



Stakeholder participation to watershed management: A case study from Beyşehir Lake Basin

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Abstract

This study addresses Beyşehir Lake Basin, which is the largest freshwater lake in Turkey. The aim of the study was to explore the knowledge, perceptions and behaviors of local communities regarding; the critical problems of the basin; technical and political situation of the water management in the basin; possible strategies ensuring positive change towards the sustainability of the basin; and the watershed management strategies which could contribute to success in this case. The participatory level of the local water users of the basin was also examined. The results revealed that local communities were aware of the basin's problems and contribution of the participatory approaches to watershed management. Also, collaboration between the public and public institutions was accepted as key to successful watershed management. The stakeholders, who considered that current water policies to solve the problems of the basin were ineffectual, relied on the local environmental groups more than central government and local authorities regarding their water policies.

Key words

Beyşehir Lake Basin, Local community, Stakeholder participation, Watershed management

Introduction

Integrated water resources management is described as a multi-layered system approach to water management integrating relation between surface and groundwater quantity and quality; relation between water and land use; relation between water and stakeholder interests; and coordination between water institutions (Warner, 2007). Participation of users representatives and other relevant social actors of the basin are part of the new value added to the participatory water policies at watershed level (Moreyra and Warner, 2007). Watershed management typically concerns several stakeholders with conflicting views. The success of any watershed project and its sustainability depends on people's participation (Yoganand and Gebremedhin, 2006). Stakeholder input is a key to successful watershed management (DeSteiguer *et al.*, 2003). For achieving the desired participation of people, the role of community organizations, groups and other stakeholders is crucial (Yoganand and Gebremedhin, 2006). At this point stakeholder analysis is considerably important in understanding complexity

and compatibility problems between objectives and stakeholders in watershed management policies.

Stakeholder analysis refers to a range of tools for identification and description of stakeholders on the basis of their attributes, interrelationships and interests related to a given issue or resource. According to Ramirez (1999), there are several reasons for carrying out stakeholder analysis: empirically to discover existing patterns of interaction; analytically to improve interventions; as a management tool in policymaking; and as a tool to predict conflict. The stakeholder analysis is useful in improving the selection, efficiency, and effectiveness of policies and projects –the explicit considerations of potential trade-offs between policy objectives and stakeholders' interest helps avoid the unexpected, facilitate good design, and improve the likelihood of good implementation; better addressing the distributional and policy impacts of policies and projects—explicit analysis of the interest of, and impacts of intervention on different stakeholders can help ensure that costs are borne and benefits are realized by those intended. This study addresses Beyşehir Lake Basin (BLB)

and assesses the knowledge, perceptions and behaviors of the local communities in this connection.

Materials and Methods

Beyşehir Lake, a Ramsar wetland site of international importance with respect to its fauna and economic function, is one of the largest freshwater lakes in Turkey, with natural beauty, rich bio-diversity and biggest fresh water source in the region. The lake is located on the southwest side of Konya Closed Basin, which is the biggest closed basin in Anatolia, lying within the

borders of Konya and Isparta provinces. Beyşehir Lake and Kızıldağ National Parks have been designated as "National Parks". A large proportion of the basin is thus under protection. There are conservation statutes as "I., II. III. Degree Natural Protected Areas" and "Archeological Protected Areas" in the basin. As the lake supplies fresh water for human consumption, its water quality is governed by Turkish "Water Pollution Control Regulations". It is also an "Important Plant Area- IPA", with third largest lake ecosystem in the southeast of Lake District in Turkey (Ozhatay *et al.*, 2003). Beyşehir Lake acquires Important Bird

