

Interactions AMONG Forest Policy, Education and Research in Turkey: Policy Documents' and Managers' Perspectives

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Abstract

The success of forest policy, research, and education depends on full consideration of the needs and knowledge of each other. In parallel to this approach, the goals of the present study were to express the role and content of aspects of forest education and research in the context of documents of the current Turkish forest policy. In addition, this paper aimed to reveal the viewpoints of senior managers of the Turkish forestry organisation in terms of policy-organisation and research-education relationships. Content analysis was used in terms of analyzing the relevant components of forest policy documents and interviews with senior managers of the national forestry organisation, allowed a more in-depth analysis. The findings showed that research and universities are the most important factors in the perspective of National forestry documents. Despite this result, meetings with senior managers of the forestry organisation proved that no real institutional cooperation existed between the organisational units and the faculty of forestry colleges and universities. Creating work groups and holding workshops are several current efforts in terms of strengthening the relationship among policy, research, and education in Turkish forestry. However, some further critical actions regarding strengthening communication, collaboration and institutional relations, developing participatory approaches, and reducing bureaucracy are needed.

Keywords: forest policy, forest administration, forestry education, institutional relations, content analysis, interviews

Introduction

The process of formulating forest policy involves an intersection of varying and sometimes opposing interests, situations, and interpretations of various interests and pressure groups. Thus, forest policy development requires accurate data, proven knowledge, and up-to-date, reliable, transparent and accessible information (Arnold et al. 2014). In addition, formulating successful forest policy depends on close ties between policymakers and researchers (Janse and Konijnendijk 2007). Cumulative and multi-dimensional research findings can be used to analyze problems related to forest policy (Krott 2005).

A diffuse link exists between research and policymaking. Also, research and policy change are seldom directly related (Spilsbury and Nasi 2006). It is generally accepted that despite the availability of adequate scientific information, policymakers are often not willing to use it (Guldin 2003). However, forest policymakers have mentioned that the reason relevant data are not used and this often depends more on the research community than on policymakers themselves. This occurs because,

as Janse (2008) revealed, researchers fail to focus their projects on areas of actual informational need for policy-making.

Likewise, the general situation related to education and research is one of the policy instruments utilized in Turkish forestry. The process of developing forest policy begins with information gathering and informatics. The goals of forest policy then need to be determined at the national, regional, and local levels. Various instruments can be used in the process to reach these goals. The main forest policy instruments in Turkey are the following: 1) forest ownership, 2) legal instruments, 3) organisational instruments, 4) economical instruments (taxes and incentives), 5) information-based instruments (education–research), 6) public relations and participation (Gümüş 2004, Kuvan et al. 2007, Erdönmez et al. 2010). Of course, the iterative policy process will continue with the application and monitoring and evaluation of forest policy. The faculty members of forest research institutes take their place among various institutions related to information-based instruments through their scientific research studies and professional forestry education ac-

tivities. Scientists also play an advisory role in all stages of the policy-making and implementation process.

Furthermore, the main stakeholder groups in the forest policy process are as follows: 1) the national forestry organisation, 2) other public institutions which have direct or indirect relations with forestry, 3) political parties, 4) the private sector, 5) nongovernmental organisations, 6) local administrations, 7) women and youth, and 8) universities and research institutions (Atmış et al. 2007, Erdönmez et. al. 2010).

Universities and research institutions are well known and accepted as both policy instruments and stakeholders in the policy development process in Turkey. Thus, evaluating the relationships between decision-makers and research/science is important. In parallel to this situation, one of the goals of this study was to express the role and content of the aspects of forest education and/or science in the context of current Turkish forest policy documents. In addition, this paper aimed to reveal the viewpoints of senior managers of the Turkish forestry organisation in terms of policy–organisation and research–education relationships.

Material and Method

The main methods utilized in the study are content analysis and focus group interviews. Content analysis is used in terms of analyzing the relevant components of both forest policy and forest research/education related documents. Face-to-face meetings with focus groups allowed a more in-depth analysis.

