perceptions of risk, and we have also stressed that public consultation and involvement, including discussions with local people about how environmental and economic outcomes play an important part in the planning process. The Axios catchment study demonstrates that environmental conflicts can be analyzed, but these are

only useful when set in the context of social, economic and environmental pressures and the responses of different individuals and stakeholder groups to these pressures.

Endnotes

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