

## **STAKEHOLDER PARTICIPATION AS A MEANS FOR RIVER BASIN MANAGEMENT PLAN**

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**Abstract.** River basin is political, economic and environmental unit containing units such as urban and rural communities, agricultural, forest, industrial, services and recreational areas. For this reason, all components including nature and human regenerated by water and human activities should be considered together and integrated management should be implemented. In this context, in this study the strengths and weaknesses, opportunities and threats (SWOT) of the field were evaluated and prioritised by one of multi-criteria evaluation methods ranking + SWOT (R'WOT) analysis in order to ensure the participation of central government and local people out of river basin stakeholders in the Devrekani river sub-basin and to evaluate their opinions and attitudes. According to the results of this analysis, central government and local people think that the most important threatening factor is the absence of solid waste disposal facilities, domestic, industrial wastewater treatment plants and the lack of interest in this situation. It is revealed by both groups that traditional livestock sector, the potential for ecotourism and non-wood subsidiary products are important development tools for the field. In this context, obtained results were proposed as the issues necessary to be prioritised for the target decisions of the management plan.

*Keywords:* integrated basin management, participation, R'WOT analysis.

### **AIMS AND BACKGROUND**

World countries fighting with the financial and energy crises will soon be faced with bigger problems such as global warming, climate change and drought. Global climate change over the coming decades could have various effects on the health of human populations within the European region<sup>1</sup>. The uncertainty of global climate change impacts on water resources has revealed a complex situation for water management. Also, studies were implemented and international meetings were held in this context. At these meetings the necessity for more effective and efficient use of water resources in the world was introduced, the concept of integrated water resource management was brought to agenda.

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Integrated water resources management overlapping with ‘managing jointly and common dependency’ approach and envisages the active participation of the local people, private sector, non-governmental organisations (NGO) as well as public institutions<sup>2</sup>. The attention of the local people will be taken into the problems of environment<sup>3</sup>. Also as well, the participation of the local people will be used as a mean of solution<sup>4</sup>.

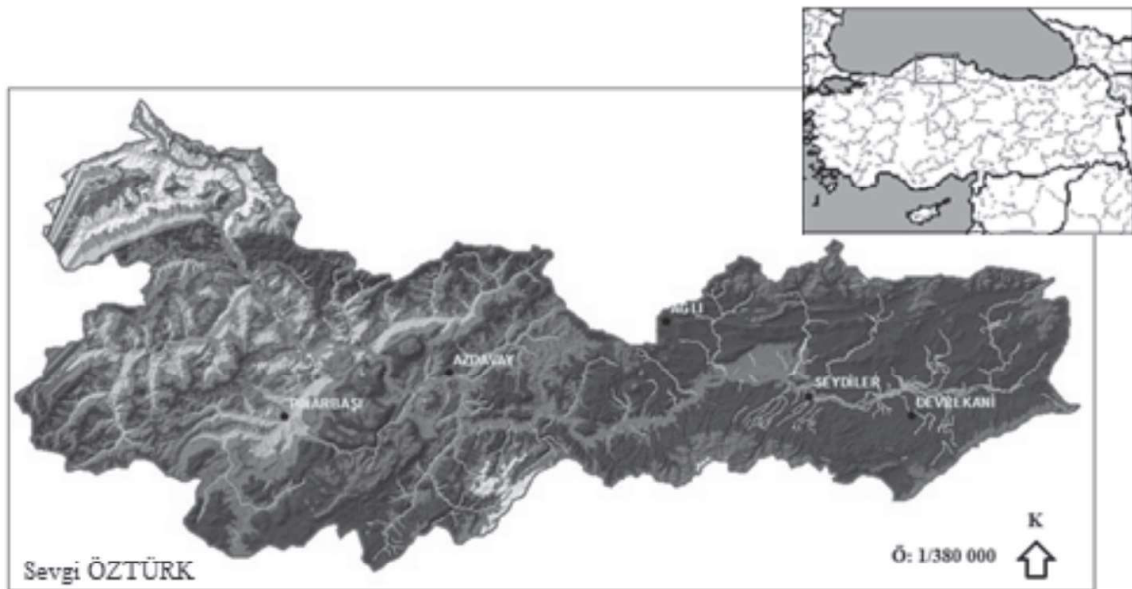
Global climate change factor makes countries interdependent. EU Water Framework Directive emphasised the river basin scale in water resources management and envisaged the preparation of river basin management plans by the candidate countries by the year 2015. The Directive strongly emphasised the participation of stakeholders, particularly ‘participation of public’<sup>5</sup>.