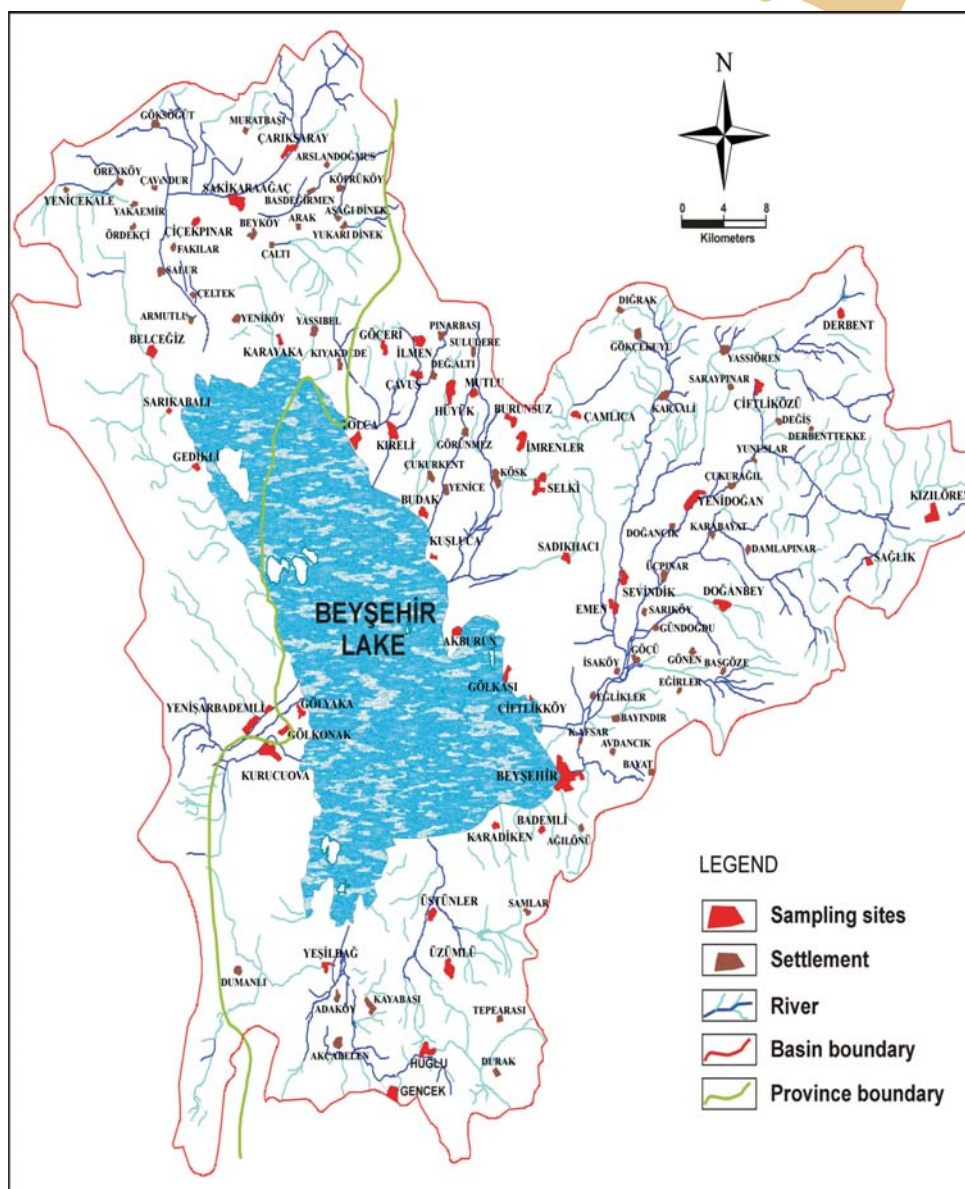


Fig. 1 : Study area

Areas (IBA) status due to major number of migratory water birds.

The present case study was centered on knowledge, perceptions, and behaviors of BLB's local communities. In this context, a field survey was conducted in 44 different basin settlements in March and April, 2010. A total of 457 household questionnaires (approximately 1.7 % sample size) were performed to determine the basin's critical problems; the technical/policy status of the basin's management; strategies to provide the sustainability of the basin; success criteria of watershed management; and participation level in the studies to protect the basin from the perspectives of local communities. The questionnaires were performed face to face by visiting all the settlements. Following a pilot study by the authors, a professional survey team has been trained and the rest of the survey has been completed by this professional team.

