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Multiple streams framework and logging policy change in the Hyrcanian forests of Iran

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ABSTRACT

The 2017 logging ban in Iran's Hyrcanian forests represents a considerable forest policy change, which was proposed following the development of other major policies to improve natural resource management. The aim of this paper is to explain the development of the logging ban policy using Kingdon's multiple streams framework (MSF). Qualitative methods – interviewing and document review – were used for data collection and analysis. The problem, politics and policy streams are shown to be linked in framing the policy change. We investigate how participants in the development of the policy used interlinkages between the problem, politics and policy streams to develop their proposals and how this simplified the change process. Despite some limitations, the MSF is helpful in explaining and analysing outcomes of natural resource management policy development processes.

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policy change; Kingdon's multiple streams framework; forest policymaking actors; forest management; logging ban (moratorium)

Introduction

As renewable resources, forests are a key element of sustainable development in many countries (Gough et al. 2008). Globally, executive policies of forest management have undergone tremendous change, from forestry based on sustainable development in the 1970s to an emphasis on local communities in the 1990s and, in more recent years, to achieving a carbon balance in ecosystems (Shivaramakrishnan 2000; Yufanyi Movuh and Krott 2011; Krott et al. 2013; Mohammadi Limaei 2020). The approach of Iran (Islamic Republic of) (hereafter 'Iran') to its forests has undergone many changes. In the twentieth century, access to oil, which was one of the country's most important economic opportunities, led to changes in urbanisation and deforestation rates (Amiraslani and Dragovich 2013).

After enactment of Iran's Forest Nationalization Law in 1963, all forests were entrusted to the Iranian Government, as endorsed in the constitution, to be used in the public interest. Forestry activities were organised with a view to adopting a scientific forest management approach to the production of wood for industry (Shoeibi et al. 2010). Two types of stakeholder can be identified: (1) local beneficiaries (communities living in or in the margins of forests) with traditional livelihoods and (2) government actors who support industrial logging for wood production (Avatefi Hemmat et al. 2013). Iran is considered a low-forest-cover country (FAO 2010), and its forests should be managed with formalised plans (Shoeibi et al. 2010). Forest management plans (FMPs) have been formulated primarily for the Hyrcanian forests (Caspian forests) over the past ten years (Amiraslani and Dragovich 2013).

In the early 2000s, Iran's Department of Environment (DOE) proposed a logging moratorium for the Hyrcanian forests. Three responsible institutions became involved in developing policy scenarios: the DOE, the Forests, Rangelands, and Watershed Organization (FRWO) and the Ministry of Industry, Trade, and Mines (MITM). A logging ban was ultimately

imposed in the Hyrcanian forests in 2017 with the aim of protecting these forests. The implicit assumption of this policy project was that multiple uses, including degradation elements such as fuelwood extraction, grazing pressure, forest land use and illegal logging, need to be considered alongside wood harvesting in FMPs, but such factors are not controllable. Therefore, the legal logging of the Hyrcanian forests under FMPs, plus the traditional use of local dwellers, has resulted in higher wood use than the production capacity of the forests (a discussion on forest management and annual timber intake and the driving forces of deforestation and forest degradation can be found in Sotoudeh Foumani et al. 2018).

In this study, we explain how the logging ban policy was developed and why this policy change was initiated. For this purpose, we use Kingdon's multiple streams framework (MSF) to answer the question: To what extent does the MSF inform the process of policy change in the Hyrcanian forests?

The MSF was developed to assess major changes in policy (Crow 2008) and is one of the main approaches for this purpose (Zahariadis 2003). Many researchers have attempted to use it in the analysis of policy change processes (Corwin 2002; Birkland 2004). Most studies related to the MSF have used qualitative techniques, such as case studies (Diehl 1991; Zahariadis and Allen 1995; Zahariadis 1996, 1998), and some have used quantitative techniques (Travis and Zahariadis 2002; Zahariadis 2003, 2007). This study uses the MSF to understand the outcomes of the establishment of forest policy.

Problem statement

Policies can have favourable or unfavourable ecological, social, economic and technical consequences across various periods (Shoeibi et al. 2010; Kolahi et al. 2012), and they may have different outcomes to those desired. Thus, not only can policies fail to achieve their stated goal, they could make the

situation worse, such as causing the loss of financial and non-financial resources. The effects of long-term plans related to the environment, resources and natural ecosystems can be complex and therefore difficult to evaluate (Avatefi Hemmat et al. 2013; Kolahi et al. 2013). Furthermore, rationally proposed policies may increase the intensity of environmental degradation (Shoeibi et al. 2010). Hyrcanian forests are the main source of commercial timber in Iran, and timber extraction has the greatest impact (World Bank 2012).