In this context, in order to ensure the participation, experiences and considerations of local people living in the river basin and central management group which is a decision-making group were asked in order to reveal the problems and potentials related to the field. R’WOT analysis is used for this purpose.

## EXPERIMENTAL

*Data collection.* In order to obtain information about the situation regarding water resource management, the institutional structure of Turkey and predictions of the EU Water Framework Directive, relevant domestic and foreign literature survey were implemented.

*Field analysis.* In this section, all kinds of literature and field work related to the Devrekani river sub-basin were implemented. An area of 2322 km<sup>2</sup> within western Black Sea basin which covers a field of 29 598 km<sup>2</sup> in Turkey is bordered by the Black Sea in the north, by Gokirmak in the east and the south-east, by Arac in the south, by the Bartın river basin in the west. It covers some parts of Alan, Devrekani, Daday, Agli, Seydiler, Pinarbasi, Azdavay and Cide districts (Fig. 1). Furthermore, part of Kastamonu – Bartın Kure Mountains National Park which is one of the Europe 100 hot points and Turkey 9 hotpoints and the only national park being a member for PAN Parks certification system in Turkey is located within the study area<sup>6</sup>.



**Fig. 1.** The Devrekani basin borderline

*R'WOT analysis.* After identification of the field it was aimed to reveal problems and potentials of the Devrekani river sub-basin. For this purpose, the data related to the field and the views of the centralised management and local people among the river basin interest groups were used. In this sense, R'WOT analysis which is created through the use of the SWOT analysis which is a threshold synthesis prepared by taking the opinions of river basin interest groups (expert group, the centralised and local management) together with the Ranking and Linear Combination analysis was used and evaluated. The analysis was first used by Yilmaz<sup>7</sup> in Turkey in the field of forestry. The purpose of the use of this analysis is to evaluate SWOT factors systematically, render the effect of the factors measurable and increase the value of SWOT analysis. R'WOT analysis consists of 3 stages. The first stage is creating the SWOT analysis. For this purpose, the public institutions and agencies responsible for water resources (the Kastamonu province private administration, 23 regional directorate of state hydraulic works (DSI), environment and forestry provincial directorate of Kastamonu, Kastamonu provincial directorate of agriculture, Kastamonu public health laboratory branch office, Kastamonu province culture and tourism office, provincial bank of Kastamonu regional directorate, representatives of related personnel and expert group within the employees of Agli, Devrekani, Seydiler districts) were asked to create SWOT analysis data specific for the field. Since the human brain can compare maximum  $7\pm 2$  elements at the same time<sup>8</sup>, the number of SWOT factors in each SWOT group was observed to be not bigger than 9. In the second stage, first the representatives of central government and local people were designated. A total of 9 expert representatives employed in Central Government departments responsible for

water resources (Environment and forestry provincial directorate of Kastamonu, the Kastamonu provincial directorate of agriculture, state water works (DSI) 23, regional directorate, directorate of health, public health laboratory Kastamonu branch office, the Kastamonu regional directorate of urban bank, the Kastamonu province culture and tourism directorate, Agli, Seydiler and Devrekani district governorships) were interviewed.

The number of village headmen needed to be discussed for the local people representatives among totally 142 villages in the river basin field was calculated using cross-sectional method. In this calculation, the formula  $n = (Z^2NPQ)/(ND^2 + Z^2PQ)$  was taken into account and 50% frequency ( $P$ ) and 15% ( $D$ ) sampling error were adopted.  $Q = 1 - P$ , the number of villages  $N = 142$ ,  $Z_{\alpha} = 1.960$  (the theoretical value of a certain level of relevance  $Z_{\alpha}:\alpha = 0.05$  for 1.960) and confidence coefficient was accepted as 95% (Ref. 9). Thus, the number of village headmen to be reached was calculated as  $33.43 \approx 34$ . Weighted averages were taken into consideration in the distribution of the number of village headmen by districts, the numbers of the village headmen interviewed were for Azdavay 8 out of 33 villages, for Cide 5 out of 21 villages, for Devrekani 7 out of 30 villages, for Pinarbasi 7 out of 37 villages, for Daday 2 out of 10 villages, for Agli 1 out of 4 villages, for Seydiler 4 out of 16 villages.