Content analysis can be defined as a research method that makes replicable, objective, and valid inferences from texts related to the context of their use based on explicit rules (Krippendorff 1980, Weber 1990, Prasad 2008). Thus, content analysis helps researchers to examine trends and patterns in various documents. When used properly, content analysis is a powerful data reduction technique; the major benefit of content analysis comes from the fact that it is a systematic, replicable technique for compressing many words of text into fewer content categories based on explicit rules of coding (Stemler 2001). Quantitative content analysis was used in the research. The steps followed in this study in terms of this type of content analysis include the following:

1. *Formulation of the research question and objectives:* Examination of the content and approaches of Turkish forest policy in terms of forest education and research.

2. *Selection of a sample:* The main current National forest policy documents include Forestry Expert Commission Report on Sustainable Forest Management of the 10th Five-Year Development Plan (MoD 2014), Expert Commission Report on Forestry of the 9th Five-Year De-

velopment Plan (SPO 2007), the Turkish National Forestry Programme (MoEF 2004), the Strategic Plan of the Ministry of Forestry and Water Affairs 2013–2017 (MoFWA 2012), and the Strategic Plan of the General Forest Directorate 2013–2017 (GDF 2012).

3. *Forming content categories and components:* these include “University-Forestry faculty,” “Research institutions,” “forestry education,” “in-service training,” and “vocational high schools,” “science-scientist,” and “research-researcher.”

4. Determining units and counting method of analysis:

4.1. The recording unit of the analysis was determined as “words and terms.” The context units were the sentences used.

4.2. The counting of the units was performed by frequencies. The documents were loaded in a computer and the components were searched. The related parts were then read and the frequencies determined. In this stage, the words were counted and the meanings were considered. Thus, the related meanings of the text were focused upon and evaluated instead of the words. In the context of this semantic evaluation, if a word was present more than once in a sentence its frequency was considered as 1. This counting was repeated three times for a document to maintain reliability.

5. *Data Analysis:* The related results are shown in Table 1. It was possible to determine how many times the categories and components were referred to in the policy documents. The percentage of these elements in the document and the percentage in all five documents were analysed. In this way, the place and weight of the elements in the national policy documents were evaluated.

Face-to-face interviews were also organised with certain senior managers who have a range of tasks in the Ministry of Forest and Water Affairs and the General Directorate of Forestry. The participants were selected based on their decision-making power and relevance to the subject. Snowball sampling was used. At the beginning of the research, the interviewees were determined in terms of their position in the organisational chart. The General Director of Combating Desertification and Erosion, Vice General Director of Nature Protection and Natural Parks, Vice General Director of Forestry, and the head of the Strategy Development Department, the General Directorate of Forestry, were determined as the main participants. Then other reviewees were determined during the research. There were representatives from each forestry-related general directorate that works under the Ministry of Forest and Water Affairs. A total of 15 face-to-face interviews were held with general directors, deputy general directors, the head of the Strategy Development Department, Ministry advisors, the head of

Research and Development, the head of Planning and Projecting, and other department managers. The semi-structured interview method was used; thus, the nature of the questions was determined before the meetings. However, the content was designed during the meeting depending upon the responses and desires of the interviewees. Some open-ended questions were determined and they focused on the following: 1) the demands of the Ministry of Forestry and Water Affairs and General Directorate of Forestry from science and the supply level, 2) evaluation of previous research conducted by college and/or university faculty members on needs of the forestry sector; 3) consideration and participation of faculty members and research institutions in decision-making processes; 4) consideration of developing a satisfactory relationship between science/scientists and policy/policymakers; 5) opportunities and extent of collaboration and communication, and 6) suggestions for strengthening the above interactions.

Results

Analysis of Policy Documents Related to National Forestry in terms of Interactions between Forest Policy and Forest Research

The content of the national plans related to the privileged demand of the forestry sector on the education and research institutions can be categorized as follows: 1) educate the students on various forestry subjects,

especially related to areas such as the social aspects of forestry, forest planning, resource management, multi-criteria decision-making methods, and business economics, 2) prepare and provide in-service training programmes, 3) support any projects that raise public awareness related to forestry, 4) support capacity development (e.g. development of institutionalization, improvement of processes regarding the administration system, human resources, decision-making, and financial analysis), 5) improve the quantity and quality of research studies that are useful for forest management, 6) contribute to the planning, implementation and control processes for some forestry issues, 7) build national networks that include the communication between various forestry-related institutions, 8) organise common research and education projects, 9) develop a common evaluation system for forestry education, and 10) prepare a national forestry education strategy with the participation of various stakeholders.

