Land Use Policy 58 (2016) 145–151

Contents lists available at ScienceDirect

Land Use Policy

journal homepage: www.elsevier.com/locate/landusepol

Science-policy interaction: The case of the forest and forestry revitalisation plan in Japan

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ARTICLE INFO

Article history:
Received 27 November 2015
Received in revised form 10 May 2016
Accepted 14 July 2016

Keywords:
Scientific knowledge transfer
RIU model
Japanese forestry reform
Forest policy process

ABSTRACT

The objective of this study is to analyse the role of science in the Japanese forest policy process. Based on the analytical RIU (Research – Integration – Utilisation) model, this study shows that science matters. During the alternative specification phase of the Japanese Forest and Forestry Revitalisation Plan especially, scientific research results came into play to influence the design of alternatives. Contrary to these findings, no direct science-based policy advice could be found in the agenda-setting process. This study also identifies two different types of power relationships between science and political actors. Internal allies of science show relationships of actors who are actively involved in the research process and the utilisation of its results. External allies of science are actors who do not participate in the research but put external pressure on other actors to seek cooperation with science and adopt science-based solutions. As a result, this study shows that the RIU model can be a powerful analytical framework to analyse dynamic interactions between science and the forest policy process.

1. Introduction

Forestry accounts for two-thirds of total land use in Japan. Private owners own 58% of Japan's forests, state forest accounts for 31%, and the rest are prefectural and municipal forests (Forestry Agency, 2014). Japanese cedar (*Cryptomeria japonica*), Japanese cypress (*Chamaecyparis obtuse*), and Japanese larch (*Larix kaempferi*) have been major species, which cover 41% of total forest areas (Forestry Agency, 2014). Because of the above-mentioned prominence of forestry for land use in Japan, Japanese forest policy is an important field of land use policy. Therefore, our study analyses Japanese forest policy processes and the role of science-policy interactions.

A main feature of forest policymaking in Japan is the Japanese Forest Planning System. The Japanese Forest Planning System has been a backbone of Japanese forest policymaking, which pays great attention to governmental control in private as well as in state forests. The origin of the Forest Planning System can be seen in the establishment of a vertical supervision framework by the national government, which was introduced in 1939 in response to the increasing demand for forest-related materials for the Second World War (Fujisawa, 2004). The basic framework was thereafter maintained by the General Headquarters of the Supreme Commander for the Allied Powers during the post-war occupation era (Fujisawa, 2004), and the supervision system was replaced by the current Forest Planning System in 1951. The Forest Planning System maintains a vertical multi-level framework, including national, prefectural, municipal, and forest management levels. The plans for every level are to be revised regularly following the structure of the upper levels. The Forest Act and the Forest and Forestry Basic Act provided the legal foundation of the Forest Planning System. The first Forest Act was enacted in 1899 to regulate nationwide forest degradation and prevent illegal logging (Endo, 2012). Several revisions were then implemented to develop and stimulate the economic aspect of forestry, to add articles concerning forest owners' cooperatives, and, recently, to extend the scope of the act into biodiversity conservation (Kobayashi, 2008). The Forest and Forestry Basic Act was first enacted as the Forestry Basic Act in 1964 to increase domestic timber production in response to the growing timber demand and difficulty in importing logs due to the shortage of foreign currency at that time. Thereafter, the scope of the Act was expanded to include the enhancement of multifunctional forestry as well (Endo, 2012).

Under the Forest Planning System, the economic role of Japanese forestry, however, has declined in rural areas for more than thirty years. The economic output from Japanese forestry decreased two-thirds during the last thirty years. As for timber production, the economic impact from Japanese forestry decreased by 20% during

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http://dx.doi.org/10.1016/j.landusepol.2016.07.012
0264-8377/

the same period (Forestry Agency, 2014). As a consequence, when the Democratic Party of Japan (hereafter DPJ) won a parliamentary majority and then formed a new cabinet in 2009, a new forestry reform plan was announced: the Forest and Forestry Revitalisation Plan (Revitalisation Plan). Its ten-year goal was to revitalise Japanese forests and forestry, which were faced with low productivity, decreasing timber prices, and a resulting lack of interest on the part of forest owners (Forestry Agency, 2009). The Revitalisation Plan aimed to make Japan 50% self-sufficient in timber production in ten years. The headquarters of the Revitalisation Plan established five consulting groups known as 'Subcommittees (SC)' to form detailed implementation strategies after the agenda authorised in December 2009 (Forestry Agency, 2009). 'SC Forest and Forestry Basic Policy' was assigned the role of designing the whole structure of the Revitalisation Plan. The other four SCs, 'SC Forest Road and Working Process', 'SC Reforming Forest Owners' Association and Developing Forestry-related Cooperation', 'SC Human Resource Development', and 'SC Domestic Timber Processing, Marketing, and Utilisation', were assigned the role of building specific alternative strategies according to the issues (Forestry Agency, 2009). The Japanese cabinet authorised the final report on the implementation of the plan in 2010, which had a strong impact on the ongoing Forest and Forestry Basic Plan that started in 2011 as the highest level of the Forest Planning System (Forestry Agency, 2011).