Currently, interventions in Iran's commercial forests include FMPs prepared by the FRWO and forest dwellers; those made by residents of surrounding villages, including by grazing their livestock; and encroachments by other agencies (FRWO 2013). Forest use can have positive and negative ecological consequences (Ghajar and Najafi 2012); negative consequences can be evaluated through forest science and should be at the minimum acceptable level (Chen and Innes 2013; Kolahi 2013, 2014; Kolahi et al. 2014; Kolahi et al. 2021). Experiments demonstrate that encroachments in Hyrcanian forests and illegal logging have been drastically reduced and even stopped where forests are managed according to FMPs (Hejazian and Lotfalian 2013). Where FMPs have not been implemented, however, or announcements have been made to change the status of a forest to 'protection', increases in forest damage and infringements by forest dwellers have been observed (FRWO 1996).

The FRWO considered that discontinuing FMPs through a logging ban would reduce overall impacts on the forests (Hejazian and Lotfalian 2013). Opponents believed that this was a defensive policy: rather than resolving the two biggest issues for timber harvesting in these forests (i.e. the collection of woodfuel by villagers, and conversion of forests for agricultural cultivation), they argued it would affect the least important factor in overharvesting (i.e. the official logging set out in FMPs).

Formal logging is conducted under FMPs, and it creates jobs, helps protect the forest and assists in the production of non-timber forest products, the national economy, and the realisation of silvicultural objectives (FRWO 2013). Hejazian and Lotfalian (2013) studied the consequences of the proposed logging ban in Hyrcanian forests. They found that the most important impacts would be an increase in timber prices; the loss of a system of forest guards associated with commercial harvesting; broad adverse socioeconomic consequences; and the shutdown of forest-related industries.

The Hyrcanian forests are deciduous mixed broad-leaved forests stretching along the Caspian Sea over an area of about 2 million ha (FAO 2020). Irregular multi-aged Caspian beech (*Fagus orientalis* Lipsky) is the dominant species, which is associated with Persian maple (*Acer velutinum* Boiss.), Cappadocian maple (*Acer cappadocicum* Gled.), hornbeams (*Carpinus betulus* L.) and Caucasian alder (*Alnus subcordata* C.A.Mey.) (Amanzadeh et al. 2013). Before 2017 (i.e. before the logging ban), about 60% of Hyrcanian forests were available for timber production (Sotoudeh Foumani et al. 2018). Trees (alive and snag) were harvested using a single- or group-selection system (Jourgholami and Majnounian 2011). The value of sustainable production in Hyrcanian forests is estimated at IRR 12.2 million (about USD 370) per hectare (Karimzadeh Jafari et al. 2020).

Chronological shifts in policies for the management of Iran's natural resources

An organised modern forest management system with related regulations and laws was introduced in Iran from the second decade of the twentieth century. The Ministry of Public Benefits, Trade and Agriculture was created in 1917 by merging various offices, such as the Bureau of Roads and Mines and Forests (FRWO 1988). An office in northern Iran was established and professional foresters from Europe were trained to assess forests, evaluate the organisation of national and private forests, and identify degraded and unlogged forests (FRWO 1991). In 2002, the northern office was changed to the current FRWO. The first administration for forest policymaking was initiated in the second decade of the 1900s, and some environmental laws and natural resource regulations were enacted in the late 1920s (Ayati 2003). The first forest law was enacted in 1943, followed by the Comprehensive Forest and Rangeland Law in 1959 (FRWO 1996). The development of formal forest management in Iran was a key step in conserving the country's remaining forests, but forest policy changed little for several decades, as was also the case in other developing countries, such as India and the United Arab Emirates (Shamekhi 2011). No significant changes were made to forest resource policies in Iran during the eight-year war between Iran and Iraq (1980–1988) (Yachkaschi et al. 2009). In 1988, the Iranian Parliament passed an enactment establishing that 'a seven-member board would be in charge of investigating the objections of farmers holding informal deeds, government institutions, and the owners of orchards and other installations located in forested lands outside the formal urban boundaries'. Following the 1992 law on the preservation of Iranian natural resources and forests, the DOE was legally empowered to hold portions of state-owned forest resources as environmentally protected areas in which no timber harvest is permitted (Ayati 2003). In 2004, to involve local people in the prevention of further desertification in arid and semi-arid regions, the government stated that 'ecologically suitable arid areas for plantation will be conditionally leased to the people, provided that a feasible afforestation plan can be presented'.