Results and Discussion

The data obtained was entered and analyzed using statistical techniques appropriate for the type of question. Table 1 shows the socio-economical characteristics of the respondents. Majority of the participants belonged to 46-60 age group (38.3%). Common occupation groups were retired persons (30.6%), farmers (20.1%), workers (15.8%) and craftsmen (15.5%). Participants whose livelihoods directly depended on the lake (fishermen) were at the level of 2.6% and the unemployment rate was low (1.1%). Average family size was 3.8 in the basin. Nearly all the participants were native of the study area (98.2 %). Their monthly income was very low. Only 9.0 % of the participants were university graduates.

The main contribution of the lake to the local people is drinking and agricultural water supply. The local people basically derived benefit from the lake such as drinking water supply (42.2%), economic activities such as fishing and cutting rush (28.4 %), landscape and recreation (21.9 %). The rate of tourism and sightseeing of bird or wildlife was very low (max. 2 %) (Fig. 2).

The current problem in the basin, overrated by the local people, are as follows: reduction in quantity or quality of the lake water, deficiencies at coastal regulations and infrastructure, reduction in fish and other life forms, agricultural pollution, etc. excessive water consumption for agricultural purposes, difficulty in accessing water and inequalities, etc..Institutions authorized at watershed management developed proposals without observing the problems of the area and did not apply the knowledge and experience of the people, were not concerned with the basin's problems and worked without co-operation. Institutions dealing in politics fulfilled their promises keeping their individual interests at forefront, and were uncontrolled.

Majority of the basin residents considered that the lake's water quality has worsened (47 %). However, the water quality was considered "better", as 28.2 % and 18.4 % of the people stated that water quality was same, however, 3.7 % of the participants stated that they had no idea.

Intensive use of fertilizers and pesticides in agricultural and urban areas is considered to be the primary reason for reducing the water quality of Beyşehir Lake (25.8 %) (Fig. 3). Furthermore, toxic chemicals in urban wastes such as oil,

Table 1 : Descriptive statistics of socio-economic variables

Variable	Category	Percentage/ average	Variable	Category average	Percentage
Gender:	Male	98.5 %	Average family size:	Person	3.8
Marriage status:	Married	90.6 %	Origin:	Native	98.2 %
Age:	Years	47.6	Monthly income:(TL /household)	Less than 500	15.1 %
Occupation:	Skilled labor (private sector)	2.0 %		501 – 750	37.4 %
	Employer	2.2 %		751 – 1000	29.3 %
	Craftsman	15.5 %		1001 – 1500	10.9 %
	Worker	15.8 %		1501 +	6.8 %
	Farmer	20.1 %		No response	0.4 %
	Fisherman	2.6 %	Education:	Illiterate	2.4 %
	Retired	30.6 %		Non university	88.6 %
	Student	0.7 %		University	9.0 %
	Administrator (public/ private sector)	1.3 %	Environmental group membership:	Yes	2.6 %
	Officer (public/ private sector)	8.1 %	Attending meetings about BLB' s problems:	Yes	7.0 %
	Jobless	1.1 %	Request to participate in the efforts to resolve BLB' s issues:	Yes	91.9 %

*1TL (Turkish Lira) = 0.5 Euro (aprox); Source: Authors' own elaboration

detergent, etc. (22.5 %), defective septic tank systems (20.3 %) and release of untreated industrial waste waters into the streams reach the lake (12.1%) and there by decrease the water quality. The effect of improperly managed construction sites (or agricultural and forest areas and sediments from eroded stream beds), salts from irrigation practices and bacteria from livestock also add to poor water quality, which otherwise were ignored by the local communities.

