WPS Nº 2024-004



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Ashank Desai Centre for Policy Studies Indian Institute of Technology Bombay Working Paper Series

Suggested citation

Kallyani, R. & Narayanan, N. C. (2024, May). The Boundary-Work in Environmental Knowledge and the Occlusion of the Social Domain: A Co-Productionist Critique of Western Ghats Conservation Policy Process. (ADCPS Working Paper Series N^o 2024-004). https://www.cps.iitb.ac.in/wps-2024-004

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The Boundary-Work in Environmental Knowledge and the Occlusion of the Social Domain

A Co-Productionist Critique of Western Ghats **Conservation Policy Process**

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Abstract

Policy studies scholars have drawn multiple connections between knowledge production mechanisms and environmental governance. However, inspired by the coproductionist paradigm, recent scholarship criticises the linear conceptualisations of these connections and argues that knowledge is intrinsic to environmental policy and governance. Foregrounding this assumption would help one to account for policy crises by paying attention to the way policy-driven knowledge has been produced. This paper attempts to explain a specific case of policy crisis concerning the Western Ghats conservation in the Indian state of Kerala by critically examining the processes of policydriven knowledge production, through an evocation of the concept of boundary-work in the contexts of knowledge production and policy formulations. Analysing the policy documents, scientific deliberations, and public debates, the paper illustrates the ways in which the difficulties in managing geographical and epistemological boundaries intersect. The policy-relevant knowledge production procedures characterise an uncritical aspiration to be scientific at the cost of an insignificant consideration of those aspects of conservation policy which are difficult to scientise. Paying close attention to the scientisation of environmental knowledge production and governance process, the paper explains how the boundary-work is characterised by the increased focus on the ecological and biodiversity aspect, which are amenable to effortless scientisation over any deep understanding of the complex domain of the social.

Keywords: Co-production, Boundary-work, Scientisation, Conservation Policy, Western Ghats

Introduction

This paper attempts to understand a specific case of conservation policy crisis in India, through a co-productionist stance on science-policy interface. Environmental and ecological¹ debates are often exemplified by STS scholars as perfect sites to make sense of science-policy interfaces. Delineating the complexities associated with this interface has been a crucial aspect of many influential debates such as that of post-normal science (Functowicz & Ravetz, 1993), contested boundaries (Jasanoff, 1987), critical political ecology (Forsyth, 2003) and others. The thesis of co-production (Jasanoff, 2004) that attempts to understand how knowledge and

¹ It is difficult to gloss the words 'ecology' and 'environment' differently due to their overt interchangeable usage in the empirical and conceptual contexts that this paper is engaging with. This difficulty, in fact, substantiates the larger argument of this paper about the difficulty associated with the epistemological boundary-works. While 'ecology' conventionally connotes certain scientific aspects, 'environment' represents larger social, political, and philosophical dimensions.

social order are co-produced has turned to be very influential for the last two decades to critically look at and gain deeper insights on the science-policy interface in STS and environmental social sciences. Inspired from the co-productionist paradigm, this paper attempts to offer fresh insights to the specific case, which is described in the next section, by examining the policy-science interface.

The Empirical Context of the Study

Formation of an expert committee to demarcate the Western Ghats region, a biodiversity hotspot in the western peninsula of India has been a longtime demand of environmentalists. Hence, they wholeheartedly welcomed the constitution of The Western Ghats Ecology Expert Panel² (WGEEP) by the Ministry of Environment and Forest³ (MoEF), Government of India. The environmental groups and conservation scientists welcomed and praised the implied ecological insights and spirit of democracy of the WGEEP report. (Chopra, 2014; Sudhi, 2012, 2013). However, the report invited huge opposition from many corners that include dominant religious and community organisations, political parties, media houses and others majorly due to the alleged anti-human and anti-development implications of the WGEEP report. To address the criticisms levelled against the WGEEP report, MoEF constituted a High Level Working Group on Western Ghats (HLWGWG), headed by Kasturirangan, a noted space scientist, in August 2012. The HLWGWG submitted the report in April 2013. A major difference of this report from that of Gadgil was that, instead of the entire Western Ghats, the HLWGWG reduced the Ecological Sensitive Area to 37% of the total Western Ghats, which the environmentalists criticised as detrimental to environmental conservation.

In the meanwhile, both the Panel Reports were opposed by a large section of people living in the Western Ghats area of Kerala, and they identified themselves as *Malayora Janata*⁴. They started various ways of public protests (Radhakrishnan, 2013). Environmentalists argue that the protests were sponsored by various mafia which were controlling illegal industrial activities in the Western Ghats, such as mining, quarrying, tourism and real-estate⁵. The protesters denied this and accused the state and the union governments and the environmental organisations of their anti-human environmental policies (Anikuzhikkatti, 2012). Though these protests took place throughout the Western Ghats region of Kerala, they turned violent at times, especially in pockets of Kannur district and Kozhikode districts. The protesters received support from all leading political parties of Kerala and several associations of dominant communities and caste groups. The report also instigated heated discussions about environment and development in activist circles, academia, and mass media⁶.