As indicated above, most forest areas in Iran are state-owned, although a couple of private estates exist. The state's role in forest administration has been characterised as 'adjusting the utilization of wood assets for the whole country as potential stakeholders' (FRWO 2013). State possession has served to control timberland use in the Hyrcanian forests, where timber could be extracted as per the endorsed FMPs. The most important commitment of the state to forests has been in addressing timber-related corruption caused by (1) the reassignment of timberland areas to other land-use designations; (2) deforestation or forest degradation, including the loss of biodiversity; and (3) illegal logging.

The FRWO has implemented activities to prevent illegal logging in Hyrcanian forests, and it has (directly and indirectly) prepared FMPs for northern Iran. The protection of the environment and the prevention of uncontrolled logging are mentioned explicitly in quinquennial (i.e. five-year) development plans (QDPs), which provided financial support for the country's economic sectors, fuelled largely by petroleum exports (Sotoudeh Foumani et al. 2018). The QDPs, which started in 1991, carefully considered the preservation of common natural assets (DOE 2000; Sotoudeh Foumani et al.

2018). The second QDP (1995–1999) addressed the need to exclude livestock from forests, integrate forest dwellers, and use natural resources based on their sustainable capacity (Alipour-Nakhi et al. 2009). The third QDP (2000–2004) tackled the sustainable use of natural resources, green industry support and assessments of environmental effects. The fourth QDP (2005–2009) identified environmental conservation as an important tool for achieving sustainable development. The fifth QDP (2010–2015) clearly announced that ‘logging is officially accepted only in the framework adopted by the Cabinet. Moreover, the use of rangelands and natural habitats is only permitted based on ecological potential’. The fifth QDP included environmental plans to be implemented under stricter rules. It is of note that one of the most obvious administrative policies for the conservation of Hyrcanian forests was the removal of livestock and forest dwellers from forests (Shoeibi et al. 2010). This policy failed in practice, however, and the degradation of these forests continued (Avatefi Hemmat et al. 2013). Although the extent of illegal logging is unknown, unrestrained timber harvesting in Hyrcanian forests is another main cause of degradation (Shoeibi et al. 2010).

The Cabinet enacted the Comprehensive Program (CP) to protect forests in 2003, and this was put on the agenda of the relevant organisations. The CP formed protection units and eliminated customs tariffs and other barriers to reduce logging pressure in Hyrcanian forests while supporting relevant industries (FRWO 2013). Thus, Article 8 of the CP states that ‘given the potential restriction of forest resources and considering the aim of reducing the volume of logging from Hyrcanian forests and decreasing illegal harvest, the Council of Ministers is obliged to remove barriers of timber imports in cooperation with MITM and FRWO’ (Shoeibi et al. 2010).

The CP proved unable to prevent unrestrained logging in Hyrcanian forests, however. Another important plan to protect the country’s natural resources is the National Biodiversity Strategy and Action Plan (NBSAP), which began in 1998 in collaboration with the United Nations Development Programme, the Global Environment Facility and the International Union for Conservation of Nature. This plan led to the accession of Iran to the Convention on Biological Diversity (CBD). The NBSAP effectively

implemented the biodiversity policy and improved the National Biodiversity Strategy and national reports to the CBD (FRWO 2013). The Optimization Plan of Monitoring, Conservation, and Exploration of Natural Forests of Iran was enacted in 2013. This plan for protecting the environment includes ten principles, seven major criteria and 80 indicators of sustainable management. In Article 6, it states that ‘FRWO is obliged to manage FMPs in a way that the timber is supplied only from damaged trees (e.g. broken, fallen, eradicated, and infested) and silvicultural operations/treatments’ (IPRC 2014).

As previously discussed, a logging ban is considered by FRWO as a solution to the degradation of Hyrcanian forests. Given the implicit assumption of the logging ban policy and organisational performance of FRWO, especially in the fourth and fifth QDPs, this remarkable policy change seemed inevitable.