A large part of the local communities (75.9%) agree that pollution caused by waste water in the basin is a major problem and need urgent attention. In line with this view, "the efforts to improve water quality (current and future) in the basin" is now

considered to be important (19.9%). Studies aiming in improving water quality are now being considered important by almost all the local communities (96.1%). Problems faced due to water pollution in Beyşehir Lake (such as reduction of fishing, unsuitability for swimming, spread of bad odor, reduction of drinking water quality, public health issues, etc.) is now being considered important by the local people. However, the problem of lake becoming unsuitable for swimming is given less attention as compared to other problems. Responses of local communities show that they were aware of the impacts of crop pattern and irrigation techniques to the water use, additionally they were willing to take precautions to save water in agriculture (Table 2).

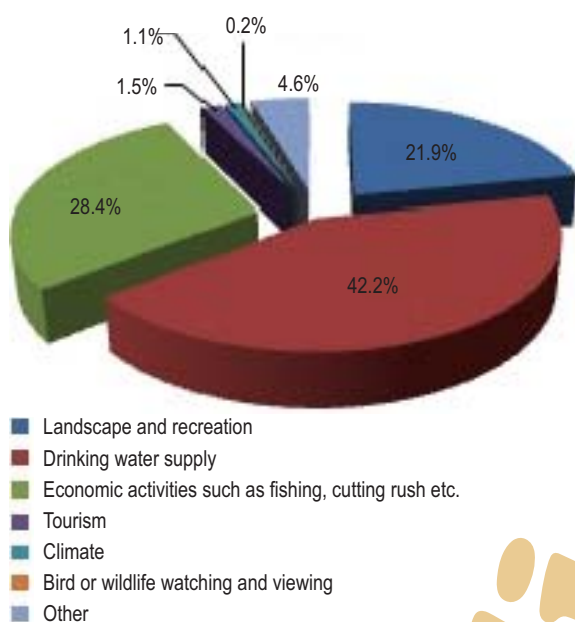


Fig. 2 : Benefits of the local communities from the lake

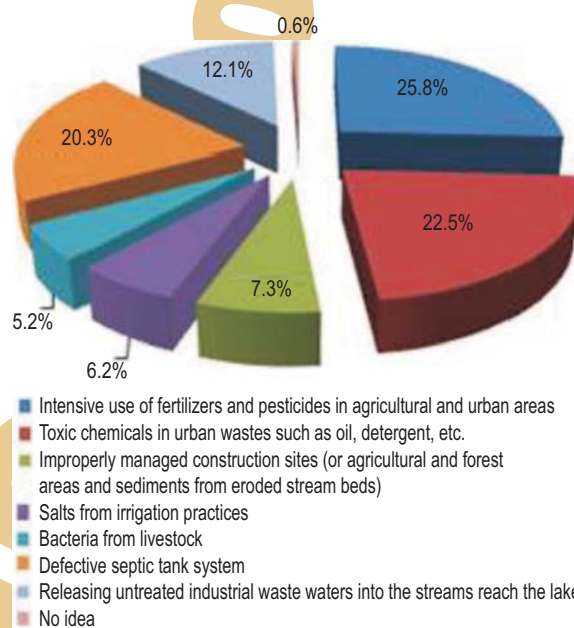


Fig. 3 : Factors affecting water quality reduction

Table 2 : Views of local community concerning the strategies intended for improving the water level

Judgments	Index of t*	Mean	P value
Low water requiring grain and vegetables should be preferred in agricultural production	+	4.1	0
Low water consuming irrigation techniques such as drip irrigation should be adopted in agriculture	+	4.4	0
Intensive use of groundwater wells should be terminated	+	4.0	0
State Hydraulic Works should stop the reduction of lake's water via irrigation projects	+	4.4	0
Researches on plant and animal communities in the basin should be performed	+	4.5	0
Conservation areas like National Parks, Natural Sites, Archaeological Sites, etc. are beneficial in maintaining environmental values of the basin.	+	4.0	0
More wetland protection area should be established in the basin.	+	4.2	0
Regional officers should encourage the establishment of local environmental groups regarding the Beyşehir Lake.	+	4.3	0