Based on the case of the Revitalisation Plan, this study focuses on the science-policy interactions in the forest policy process. Science-based policy advice was frequently used within Japanese forestry, and several studies have already mentioned the critical aspects of the interaction between science and forest-related policies (Kawata, 2014; Isaka, 2011; Ishizaki, 2010; Tanaka, 2009). However, so far, no research has been conducted to analyse detailed interactions between science and the Japanese forest policy process. Based on the analytical RIU model, the objective of this study is, therefore, to analyse the science-policy interactions in the Japanese forest policy process through the example of the Revitalisation Plan. Accordingly, the following research questions are investigated:

- Who were the main actors in scientific knowledge transfer of the Revitalisation Plan?
- How did science contribute to the process of specifying innovative alternatives to the Revitalisation Plan?
- What was the role of politics in the case of the science-policy interactions of the Revitalisation Plan?

2. Theoretical approach and hypotheses

A lot of theoretical and empirical research has been conducted on scientific knowledge transfer (Ascher et al., 2010; Bocking, 2004; Guston, 2001; Jasanoff, 1990; Jasanoff and Wynne, 1998; Lentsch and Weingart, 2011; Maasen and Weingart, 2005; Mitchell et al., 2004; Pregernig, 2014; Pregernig and Böcher, 2012a; Weingart, 1999). In linear models of scientific knowledge transfer, scientific knowledge can directly be applied to policymaking because it flows automatically from the sphere of science to the sphere of politics (Beck, 2011; Durant, 2015; Hulme, 2009). The linear model assumes a strict separation between science and politics. Mutual interactions between the two spheres are not significant because of a simple relationship between science and political practice: if there is scientific evidence, it can be applied in policymaking. However, many specific assumptions are required to maintain the credibility of the linear model, such as a strict separation between knowledge production and utilisation, finalisation of the production of scientific evidence when it is handed over to the policy process, and a separation between scientific facts and political values (Pregernig and Böcher, 2012a). Because of the limitations of the linear model, political scientists have developed alternative models of science-policy interactions to better reflect the different codes under which science and the political system operate (Pregernig and Böcher, 2012a; Böcher and Krott, 2016).

Functional models highlight the natural incompatibilities between science and politics (Böcher and Krott, 2016; Boehmer-Christiansen, 1995; Miller, 2008; Pregernig and Böcher, 2012b). Science is seen as an incremental process that is oriented towards finding the truth using sound scientific standards and methods. In contrast, politics is oriented towards organising collective action in the context of different short-term interests and is directed towards the pursuit of power. In this context, political actors do not necessarily base their decisions on scientific evidence. They often disregard or ignore science in their political decisions. Additionally, functional models assume that, under these conditions, science may fulfil certain functions for political actors like a source of authority or an instrument of persuasion in debates and negotiations, and may play a scapegoat role in explaining delays or avoidance of actions, and facilitation of policy change. Science then has only a limited epistemological function in the policy process (Pregernig et al., 2012; Boehmer-Christiansen, 1995). Functional models are useful to describe power-related functions of science for political actors, but they are weak in analysing cases in which scientific evidence gains epistemological authority that informs politics and leads to political decisions that, at least to a certain degree, rely on scientific evidence (Böcher and Krott, 2016).

Another alternative model is the so-called 'coproduction model' that describes the complex phenomenon of science- society and science-policy interactions in a way that also integrates the social and cultural embeddedness of both science and politics (Jasanoff, 2004). This model has been developed to better reflect the reality that political decisions, especially in environmental policymaking, are often the result of joint considerations of scientific and non-scientific arguments resulting from numerous interactions between policymakers and scientific experts.

The Research-Integration-Utilisation (RIU) model that serves as an analytical tool for this study was developed to draw a clear analytical distinction between scientific research, utilisation of such research in politics and practice, and integration activities as important interfaces between research and utilisation transfer (Böcher and Krott, 2016). Each category follows an individual logic (Böcher and Krott, 2016; Stevanov et al., 2013). The critical core of the model is a focus on describing the dynamic selection and interaction process among actors who play a certain role in research or utilisation of scientific advice.

This model was introduced and developed by Böcher and Krott based on various research projects that addressed scientific knowledge transfer in environmental and forest policy in Germany (Böcher, 2012; Böcher and Krott, 2010, 2011, 2014a,b, 2016; Heim and Böcher, 2016) and Eastern Europe (Stevanov et al., 2013; Stevanov et al., 2011). It has been used to analyse Austrian research programs for sustainability (Böcher and Krott, 2012, 2014a), In this paper, the RIU model is used for the first time on forest policy processes in Asia, as well as to study the science-based interactions between researchers and political actors in Japan. The novelty of this approach lies in the detailed analysis of long-term science-policy interactions as well as in revealing research, integration, and utilisation activities, and their interconnections in Japan.

The RIU model defines scientific knowledge transfer as 'the connection between research, integration, and utilisation' (Böcher and Krott, 2016). Each of these three categories is assumed to have different subtasks and principles (Böcher and Krott, 2016). For instance, activities within the integration category should be bi-directional. On the one hand, the practical demand for science-based solutions has to be investigated and used for the selection