Theoretical fundamentals: multiple streams framework

The application of the MSF to public policy was introduced in John Kingdon’s book (1984), *Agendas, alternatives, and public policies*, which is regarded as a ‘modern classic’ in political science and a widely cited academic work (Pollitt 2008). The MSF is a framework for exploring the nature of policy change (Cohen-Vogel and McLendon 2009). It can be used for analysing decision-making and policymaking in complex circumstances in which many potential solutions exist for a particular issue and additional information will not change the approach to solving that problem (Zahariadis 2003). The MSF defines policy formation as a process connecting three separate streams: problem, politics and policy. Figure 1 presents a flowchart of MSF elements with respect to the proposed logging ban for Hyrcanian forests.

The problem stream comprises issues capturing the attention of any entity, including government (Kingdon 1995). Policymakers perceive issues through statistical reports, annual reviews and previous policies (Storch and Winkel 2013). The politics stream is a combination of political processes and institutional governance

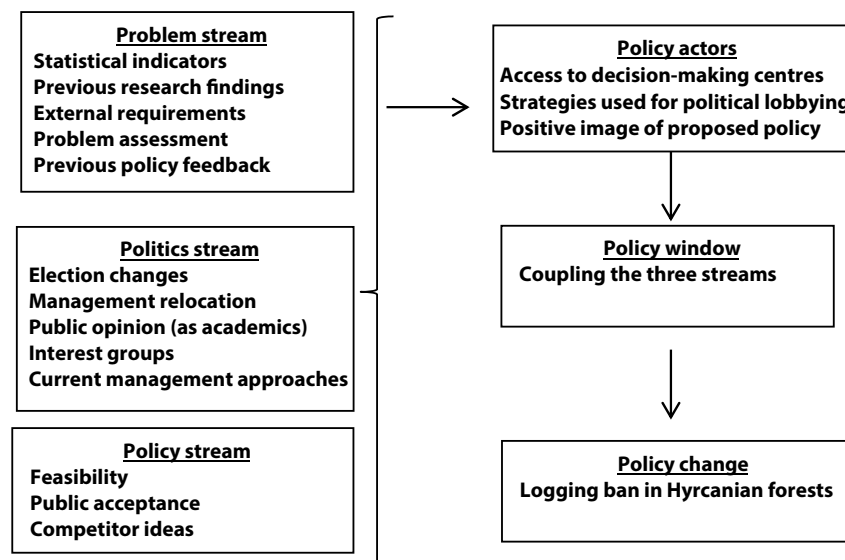


Figure 1. Multiple streams framework and proposed policy change of logging ban for Hyrcanian forests, Iran

(Zahariadis 2003). Important criteria in the process of policy formation include the acceptance of proposals, technical feasibility studies, and financial implications (Zahariadis and Allen 1995). The policy stream contains ideas competing for acceptance in policy networks (Storch and Winkel 2013). Policy communities, comprising (for example) consultants, members of Parliament, academics and analysts in think tanks, create ideas and may have a shared view in an area of policy (Crow 2008), and they may create elements such as new policy structures and proposals. Kingdon identified the following important criteria for the survival of such ideas: technical feasibility; value acceptability; a moderate expectation of public acquiescence; prediction of future restrictions; and receptivity on the part of elected officials (Boscarino 2009; Storch and Winkel 2013). Hence, by aligning the effects of the three streams, a path of least resistance is found for specific kinds of policy alteration. Such opportunities to participate in novel policies are called 'policy windows' (Cohen-Vogel and McLendon 2009), which may open in response to the accentuation of a problem or the occurrence of an event (e.g. a change in administration) in the politics stream. In this latter, a new administration may be ideologically committed to certain changes. Policy windows allow policy entrepreneurs to share their proposals by integrating problems, politics and policy streams in the form of agendas (Zahariadis 1996). Policy entrepreneurs need to quickly take advantage of opportunities presented by the opening of a policy window (Zahariadis 2007). This process of deliberately connecting the putative problem with the optimum solution is called 'coupling', and the new policy needs to be fully articulated at this point and endorsed into law through the appropriate channels (Ackrill and Kay 2011).

The MSF is an important framework for understanding policy change, along with other political science theories such as punctuated equilibrium framework, advocacy coalition framework and path dependence framework (Storch and Winkel 2013). Kingdon (1995) used the MSF in pre-decision processes in the United States Government. Contrary to traditional rationalist models, the MSF allows ambiguity; it represents a paradigm shift in policy investigations (Nutley et al. 2007) and offers an approach that is relevant in the real world (Pollitt 2008).