* According to One Sample t Test at the P < 0.05 significance level if "t" value is +, it means participants agree with the judgments. At P < 0.05 significance level if "t"-value is -, it means participant disagrees with the judgment. At P > 0.05 significance level regardless of the sign of "t"-value, it means participants "have no idea" about the judgment

Questionnaire participants did not support the idea of "Intensive use of groundwater wells should be terminated in order to improve the amount of Beyşehir Lake's water" which deals with illegal wells (4.0 mean level). Local people using groundwater through wells (especially in dealing with the agricultural sector) may be abstained from overuse and their use be limited. Local people felt that "moving the lake's water out of the basin via irrigation projects-especially Project of Konya Plain" was prime reason for reduction in the lake's water quantity. They largely supported the researches carried out on plant and animal communities of the basin. However, the idea of "conservation steps like National Parks, Natural Sites, Archaeological Sites, etc. were beneficial in maintaining environmental values of the basin", which were less supported by the participants. They repeatedly expressed that National Parks limited the actions of the basin's people and effective conservation cannot be performed *via* prohibition. In addition, majority of them supported the construction of more wetland protection area. Encouragement of the local governments in establishing local environmental groups, regarding Beyşehir Lake, is a useful approach in solving the problems of the lake (Table 2).

Local people were aware of the importance of protecting water, even if it means less economic development. People shared the view that their lives were connected to good water quality, in addition realized that quantity and quality of lake water was a major threat in front of economic and social development. Therefore, full cooperation of the people of the basin in spreading

Table 3 : The reasons of local people for not believing in the Central Government departments for making sound decisions to solve the basin's problems

Reasons:

- [35]Incurious attitudes to the region's problems.
- [9]Not abiding by promises to the local people.
- [8]Absence of any activity for the basin.
- [8]Keeping own interests at forefront.
- [6] Making policy.
- [6]Following wrong policies.
- [4] Insufficient applications.
- [2]Lack of coordination.
- [2]Do not having enough information
- [1] State does not consider the facts of the region.
- [1] Lack of control.
- [1] Wasting sources.
- [1]Producing table-top solutions.
- [1] Disowning the projects.
- [1] Being late in responding to the problems.
- [1]Authority conflicts.
- [1]Lack of sufficient appropriations.
- [1] Lack of a deputy from the region.

Level of distrust: 19.9 %; * Values given in parenthesis refer the entities who share this view

the awareness about water quality and protection would help in preserving the lake.

The main information of the local people, regarding the environmental issues of the basin, was personal observations and experiences (33.5%), TV and radio (22.3%), friends (12.8%), and local government units of the basin (12.6%). In addition, despite the fact that the rates were low, journals and magazines, government agencies, environmental organizations, local institutions such as Beyşehir Lake Basin Municipalities Association, Irrigation Association, Agricultural Development Cooperatives, Agricultural Chambers, etc. and internet were most effective in spreading environmental awareness among local people.

Almost all the respondents (97.8 %) stated that "everybody owed the responsibility protecting water quality and quantity of Beyşehir Lake. Most of the local communities (81.7 %) accepted lake as a part of their life. Despite the fact that their environmental awareness was high, it was observed that only 2.6 % people participated in any local/national organization. In addition, only 7 % of the respondents participated in the meetings related to BLB problems during the last two years. But majority of them (91.9 %) were willing to participate in the studies to protect the basin.