Furthermore, the results of content analysis provide some results regarding the weight of related factors. The Turkish National Forestry Program produced the largest number of expressions related to research and education (frequency (f) = 184, 39.1% of all expressions; Table 1). The expression “research and researcher” (f = 162, 34.4%) is the most common among the selected expressions, followed by “University and Faculty of Forestry” (f = 110, 23.4%), and “research institution” (f = 82, 17.4%). It is understood that research is the most impor-

Table 1. Distribution of key words related to forestry education in various national policy documents

Document \ Factor	Turkish National Forestry Programme	The 9th Development Plan Forestry Expert Commission Report	Strategic Plan of the General Directorate of Forestry	Strategic Plan of the Ministry of Forestry and Water Affairs	The 10th Development Plan Sustainable Forest Management Expert Commission Report	TOTAL
University - Forestry Faculty (f)	37	13	7	12	41	110
Percentage in the document (%)	33.6	11.8	6.4	10.9	37.3	100
Percentage in all documents (%)	7.9	2.8	1.5	2.5	8.7	23.4
Research Institutions (f)	35	14	12	3	18	82
Percentage in the document (%)	42.7	17.0	14.6	3.7	22.0	100
Percentage in all documents (%)	7.5	3	2.5	0.6	3.8	17.4
Forestry education (f)	5	12	6	2	8	33
Percentage in the document (%)	15.1	36.4	18.2	6.1	24.2	100
Percentage in all documents (%)	1.1	2.5	1.3	0.4	1.7	7
In service training (f)	10	9	7	9	6	41
Percentage in the document (%)	24.4	21.9	17.1	21.9	14.7	100
Percentage in all documents (%)	2.1	1.9	1.5	1.9	1.3	8.7
Vocational high school (f)	2	3	2	-	1	8
Percentage in the document (%)	25	37.5	25	-	12.5	100
Percentage in all documents (%)	0.4	0.6	0.4	-	0.2	1.7
Science-scientist (f)	17	9	6	-	3	35
Percentage in the document (%)	48.6	25.7	17.1	-	8.6	100
Percentage in all documents (%)	3.6	1.9	1.3	-	0.6	7.4
Research-researcher (f)	78	28	13	8	35	162
Percentage in the document (%)	48.2	17.3	8.0	4.9	21.6	100
Percentage in all documents (%)	16.6	5.9	2.8	1.7	7.4	34.4
TOTAL FREQUENCY	184	88	53	34	112	471
TOTAL PERCENTAGE (%)	39.1	18.7	11.3	7.2	23.7	100

tant factor from the perspective of forest policy documents in terms of forestry education and research. In addition, Universities, faculty members, and Research institutions are accepted as important components of forest policy development and education/research interaction.

Current nationwide programmes and plans also have a greater amount of expressions when compared with current strategic plans. Strategic plans contain only 18.5% of all the related terms. This negative situation (in the sense of strategic plans lacking these terms) occurs because strategic plans depend on the need of planning for organisations in changing environmental situations, so they must have dynamic properties. Therefore, it is critical to express the relationships and related solutions as strategic in strategic plans to maintain a sustainable and long-term approach.

Analysis of Approaches of the Senior Managers of Forestry Organisation

Interviews with senior forestry organisation managers revealed that some applications were supported by participating scientific bodies. The opinions of the scientific bodies were considered during the “norm staff” planning processes, and were consulted during the development of the Forestry Information System. In addition, working teams were formed to conduct Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis during the strategic planning process. A draft was prepared and shared online for evaluation by the stakeholder groups. Scientific contributions of expert commission reports, which were prepared for national 5-year development plans, were also considered during the preparation phase. Participation of forestry organisation staff representatives at meetings of the Deans of the Forestry Faculties was a method of communication. Aside from the institutional relationships Ministry of Forestry and Water Affairs and the General Directorate of Forestry had already built expertise fields and groups. These groups are supported by working teams organized to function for a limited period, and contain other participants such as universities, related public institutions, nongovernmental organisations, private sector representatives, and other experts.