Kamieniecki (2000) applied the MSF to explain a policy change in forest management in British Columbia, Canada. Colebatch (2006) contended that discourses using other approaches are constrained and policy scholars ought to use pragmatic models. Lange and Garrelts (2007) researched flood protection and employed the MSF for decision-making under ambiguous conditions. McLendon and Cohen-Vogel (2008) stated that Kingdon's MSF methods are among the most cited policy formation theories and one of the least systematic. Numerous policy researchers have indicated that not all policymaking procedures are rational (Monaghan 2011). Chow (2014) used the MSF to assess the policymaking procedure in Hong Kong. Thus, political scientists use MSF as a heuristic tool in their empirical research. In this study, MSF was used as a suitable method for analysing forest policy associated with Hyrcanian forests. In the following, we describe

information associated with notable shifts in the restructuring of natural resource management in Iran and apply the MSF to the legislated logging ban in Hyrcanian forests.

Research methodology

This paper uses qualitative analysis, which, based on the study of Berg (2009) and given the nature and objectives of the research, we considered an appropriate method for our investigation. The study is organised as follows: first, a review is conducted of changes in natural resource management since the enactment of the third QDP, which proposed a logging ban. Second, we collect and analyse the data obtained, enumerating the various factors for logging policy change, converge the three streams and analyse how the logging moratorium policy is defined, given the surrounding political forces. Third, we combine and categorise the factors affecting the logging policy change and draw conclusions on the use of MSF in general and for forest policy processes.

The data were collected from three main sources: (1) maintained documentation and historical records, including two types of documents: legitimate and organisational. Legitimate documents are those associated with the third and fourth QDPs, and organisational documents are protocols and notes (any written records of meetings focusing on the issue of the logging moratorium), in addition to parliamentary processes; (2) reports and press articles related to the topic; and (3) interviews with key officials. The interviews, which were semi-structured (Storch and Winkel 2013), were conducted with 35 key policymakers of natural resource management, comprising five senior managers of the FRWO, five major deputies of the DOE, three personnel from each of the Forestry Community of Iran (FCI) and the Forestry Association of Iran (FAI), and 19 researchers in relevant fields. Interview participants were selected by snowball sampling, in which each interviewee is asked, during the interview, to introduce other individuals or groups who actively affect policy change, hence increasing the number of people in a 'snowball' effect (Goodman 1961; Patton 1990).

Our study area is the Hyrcanian forests situated on the southern coast of the Caspian Sea in northern Iran (Figure 2). This area covers about 18 500 km² and comprises 15% of Iran's forest area (Jaafari et al. 2014).

The qualitative data from interviews were transcribed verbatim; the documents were studied closely and written up in the form of storylines (Storch and Winkel 2013). Methodically, the events related to this policy change were interpreted according to the MSF. The main objective of the research was to analyse the case study based on the three streams and other focusing events; thus, at this stage of the data analysis, theoretical concepts of Kingdon's theory formed the main indicators. The following categorisation was the main basis of data analysis:

- Operational and administrative issues in the field of natural resource management (particularly the forest sector)
- Ideas and suggestions (e.g. logging ban)
- Important events affecting the change within and outside the system



Figure 2. The map of study area (Hyrcanian forests, Iran)

- Policy entrepreneurs (officials of FRWO and DOE)
- Policy windows
- Interest groups (academics, environmental non-governmental organisations – NGOs, FAI and FCI).

The above-mentioned categories were studied in the form of four main components of Kingdon's theory: the problem stream, the politics stream, the policy stream, and the coupling of streams (Zahariadis 2007).

Findings

The problem stream

The debate on changing the logging strategy in Hyrcanian forests was initiated to solve significant problems of forest and ecosystem degradation. A review of aerial photography by the FRWO found that, on average, almost 2000 ha of Hyrcanian forests was destroyed annually over a 52-year period (1955–2007) (Shoeibi et al. 2010). The FRWO – the main institution charged with providing a policy solution – considered this forest loss to be unacceptable. Field observations and a review of aerial photography indicate that the main cause of qualitative forest destruction was conversion (i.e. a land-use shift in these areas into agricultural farms, gardening lands, and even villa construction) and encroachment (Yachkaschi et al. 2009). In contrast, timber harvesting in FMPs was not shown to lead to forest destruction and also generated revenue that helped fund the implementation of the plans (Hejazian and Lotfalian 2013).