Confidence levels of local communities to the institutions effective in management of BLB and their views on the obstacles that strike or delay basin conservation practices were: 19.9 % of

Table 4 : The reasons of local people for not believing in provincial government units of ministries related to water management making sound decisions to solve the basin's problems

Reasons:

- [11]Incurious attitudes to the region's problems.
- [8]Neglecting their duties.
- [7] Political approaches.
- [4] Lack of researches and studies.
- [4] Keeping own interests at forefront.
- [2] Insufficiency of solutions.
- [2] Lack of control.
- [2] Producing table-top solutions.
- [2] Being late to the problems, not being cautious before.
- [2]Authorities-being inexperienced.
- [1] Financial inability.
- [1] Not inspiring confidence.
- [1] Lack of coordination, authority conflicts.
- [1] Lack of the compatible business ambience.
- [1] Following wrong policies.
- [1] The idea that they can do nothing.
- [1] Legal deficiencies.

Level of distrust: 12.9 %; * Values given in parenthesis refer the entities who share this view

Table 5 : Reasons of local people for not believing on local governments in making sound decisions to solve the basin's problems

Reasons:
[7] Keeping own interests at forefront.
[6] Lack of studies.
[4] Neglecting their duties.
[4] Disinterest.
[4] Political approaches.
[3] Following wrong policies.
[3] Financial power inability.
[3] Not abiding by promises to the local people
[2] Lack of actions.
[2] Differences in political opinion.
[2] Having limited opportunities to solve the problems.
[2] Making policy.
[1] The thought of "only local people can solve the problems"
[1] Being unconscious
[1] Lack of control and ignoring trend of errors.
[1] Not generating permanent solutions.
[1] Incurious attitudes to the region's problems.
[1] The idea that they can do nothing.
Level of distrust: 12.3 %; *Values given in parenthesis refer the entities who share this view

Table 7 : Views of local people regarding the reasons making the public institutions' watershed projects and implementations ineffective

Reasons:
[26] Lack of plans and projects.
[24] Lack of studies.
[11] Insufficient and ineffective projects.
[9] Wrong policies being followed.
[5] Lack of coordination.
[4] Lack of interest.
[3] Keeping own interests at forefront.
[3] Talking with assumptions.
[2] Not to phase out projects.
[2] Not producing solutions.
[2] Financial problems.
[2] Lack of resource transfer.
[2] Differences of political opinion.
[2] Prohibitionist approaches.
[1] Decrease of fishery.
[1] Lack of knowledge and experience.
[1] The lack of deterrent penalties.
[1] Moving the lake's water out of the basin via irrigation projects - especially Project of Konya Plain.
[1] Acting without the knowledge of local communities.
[1] The idea of "they can do nothing for their profitability".
[1] Existence of table-top solutions.
[1] Distrust to the content and success of the projects.
[1] Political approaches.
[1] Apathetic and deficient political approach.
[1] Not caring the region's problems sufficiently.
Local people consider public institutions on watershed projects and implementations as ineffective: 25.6 %; *Values given in parenthesis refer the entities who share this view

Table 6 : Reasons of local people for not believing in on local environmental groups for providing accurate information and making sound decisions

Reasons:
[5] Working in the direction of the interests of own or others'.
[4] Being unaware of the problems or not caring.
[4] Working partial.
[3] Lack of studies that yield useful.
[2] Not providing accurate information.
[2] Lack of researches
[1] Not trusting in their work.
[1] Producing problem instead of producing solution.
[1] Keeping economic interests at forefront.
[1] Not taking account of the lake's problems.
[1] Playing act.
[1] Neglecting the local people.
[1] Political approaches.
[1] Have limited opportunities to solve the problems.
[1] The idea that they can do nothing.
Level of distrust: 8.3 %; * Values given in parenthesis refer the entities who share this view

Table 8 : Views of local people regarding the reasons making plans and projects of environmental organizations ineffective