During discussions with representatives of central government and local people, they were asked to make comparison to determine which SWOT groups and SWOT factors within SWOT group are more preferable (important). This sorting process is realised through 'the 9-grade scale'. In this scale the following numbers (values) are used for the indicated meanings: 1 – important in low proportion, 3 – less important, 5 – moderately important, 7 – more important, 9 – extremely important. Besides them 'the values 2, 4, 6 and 8' can be used for moderate values. Therefore, the relative priority values of SWOT groups and SWOT factors in each SWOT group are calculated on the basis of the order given to each SWOT group or SWOT factor. For example, if it is accepted that a decision-maker ( $k$ ) gave an order such as  $r_{jk1}, r_{jk2}, \dots, r_{jkm}$  to SWOT factors belonging to ( $j$ ) SWOT group, then  $X_{ji}$  value which is the relative priority value of ( $i$ ) SWOT factor in ( $j$ ) SWOT group can be calculated by using ranking analysis (RA) as follows:

$$X_{ji} = \frac{\sum_k r_{jki}}{\sum_i \sum_k r_{jki}} \quad (i = 1, 2, \dots, m)$$

In the third stage Linear Combination Analysis, the priority of SWOT factor in a specific SWOT group is obtained by multiplying the relative priority value of SWOT factor and the relative priority value of SWOT group including this factor. Therefore, mathematically a 'linear combination' process is carried out and

by putting the relative priority values of the SWOT factors to the same scale they becomes comparable with each other<sup>7</sup>.

In this way, the final priority value of each SWOT factor included in the relevant SWOT group is reached. This process is carried out separately for each of the 4 SWOT groups.

Linear equation used in this technique can be displayed as follows:

$$P_{ji} = W_{ji} X_{ji},$$

where  $P_{ji}$  is final priority value of ( $i$ ) SWOT factor of ( $j$ ) SWOT group;  $W_{ji}$  – relative (also final) priority value of ( $j$ ) SWOT group including ( $i$ ) SWOT factor;  $X_{ji}$  – relative priority value of ( $i$ ) SWOT factor of ( $j$ ) SWOT group.

*Implementation of the R'WOT analysis for the Devrekani river sub-basin on central government and local people groups.* The results of the R'WOT analysis implemented on the representatives of both central government and local people are shown in Table 1. Thus, the central government representatives preferred among the SWOT groups: the strengths (0.287), opportunities (0.286), threats (0.238) and weaknesses (0.189) groups as the highest priority, the 2nd priority, the 3rd and the relatively lowest priority groups, respectively. The local people representatives preferred among the SWOT groups: weaknesses (0.257), strengths (0.256), threats (0.249) and opportunities (0.238) groups as the highest priority, the 2nd priority, the 3rd and the 4th priority SWOT groups, respectively. According to the central government the values of the strengths, opportunities and threats groups are close to each other. The weaknesses group has less (1.3 times) priority according to these groups. Local people living in the region which can reach conclusions about the future more clearly and can perform tangible approach to problems and solutions chose the weaknesses group with higher priority in accordance with the central government.

**Table 1.** Results of R'WOT analysis related to the central government and local people\*

SWOT groups	C.G. priority		SWOT factors	L.P. priority	
	2	3		5	6
Strengths	<b>0.287*</b>	0.256	Environmental layout plan (1/100 000) has already been approved Floor agricultural land in the river basin is high Low population density constitutes a pressure on natural resources The Devrekani river water quality and quantity are high It is a virgin river basin Existence of protected areas with high natural and cultural resource values* Existence of forest and pasture areas in the field** The lack of development of industry sector	0.037 0.033 0.038 0.032 0.036 <b>0.039</b> 0.034 0.036	0.032 0.030 0.029 0.028 0.029 0.036 <b>0.040</b> 0.031
Weaknesses	0.189	<b>0.257**</b>	Economic failure (distance to the tourism and industrial markets, inadequate promotion of source values)** Negative effect of continuous migration on spatial development Lack of infrastructure (transportation, sewage, agricultural infrastructure)* Lack of qualified employee* Lack of civil society initiatives Potential flood risks because of the lack of river training The risk of erosion created by the structure of fractured and uneven terrain Agricultural land has fragmented structure Low level entrepreneurial activity of private sector	0.021 0.016 <b>0.025</b> <b>0.025</b> 0.022 0.019 0.020 0.020 0.023	<b>0.033</b> 0.030 0.032 0.023 0.030 0.031 0.020 0.028 0.029