FMPs provide the basis for management at different levels (watershed, district and compartment) and the protection and control of forests (e.g. through the use of forest guards) and networks of access roads. This, in turn, significantly decreases the possibility of encroachment on forest lands and increases their protection and governance (FRWO 2013). According to data from FRWO, the rate of encroachment in forest areas outside FMPs was 11.4 times higher between 1979 and 2000 than for areas under FMPs. At the

institutional level, the lack of an effective monitoring and enforcement system and inadequate financial resources are the most important issues in Iranian forest management (Avatefi Hemmat et al. 2013). In a meeting with officials and practitioners of natural resources and environmental protection, the nation's formerly most senior political leader, President Rouhani, stated that: 'solving environmental issues requires planning, strategy, and serious follow-up. Environmental protection is a public duty that should be practiced by providing the environmental guidelines [appendix] for public works projects' (MNA 2016). Unfortunately, operational overlaps between various institutions involved in natural resource policymaking, and the scarcity of coordinated planning, reduce management efficiency and the effectiveness of the FRWO's mission, which is the 'conservation and systematic exploitation of forests, through scientific management of watersheds and considering sustainable development principles'. Furthermore, operational overlaps have caused conflicts between officials and institutions over decision-making in natural resource management (Shamekhi 2011).

Given such problems, both the scientific and academic community and authorities indicated that measures were needed to increase institutional flexibility to enable the achievement of sustainable development objectives while conserving natural resources for future generations.

Policy stream

Certain solutions have been proposed for the change in logging operations in Hyrcanian forests (e.g. a ten-year logging moratorium, a logging ban and the cessation of FMPs). What is certain is that maintaining the status quo would not enable the FRWO to achieve its mission of halting deforestation and forest degradation. According to Article 104 of the third QDP, the FRWO was commissioned to consider the use of natural resources based on their sustainable potential. According to Article 148 of the fifth QDP, the FRWO was obliged to regulate

and implement a plan for the conservation, restoration, development and use of renewable natural resources based on agreed priorities (e.g. the exclusion of livestock from forests, the relocation of forest dwellers, the development of agroforestry, reforestation, and stricter regulations against illegal logging). Some advocates of the proposed logging ban believed that the FRWO did not perform its duty in protecting the forests, especially in the fourth QDP. For instance, according to Article 69 of the fourth QDP, the FRWO was supposed to operate logging in forests based only on the ecological potential to maintain the forests. Thus, advocates of the logging ban believed that, to conserve the forests, it was necessary to change the policy on timber harvesting in Hyrcanian forests with a view to halting legal logging.

Policy experts in this stream were mainly from the operational sector and academics. They sought the views of such policy experts and the generation of ideas through think tanks. Policy experts also included personnel in the MITM and other institutions in the field of natural resources. Finally, the main policy was supported by advocates of the policy change. Given that, according to Kingdon, general acceptance was key for the survival of a new idea (Storch and Winkel 2013), most policy advocates generally accepted the proposal for a logging ban in Hyrcanian forests.

Politics stream

One of the crucial elements in policy change is management change (or a change in administration), particularly when the ideological beliefs of a new manager convince key informants to consider a proposal for change (Ackrill and Kay 2011). In Iran, a process to develop a more flexible approach to management, taking into consideration essential principles of sustainable development, was initiated in the early 2000s (IPRC 2014). Later, an important component of the policy change process was provided by a change in administration. However, an influential manager of the FRWO said that changes in the management of natural resources did not happen instantaneously and the idea of change had formed over years: 'from the 90s, a sort of managerial regime has occurred in all sectors of the country and the centralization approach in management has gradually shifted to a flexible approach for management' (Interview with an FRWO manager, September 2015). A different approach was created in the executive branch of management especially in light of the election of a new (and the fifth) president of Iran in 1997, Dr. Sayyid Mohammad Khatami, who advocated freedom of expression, tolerance and civil society, and constructive diplomatic relations with many states around the world, and who supported a free market and foreign investment. New management views and the model of this administration encouraged new proposals and more fundamental changes in natural resource management (Alvani and Sharif-zadeh 2015). Moreover, a similar view between the management of the FRWO and the new administration gave the continuity needed to follow up to make changes in some existing policies (Shamekhi 2011).