However, in our surveys, most of the meeting participants mentioned that no real institutional cooperation existed between the organisational units and the faculty of forestry colleges and universities ($f=11$). The managers also generally preferred to contact the expert faculty members individually rather than depending on formal institutional relationships ($f=9$). They used contributions from instructors through their personal relationships. Moreover, they highlighted that the scientific research studies of faculty members often did not reflect the demands of the organisation ($f=7$). They also ex-

pressed that the research studies conducted by the faculty members were not designed to help steer the future of the forestry organisation ($f=4$). They believed that the mission and vision of the forest faculty tended to focus heavily on education and not on providing a contribution to the forestry sector ($f=4$).

Furthermore, representatives of the Nature Protection and National Parks units mentioned that they had strong working relationships with various researchers from different colleges and universities, especially in the context of their projects. However, representatives of this department expressed that they did not take contributions from these educational institutions while making institutional decisions.

Some other participants ($f=7$) stated that they took scientific publications into consideration during the decision-making process. They then employ consultancy services from various experts to acquire opinions on the drafting of the documents ($f=10$). The participants also remarked that the demands of the Faculty of Forestry members generally focused on supply of equipment and transportation vehicles for scientific research studies. These faculty members also had some need to support internships for students ($f=5$).

However, several representatives ($f=5$) mentioned that Faculty of Forestry members tried to employ a participatory method in some decision-making processes when they developed their curricula or conducted strategic planning. However, they also noted that faculty members were not successful in considering the demands of the national forestry organisation. They provided constructive criticism about three aspects of the interrelationships: 1) the representatives were generally invited from local units of the forestry organisation but not from central units, 2) the curricula developed by the faculty members did not meet the needs and demands of the organisation, and also 3) research studies conducted by the faculty members did not overlap the needs of the organisation.

The managers believed that politicians made forest-related policies; scientists were not seen as an important part of the policy-making process ($f=11$). The relationships were limited to technical, academic, and practical aspects of forestry and also provided insufficient input into decision-making and policy-making processes. The interviews were also designed to address problems related with relationships among the forestry organisation and forestry research and education, the results of which are summarized below. Some examples of quotes from the interviews are given in Table 2.

- The relationships lacked an institutional structure ($f=11$). The level and style of the dialogue depended on the attitudes of the managers and their personal relationships rather than formal institutional rela-

tionships; thus, the relationships lacked a sustainable structure.

- The collaborative study culture had not developed within the forestry sector. Thus, some protocols had been developed between the institutions but the decisions were not generally implemented ($f=8$).

- There is a lack of implemented legal and financial infrastructure related to the development of relationships ($f=7$). Moreover, the fact that a bureaucratic approach dominated the management style made cooperation more difficult.

- National science policy had popularized international research topics, causing scientists to ignore issues with a national scope ($f=7$). In addition, faculty members prioritized personal goals such as being promoted rather than making a contribution to society and to the forestry organisation ($f=3$).

- There is no effective coordination between the goals and implemented projects of the two parties ($f=5$).

- Scientists were generally reluctant to give constructive criticism related to the decisions and implementation of projects of the organisation, and the implementers were also reluctant in terms of considering research findings ($f=8$).

- The prominent aim of the organisation focused on tangible suggestions, but the results of scientific studies had a considerable amount of detail ($f=4$). Thus, the nature of scientific publications became unintelligible for the decision-makers and implementers from the forestry organisation.

- The process of conducting research was very long compared with the need for data by the decision-makers who needed applicable results in a short time, this process therefore weakened relationships and interactions ($f=4$).

- A participatory management culture had not been well adopted in all forestry-related institutions ($f=11$).

- Forestry-based research studies should prioritize socioeconomic issues because Turkey cannot focus on technical problems without solving socioeconomic-based issues ($f=6$).

- An effective organisational structure that had certain aims and tools should be developed that includes collaboration and future-based planning ($f=5$), and also the authority and responsibilities of various parties should be clearly defined ($f=3$).

- Total quality management and strategic management approaches should be integrated into forestry organisations ($f=3$).