to be continued

Continuation of Table 1

1	2	3	4	5	6
Opportunities	0.286	0.238	Farmers training performed by the Provincial Directorate of Agriculture Solid waste disposal facilities has already been planned Ecotourism potential is high* Existence of lands suitable for organic farming and potential for rich non-wood forest products (medicinal and aromatic)* HEPPs provide energy and irrigation potential Ever increasing of the traditional livestock sector and the rates of high yield breeds and designation of the need for organised livestock industry by the appropriate units** Development of fruit growing and the wood-based handicrafts unique to the region Breeding Cattle and Honey Producers Associations are router in the river basin	0.031 0.038 <b>0.044</b> <b>0.044</b> 0.029 0.034 0.036 0.030	0.024 0.032 0.029 0.029 0.026 <b>0.036</b> 0.029 0.032
Threats	0.238	0.249	Impact of HEPPs on the natural resource values Lack of solid waste disposal facility, domestic and industrial waste treatment facilities and lack of interest** Impact of mineral exploration and extraction activities on natural resources Seismicity status Conventional agriculture is activated in the river basin The lack of river basin management plan creates the risk of conflict in sectoral development Decrease in productivity of agricultural lands downriver of Kulaksizlar and Beyler dams (sediment flow) Unconscious agricultural activities	0.034 <b>0.036</b> 0.031 0.020 0.027 0.030 0.025 0.035	0.035 <b>0.040</b> 0.036 0.024 0.025 0.034 0.026 0.028

\* The highest priority factor for central government; \*\* the highest priority factor for local people.

According to the central government, which is the decision-maker group of the field, the most important strength (0.039) is the factor of ‘the existence of the protected areas having higher natural and cultural resource value (Kastamonu-Bartın Kure Mountains National Park, wildlife development zone, natural and archeological protected areas)’. This preference shows that the central administrators of the decision-making group are aware of the natural assets to be protected which are important for the area. The local people chose the factor of ‘the presence of forest and pasture areas’ (0.040) as the highest priority factor. The representatives of the villages benefitting from forest resources particularly the villages belonging to Azdavay, Pınarbasi and Cide districts and the villages of Devrekani district giving particular importance to the livestock have understood the importance of the existence of these areas. ‘Lack of infrastructure (transportation, sewage, agricultural infrastructure, etc.)’ and ‘lack of qualified employee’ (0.025) were chosen by the central government as the most important weakness. ‘Economic failure (being far away from the tourism and industrial markets, inadequate promotion of the source values)’ (0.033) was chosen by the local people as the most important weakness. While ‘ecotourism potential’ and ‘existence of lands suitable for organic farming and potential for rich non-wood forest products (medicinal and aromatic)’ (0.044) were the central government factors with equal highest priority, ‘ever increasing of the traditional livestock sector and the rates of high yield breeds and designation of the need for organized livestock industry by the appropriate units’ (0.036) was chosen as the highest priority factor by the local people. Significant potentials of the field were discovered by the participants and designated as the highest priority factors. The biggest threat for the field according to the central government (0.036) and the local people (0.040) by a common conclusion is ‘the lack of solid waste disposal facility, discharge of municipal wastewater (sewage) to the river basin, the lack of treatment facilities in industrial companies and CSR’.

## RESULTS AND DISCUSSION

When the water resources management in Turkey is examined, it is observed that there are a lot of troubles with regards to the laws and sanctions such as the boundaries of the river basin do not overlap with the administrative boundaries, there are a lot of institutions having authority, participation is not kept in the forefront and remains unfulfilled, institutions do not join forces with each other, there is no database on water resources and river basins, monitoring and supervision remains insufficient because of this situation, there are more than 70 laws and regulations related to water resources, the policies are short-term.

In the study, which was considered to be the base of the management plan and envisaged by the EU Water Framework Directive, it was tried to obtain participation by R’WOT analysis prepared by receiving the opinions of the central government

and local people. It is proposed to use the obtained results to determine the issues and priorities from the stages of river basin management plan, to develop the ideal goals and constraints that create barriers to achieving these goals, implementation objectives, activities.

R'WOT analysis was implemented with total 43 participants comprised of 34 local people representatives and 9 central government representatives in order to put forward the views and attitudes of these interest groups. According to the results of this analysis, the adverse effects of wastewater and solid wastes on natural resources were considered as a significant threat. Central government detected the lack of infrastructure and technical staff having skills necessary for working on the region and the local people focused on the region labour shortage for the weaknesses of SWOT group. For the opportunities group related to the field, the members of central government, the assessment of the potential of ecotourism and non-wood products of as an alternative source of income and local people preferred to support and encourage the traditional livestock sector. The local people associated the importance of pasture areas with livestock factor and chose as the highest strength. The central government stated that the protection-utilisation balance of the national park, wildlife enhancement area, archaeological and natural protected areas must be ensured and correlate with ecotourism by seeing the long-term positive aspects.

## CONCLUSIONS

When all results obtained were evaluated, the need for a new structuring on the river basin scale has emerged. With the addition of the international agreements to the dispersed structure of legislation in the country related to water resources a more complex management and legal structure emerges. In this sense, it is necessary to simplify the legislation taking into account the international commitments, to use natural boundaries in river basin management and to adopt integrated river basin management structure valid in the many countries around the world by eliminating the authority mess.

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