Conserving and protecting the environment and natural resources is considered part of higher-level law in Iran. Moreover, the government has frequently emphasised the comprehensive protection of natural resources and the environment: 'With the rise of the eleventh government in Iran,

environmental protection was considered not a slogan but a strategy . . .' (Interview with a member of Iranian Parliament, July 2015), and indeed all governmental pillars are required to align their civil activities with environmental measures (IPRC 2014). The 11th Iranian Government activated environmental diplomacy internationally along with political and international diplomacy (Alvani and Sharif-zadeh 2015). The idea of International Mother Earth Day is accepted in various international environmental charters and conventions (IPRC 2014) to prevent economic, industrial, social and municipal pollution. Thus, the use of clean energy is on the agenda of governments worldwide: 'The access of developing countries to new types of energy sources is essential for their economic development, and there is a correlation between the level of development of a country and its energy consumption. Therefore, we should try not to utilize our forests and attempt to apply clean energies instead' (Interview with a DOE Officer, August 2016).

Coupling three streams and the creation of policy windows

The MSF theory suggests that the convergence of the three streams described above provides a good opportunity for policy change. In other words, multiple streams of action are required to drive such change. According to the problem stream, it was claimed (unsupported by evidence) that timber removals in Hyrcanian forests are greater than production capacity, and the proposed solution was to suspend the legal timber harvest to ensure forest conservation. Predominantly, this problem was communicated to the DOE by civil activists (e.g. members of the FAI and FCI, and environmental NGOs), although most policymakers are governors and academics. Another debate was to change the approach to meeting the country's timber demand.

Sanctions against Iran, the post-war needs of the country (after the war between Iran and Iraq from 1980 to 1988) and Iran's policy of domestic timber production self-sufficiency were other issues that can be interpreted in terms of Kingdon's 'focusing events'. In the policy stream, a solution was proposed by a community of policy experts, including governmental officials and interest groups, involving a logging ban in Hyrcanian forests. With changes in government and other changes of circumstances, a policy window opened as the three streams converged, certain focusing events occurred, and solution proposals emerged.

Since the early 1990s, Iran has undergone a series of social and paradigmatic changes in management. From the middle of that decade, a certain management approach emerged known as 'components of modern government management' (Alvani and Sharif-zadeh 2015), which was also influential in natural resource policies.

Discussion

The logging ban in Hyrcanian forests is considered a major change in the structure and management of natural resources in Iran. Given the importance of the forest sector in developing the country's economy and the notable changes brought about in the management of agriculture and natural resources, this paper has reviewed the factors and events affecting this policy change.

Studying policy change helps in understanding the actors and factors that bring it about (Kolahi 2020, 2021; Payste et al. 2020). More specifically, it helps investigate whether the process of change follows the scientific principles of policymaking and can be interpreted by the logic of this science (Alvani and Sharif-zadeh 2015). The MSF is a common method for explaining policy change, and it is considered one of the most important frameworks in the policymaking process. Although the theory is not always clear, it has wide applications in policymaking. The MSF suggests the need to combine the three streams of problem, policy and politics but it does not determine the circumstances under which the solutions seek the problems and the problems seek the solutions. Moreover, the MSF emphasises individual behaviour, while the role of institutional arrangements is less considered (Zahariadis 2007). Gaps exist in the model, including the assumption that the streams are independent and the unclear role of policy windows in connecting the streams (Zahariadis 1998). The purpose of this paper, however, is not to analyse the theory but, rather, to apply it to the change process for logging policy in Iran forests. According to Kingdon's theory, the three streams are independent, but they can converge in certain circumstances, thereby creating a window for policy change. Policy entrepreneurs play a vital role in connecting the streams. The three streams, and how they are connected, are the foundations of Kingdon's model to explain policy change.

The results of this study show that the policy change and the factors influencing it can be analysed using this approach. The three streams were not independent as Kingdon predicts, however, because the political stream highlighted many problems in natural resource management. In our case study, the role of policy entrepreneurs was important in attracting the attention of policymakers to the problem, suggesting ideas and proposals, and enabling the convergence of the three streams. The values underlying party ideologies, with their biases towards certain policies, played a pivotal role in defining the problem, as suggested in a general sense by Kingdon (1995). For example, according to advocates of the logging ban, a ten-year moratorium on logging, the elimination of customs tariffs and other barriers to timber imports, and even the creation of a new Ministry of Environment and Natural Resources, were all urgently required. In contrast, some groups opposed the logging ban and considered that its adoption would lead to a failure to implement FMPs and thus to an increase in illegal logging. According to these policy actors, the establishment of the Ministry of Environment and Natural Resources would not help resolve the problem (Hejazian and Lotfalian 2013).