Discussion and Conclusions

Obviously, it is not possible to create an effective forestry sector without considering the relationships

Table 2. Example quotes of expressions

Expression	Example Quotations from the Interviewees' Speeches
The relationships lacked an institutional structure	"If officials of the department contact faculties regarding scientific support there is generally no feedback" "We prefer to contact the scientists who we met earlier rather than conducting studies with faculties." "There is no institutional relationship because there is no institutional stability, especially managers and other human resources' duty areas have changed so often." "There has been a relationship between the forestry organisation and forest faculties in the historical process, but this relation is far from sustainable inter-institution relations."
Collaborative study culture had not developed within the forestry sector	"Faculties determine the themes of graduate theses by themselves. However, forestry organisation and forestry faculties have to determine the topics of graduate theses through meetings so it could be possible to meet the scientific needs of the organisation and strengthen relations" "Supporting the cooperation in terms of graduate education of technical personnel could be an effective mechanism to strengthen the collaboration between the forestry organisation and faculties." "There is no joint project making culture in forestry organisations, but it is essential in forestry, and participation of scientific bodies is important in terms of making long-term decisions, forecasting, multi-criteria decision-making" "The researchers and decision makers have not given feedback about the results of research and implementations. This situation prevents the sectoral development and collaboration"
There is a lack regarding the legal and financial infrastructure implemented related to the development of relationships	"Lack of legal arrangements in supporting relations between scientific bodies and decision makers is the main factor that affects the institutionalization of relations" "It is not possible to sustain relations between the forestry organisation and scientific bodies on a volunteer basis without making financial support" "Lack of a legal arrangement in supporting relations between scientific bodies and decision makers is the main factor that affects the institutionalization of relations" "Many scientists from faculties have been invited to meetings but they didn't join because of lack of financial infrastructure"
National science policy had popularized international research topics, causing scientists to ignore issues with a national scope	"Most scientists from universities focus on scientific projects to meet the scientific criteria in terms of their academic career" "Scientists prefer to make research projects instead of supporting national forestry organisation's activities" "Scientists from universities try to make international publications, which are away from making suggestions to national level problems" "National science policy focuses on international criteria, which is why the scientists remain insensitive to local and national issues"
There is no effective coordination between the goals and implemented projects of the forestry organisation and forestry faculties.	"Forestry faculties don't share information about lectures and scientific studies. Thus, there is no effective mechanism to maintain coordination between the needs of the forestry organisation and education-research priorities" "Scientists from universities prefer to work independently and these scientists generally prefer not to integrate forestry departments or personnel to their projects; therefore, it is not possible to build coordination." "Research priorities should be determined in a systematic way and by depending on integrated long-term plans, because today, some of the research projects are determined by individual approaches."
Scientists were generally reluctant to give constructive criticism related to the decisions and implementation of the projects of the organisation, and the implementers were also reluctant in terms of considering research findings	"When a draft (e.g. legal arrangement, policy document, institutional decision) was sent to the faculties some views and suggestions were made by some scientists and it was away from an institutional approach." "After gaining field experience, the organisation began to find that consultation with faculty members was unnecessary" "The scientists don't care about the experience of the forestry organisation staff, and forestry staff don't care about the scientists because most believe that the scientists are distant from the forestry applications and they focus on theoretical subjects"
The prominent aim of the organisation focused on tangible suggestions, but the results of scientific studies had a considerable amount of detail	"Scientific research is made just for its contribution to science, not for a contribution to society and forestry implementation" "Scientists focus on a specific subject and so they don't have a general perspective to analyze the general or macro situation; thus, it is not possible to reflect the results policies." "The research results of forestry faculties are not generally related with the priorities of the forestry organisation."

Table 2. (Continued)