Reasons:
[18] Lack of plans and projects.
[16] Lack of studies.
[12] Wrong policies being followed.
[9] Disinterest.
[4] Financial problems.
[3] The idea of "not can be successful without a State Project".
[3] Not abiding by promises.
[2] Importance of loss of fishery.
[2] Not having good practices.
[2] Being unconscious.
[2] Political view differences.
[1] Not acting together.
[1] Not producing comprehensive solutions.
[1] Lack of control.
[1] The idea of "cannot be successful without local people's participation".
[1] Keeping individual interests at forefront.
[1] Inter-institutional conflicts.
[1] Working away from professionalism.
Local people considering plans and projects of environmental organizations ineffective: 18.2 %; * Values given in parenthesis refer the entities who share this view

local people did not believe in Central Government Departments making sound decisions in solving the basin's problems. Main reasons indicated by the individuals in this view were: incurious attitude of Central Government Departments; keeping region's problems at the background, not abiding the promises given to

Table 9 : Overrated success criteria for BLB's watershed management from the perspectives of local communities

Entity	Criteria
170	Cooperation between the public and public institutions, acting together.
89	Financial support.
24	Both relevant institutions, as well as local people should give importance to cleanliness of the lake.
21	Relevant institutions should develop effective projects.
17	Raising awareness among local people about water consumption, importance of water and existing problems.
17	A conscious use of water and turning to savings in water consumption for agricultural purposes.
13	Termination of water distribution out of the basin.
11	Institutions have inter-agency coordination and the spirit of teamwork and work effectual.
8	Government should care and support the local issues, provide economical resources.
7	Surrounding settlements should not use the lake's water, water consumption should be local.

local people; absence of any conservation activity in the basin; keeping their own interests at forefront; and making and following wrong policies (Table 3).

12.9 % of local people did not believe in Provincial Government units of ministries related to water management, making sound decisions in solving the problems of the basin. Main reasons indicated by the individuals in this view were: shrugging off the region's problems; making policy; lack of research and studies; and attendance to their individual interests (Table 4). 87.7% of local people relied on local governments in making sound decisions in solving the basin's problems. The reasons primarily cited as the cause of distrust to local governments in the basin were: political approach of local governments while solving the problems and keeping their private interests at the forefront (Table 5).

People of the basin relied on the local environmental groups more than the Central Government as they felt that local government provided accurate information in making sound decisions (91.7 %). Reasons cited mostly by the individuals who didn't trust local environmental groups were: working in the direction of the interests of their own or others'; being unaware of the problems; working partially; and lack of studies on useful yield (Table 6).

Local communities considered that current water policies in solving the problem of the basin were ineffective. 74.4 % of local people supported the plans and projects of public institutions related to protection of the basin. Reasons cited mostly by the individuals who didn't supported the studies of public institutions were: insufficient and ineffective projects and following wrong policies (Table 7).

18.2% of local people told that the plans and projects of the environmental organizations, in protecting the basin, had failed. Main reasons indicated by the individuals were: insufficient studies, wrong policies being followed, and incurious attitude towards the problems (Table 8).

In order to assess the success criteria in watershed management activities of BLB from the perspective of local communities locals were queried, in their opinion what was the way to ensure success in the management of BLB. Stakeholder evaluation for the effective watershed management determinants are presented in Table 9.

Collaboration between the public and public institutions was accepted as the key to success by the local community of BLB (Table 9). Local people's understanding level, regarding the participatory management approach, was quite high (37.2 %). Awareness among the local people, regarding their position and possible effects in solving the basin's problem, provided a significant potential for the sustainability of BLB in enabling watershed management activities successful. In addition, 'the presence of financial resources' was regarded as the second success factor and 'raising consciousness in using water was considered essential.

This study enables guidelines for effective stakeholder participation to watershed management and provides some insights on what can be done to enhance the likelihood of watershed management success in BLB. The findings revealed that the local communities were aware of the reduction in Beyşehir Lake's water quantity and magnitude of water pollution. The success of watershed management depends on stakeholder participation. Thus, local community views should carefully be evaluated to enhance the success level in watershed management studies. Additionally co-operation between the public and government agencies should be improved (DeSteiguer et al., 2003; Yoganand and Gebremedhin, 2006).

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