Some elements of the MSF were not found in the debate on logging strategy change in the Hyrcanian forests. For instance, no reliable statistics were available on the extent to which current logging was causing forest degradation. Moreover, no research had been conducted on the impacts of previous policy settings. Although the need for policy change was indicated by various sources, no specific data were available to assist the policy change process for the Hyrcanian forests. At the policy level, Kingdon identifies policy communities that can play important roles in policy change (Pollitt 2008). In the logging change process, such policy communities consisted of policy experts and academics and officials in DOE and the FRWO, with the capacity to identify appropriate solutions in a well-timed opportunity to solve problems.

In the politics stream, Kingdon believes that a change in administration can have a significant impact on changing the policy 'agenda' (Zahariadis 2007) – administrative change here means a change in forest management or policy personnel to achieve a desired outcome. Changes in administration or parliamentary processes because of elections provide scope for the development of new policies (Chow 2014); political change is the most apparent opportunity in the policy system to support a proposed solution (Alvani and Sharif-zadeh 2015). Concerning such change, events in government, such as a change in key principles, played a crucial role in supporting the idea of restructuring the logging policy in Hyrcanian forests. Accordingly, the new management in the executive and legislative branches put logging policy change onto the government agenda and proposed it to the Parliament as a solution (IPRC 2014). The three streams flowed into the restructuring of the logging policy change. When the policy and problem streams were coupled, the politics stream also became activated (Zahariadis 2007). Policy entrepreneurs at DOE were aware that the policy window had opened, and, to some extent, they were able to converge the three streams. A policy window opens when changes occur in the politics stream (Chow 2014); however, some advocates of the logging moratorium in Iran were at the top level of policymaking. In MSF theory, entrepreneurs facilitate the connection of problem, politics and policy streams (Zahariadis 2007). In this case study, the policy entrepreneurs operated at the highest levels of government.

Kingdon refers to policy entrepreneurs as advocates who wish to invest their resources, time, energy and position to achieve a particular result or position (Storch and Winkel 2013). The main policy entrepreneurs in the logging ban were the heads and some deputies of DOE and the FRWO, who attempted to gain support for their ideas by interacting with other specialists, policymakers and influential people, especially high-ranking officials in the executive branch, the Iran Parliament's Research Commission and the Iran Supreme Council of Forests. The role of some of these entrepreneurs was important in gaining the confidence of opponents and reducing tensions and challenges encountered in the policy approval process (Alvani and Sharif-zadeh 2015).

As Kingdon states, policy windows will not remain open for long because every idea has a termination time (Kingdon 1995). In the current case study, it is difficult to conclude, however, that the policy window closed with the approval and implementation of the logging ban. This is because, first, this policy change has not been fully implemented and, second, the problem stream may restart after enactment of the moratorium if the problems associated with management, decision-making and policymaking reappear. The policy stream may be reinstated, and policy experts will again seek appropriate solutions.

Conclusion

The aim of this study was to use the MSF to investigate the development of the logging ban policy for Iran's Hyrcanian forests. The MSF can be useful for understanding the policy change process in natural resource management. According to this model, forest policy entrepreneurs can take advantage of policy windows to enact changes based on proposed solutions. The research presented here showed how the problem, policy and politics streams were linked in framing the policy change

but also suggested that the evidence for the proposed solution wasn't strong and was contested. The MSF could be used as an analytical method for integrating policies. For example, when a certain political stream is changing but a policy window has not yet been formed, the trend can be predicted and the framework used at the macro level and integrated into policy-making. In the MSF approach, it is important to identify the problems and the main policy entrepreneurs and policymakers in the policy stream. The policy stream is sensitive and complex. Further research is needed to evaluate whether the problem or policy window will open again in the future and the politics stream that policy entrepreneurs might follow to have their solutions adopted. Such research could go further in developing a stronger empirical basis, a wider policy arena under scrutiny and a stronger theoretical base.

Disclosure statement

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