The process of conducting research was very long compared with the need for data by the decision-makers.	<p>"The forestry organisation demands brief and focused solutions from scientists but the scientific research has lots of details"</p> <p>"Research results should be presented in two ways: one for the scientific arena that has details, and the other for decision makers and implementers, which contains just results and suggestions in a simple way"</p> <p>"Sometimes it is not possible to reach absolute results after the research process but the decision makers and implementers do not approve of this situation"</p> <p>"Projects on a lot of themes and areas in forestry need to be an intersection of a few small-scale projects and preliminary research, and that makes the process longer."</p> <p>"There is no integration between research projects and this makes the situation difficult in terms of reflecting research results in the policy-making process."</p>
A participatory management culture had not been well adopted in all forestry-related institutions	<p>"Invitation and participation of forestry organisation representatives to scientific meetings held by the university is very limited"</p> <p>"There is communication between the forestry organisation and scientific bodies but the power and level of effecting decisions is very poor"</p> <p>"When a draft of a legal arrangement, strategic plan etc. is prepared, the scientists are asked for their opinion and their added contribution is very low"</p> <p>"The problem is dealing with the uncertainty of the policy-making process in terms of legal procedures. Thus, national level policies are made by politicians and the interest groups' effectiveness is very limited"</p> <p>"Legal regulations related with forestry have rarely been arranged by forestry experts. Generally, political pressures and demands of private institutions affect the legislation process".</p>
Forestry-based research studies should prioritize socioeconomic issues	<p>"Forest engineers need to have deeper knowledge about public relations, forestry administration, administrative law, and forest policy to be successful land managers and contribute to sustainable development."</p> <p>"Managers and implementing staff in the forestry organisation have not really internalized the importance of social sciences in forestry; however, to solve the problems both in central and local units, social science are of critical importance"</p> <p>"Forestry does not have problems regarding technical aspects in Turkey, but social issues cause deficiency in forestry applications and inter-institutional relations".</p>
An effective organisational structure that had certain aims and tools.	<p>"Although there are some examples of participation and team working, officials who have responsibilities make the final decision; authority and responsibilities regarding decision-making should be delegated to local managers".</p> <p>"There is a lack of work sharing and exact work definitions in the context of different institutional bodies, as a result of this, relations have been affected negatively."</p> <p>"Personnel changes in management and decision-making levels affect this situation in a negative way".</p> <p>"There is a lack of institutional culture regarding joint projects or decision-making in public institutions, and that includes forestry organisations in Turkey".</p> <p>"Lack of quality of human resources affects inter-institutional interaction, because the decisions and implementations are made by personnel of the organisations."</p> <p>"Plan-focused management should be an essential principle of the organisations; therefore, institutional objectives and decisions should replace the personal attitudes and relationships".</p>
Total quality management and strategic management approaches should be integrated into forestry organisations	<p>"Some decisions are made according to international processes like the European Union integration process. In this process, some decisions are away from scientific findings and the country's situation. This approach causes problem in terms of interaction between science and policy".</p> <p>"The national forestry organisation and forestry education have a traditional management style and they are away from catching current trends and enhancing good governance".</p> <p>"There is no sustainable system in terms of implementation and controlling mechanisms of strategic planning, in particular, there is a lack regarding electronic databases".</p> <p>"The lack of standards, criteria, and indicators in terms of monitoring the management process and monitoring is a problem in terms of supporting sustainable relations."</p>

between policies, research and education. Parallel to this approach, the success of forest policy, research and education depends on full consideration of the needs and knowledge of one another (Yurdakul Erol 2015).

The findings show that research is the most important factor in the perspective of forest national plans. Despite the content of national plans, meetings with senior managers of the forestry organisation prove that forest management is not being conducted as a sustainable and corporate practice. Additionally, the questionnaire developed by Kuvan et al. (2011) revealed that regional forest directorate managers in Turkey emphasized political tendencies and preferences that outweighed scientific-technical information and data in the determination and implementation of national forest policies. The findings of Daşdemir (2012) based on the questionnaire survey of Turkey showed that only 25% of research results were considered by forestry units. Aside from not sharing organised and simplified knowledge with the project implementers of the forestry organisation, popular data transcription methods were not used and this caused problems in terms of strengthening the inter-organisational relationships (Alkan 2012). Although one of the duties of research institutes was identified as "making suggestions to politicians in the policy making process" (MoF 1999), the results of the questionnaire survey conducted by Şener (2012) also showed that just 4% of the participant researchers believed that research results played an active role in the policy-making process; most researchers believed that research studies had no effect on the process.

The interaction of science and policy was investigated by Nagasaka et al. (2016a) in Japanese National Forestry relating planning process and it was found that the scientific bodies had no influence in agenda setting but made contributions by specifying alternatives and giving science-based advice. There was also an integrating role of scientists in the discussions of subcommittees. When these results are compared with a Swedish case it is seen that scientists play an active role in proposing the organisational structure of national forest plan policy process and they have direct influence on the policy making process (Nagasaka et al. 2016b). However, the inadequate capacities of research institutions create a gap in terms of the role of science and research in the developing countries of Asia (Avishek et al. 2012). Currently, scientific bodies in Turkey give scientific advice at national planning processes and play a consulting role in working teams. Nevertheless, the power of these contributions in terms of affecting the policy process and decision-making process is at limited levels.

One of the highlighted issues for the situation related to Turkish forestry regards the institutionalization of the interaction between policy-making and science. As Côté (2002) reported, forest managers need to see research activities as a tool that can provide long-term benefits, and scientists need to understand the activities, decisions, and considerations of forest managers when selecting research activities. Weichselgartner, Kasperson (2010) also

presented the importance of interaction and encouragement in the institutional context, which could be used to generate a mutual understanding in the science-policy-practice interface process.

Parallel to the situation in Turkey, as van den Hove (2007) pointed out, some general methodological problems exist, such as the translation of scientific knowledge into relevant policy-related knowledge and the translation of policy knowledge into relevant science-related knowledge and interdisciplinary research studies. Furthermore, Salomaa et al. (2016) focused on the same point and suggested that educating forest advisers and increasing collaboration would enhance effective flows from research to practice. Yet Krott (2012) also noted that linear transfer of scientific knowledge into political practice did not work and the author suggested a policy-policy-science interface model. This model depends on communication between powerful stakeholders with less-powerful stakeholders and the use of scientific arguments in this process. The suggestions of Runhaar and Nieuwall (2010) were related to enhancing the opportunities of knowledge being used both by creating a more open science-policy interface and by reframing the policy problems of an issue. However, credibility, relevance, legitimacy, and interaction are also important properties of research results in terms of building an effective science-policy interface (Sarkki et al. 2015). At this point, developing survey-based research and using appropriate methodology is very important in forestry (Stevanov 2016) regarding the appropriate preparation of useful knowledge for the policy-making process and practice.

Effective communication and use of active communication tools are one of the most important factors that can strengthen this type of interaction. The results of the Janse (2008) case study showed that increasing personal contact and networking between scientists and policymakers, presenting scientific information concisely and comprehensibly, as well as a deeper and earlier involvement of scientists in policy processes, were beneficial. In addition, Gingsburg and Cowling (2003) also mentioned that communication supported the effectiveness of scientists, and having scientific knowledge available for policy-making was recommended. As a complementary factor, participatory and multidisciplinary approaches are also important components of improving the integration among science, policy and implementation (Konijnendijk 2004). Parallel to this approach, co-learning and co-production process among scientists, policymakers, and the general public can be used as an effective tool to solve the environmental problems (Lopez-Rodriguez et al. 2015).

However, innovative adaptive management of science programmes is needed to be relevant to the policy-making process, strengthen the economic and social

sciences in forest research studies, and help scientists to understand the policy process in a way that will play critical roles in strengthening relationships (Guldin 2003). The results show that these aspects also have a critical role in strengthening the relationships between forestry organisation-policy and research-education in Turkey. It is also important to determine, formalize, and institutionalize the status and role of science, research, scientists, and researchers. In this context, Driscoll et al. (2011) expressed that the advisory function of knowledge and scientists should be used as one of the main guides of a policy-making system. However, the advisory model does not currently work efficiently in Turkey. An institutional status and legal background should be gained to these relationships.

In conclusion creating work groups and holding workshops are some current efforts in terms of strengthening the relationship between policy, research, and education in Turkish forestry. However, some further critical actions regarding strengthening inter-organisational relations.

In this context some critical points for Turkish forestry should be emphasized to reach a sustainable future and realize our long-term goals regarding the interaction between research and education as follows: 1) considering various aspects of policies in designing research studies, 2) strengthening a participatory approach in the policy-making process, 3) supporting communication and collaboration between forestry organisations, policymakers and research/educational institutions, 4) decentralization in forestry administration, and 5) reducing bureaucracy and political effects.

In light of the highlighted suggestions of senior managers, a consultative committee should be created with participation of the forestry organisation, NGOs, the private sector, and universities. The committee decisions should be used as the basis of decisions made by policymakers. A network should also be developed to strengthen the communication process. Moreover, the implementers should participate in research processes and assignments to other regions should not generally be permitted. As an alternative suggestion, researchers should participate in the implementation process in this way to make it easier for them to understand the prominent issues and problems that need attention. It may also be useful to analyse the relationships and interactions at regional and local levels to provide applicable and sustainable decisions.

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