In short, both these policy reports did not succeed in what it was supposed to attain as it attracted massive and unprecedented protest mobilisations (K, 2022; Pereira 2012). These protests and the ongoing legal and otherwise fights mark a serious policy crisis regarding the Western Ghats conservation. This paper analyses these two reports and the related scientific and public discussions with a focus on the boundary-work to explain the policy crisis.

² As the Panel was headed by Madhav Gadgil, a renowned ecologists in India, it is popularly known as the Gadgil Committee. The panel held 14 meetings during its study and submitted the final report on August 31, 2011. It adopted an approach of considering the entire Western Ghats area as ecologically sensitive, designating it as Ecologically Sensitive Area (ESA) and classifying the areas into three Ecological Sensitive Zones (ESZ), as per the level of ecological sensitivity, into ESZ-1, ESZ-2 and ESZ-3. These three zones are besides the already declared Protected Areas (PAs). In short, the entire Western Ghats area is ecological Sensitive Zones (ESZ). The formation of a statutory body under the MoEF, as per the Environment (Protection) Act 1986, called the Western Ghats Ecology Authority (WGEA), was another important recommendation of the panel. This body would take care of a supervisory role in the demarcation exercises of the ESZs and other regulatory works in the Western Ghats. The panel also recommended considering the suggestions and opinions of local communities and the Local Self-Governing Institutions while developing and implementing conservation plans.

³ Climate Change is also a subject matter of the ministry since 2014 and now the ministry is knows as Ministry of Environment, Forest and Climate Change.

⁴ The translation of this expression is "people of the mountains". See K (2022) for further details about this category.

⁵ See (Kasturirangan Report will benefit land mafia: Expert, 2014; Suchitra, 2013)

⁶ See (Chopra, 2014; Gadgil, 2014; Mohan, 2014; Nagarajan et al., 2015; Kokadan, 2014; Kunhikkannan, 2014; Suresh, 2023; Vinod,2014)

Boundary-Work: A Conceptual Understanding

The concept of boundary-work is majorly used as an explanation to the so-called demarcation problem - about the epistemological difficulties associated with demarcating science from non-science. Policy studies scholars understand boundary-work in two separate but interrelated ways. One is about marking science from non-sciences, that is as "an ideological style found in scientists' attempts to create a public image for science by contrasting it favourably to non-scientific intellectual or technical activities" (Gieryn, 1983, p.781). Among the non-science domains, policy has been most often referred and boundary-work has been used to demarcate science from policy (Jasanoff, 1990). This paper uses this concept in both these senses in different contexts. Demarcating science from other intellectual activities is a philosophical⁷ and sociological⁸ problem. This paper adopts Gieryn's complex conceptualisation of boundary-work as an everyday practical problem, more than as a philosophical or sociological problem. For him " 'science' is no single thing: characteristics attributed to science vary widely depending upon the specific intellectual or professional activity designated as "non-science," and upon particular goals of the boundary-work. The boundaries of science are ambiguous, flexible, historically changing, contextually variable, internally inconsistent, and sometimes disputed" (Gieryn, 1983, P792).

Following the first sense of boundary-work, the paper argues that both the Panels' epistemological limitations to understand the social domain explains the specific policy crisis addressed in this paper. This limitation applies, perhaps more crucially in the second sense of boundary-work, that is demarcating scientific knowledge production from policy. The paper illustrates that the Panels adopted similar methodologies and approaches towards scientific knowledge production and policy prescriptions. They were somehow hesitant to understand these two intellectual pursuits differently. While they adopted the best possible methodologies in scientific knowledge production, the effectiveness of the same in policy regime is doubtful⁹.

The argument of this paper is not about the demarcation problems encountered by the Panels. As mentioned above, developing a coherent distinction between science and policy is an epistemological issue, known as the demarcation problem. The elaboration of the concept of boundary work, as detailed in the beginning of this section, underscores the complexities in the demarcation. The argument of this paper is not that the Committees didn't draw a boundary, but an apparent lack of any sense of thoughtfulness about managing the boundaries between science and policy; and the seemingly arbitrariness and casualness in not treating policy distinctively from the science work that they are good at.

Methodology

Content analysis is the major method used in the study. The WGEEP and HLWGWG reports, other scientific articles, policy documents and media reports are analysed. The scientific deliberations include the scientific article written by the members of WGEEP in current science and the appended copy of the article in WGEEP. The publicly available content related with the conservation debates such as newspaper reports, and articles are also analysed.

⁷ See (Feyerabend, 1993; Kuhn, 2015; Lakatos, 1978; Laudan, 1983; Popper 1992)

⁸ See (Barnes, 2009; Collins & Pinch, 2020; Latour, 2015; Merton 1998)

⁹ This paper is not venturing to explain how policies and scientific knowledge are made differently as it is beyond the scope of this paper. However, the critical debates on policy studies (Eg: Asthana, 2009) would be helpful to understand the non-commonsensical ways of policy making.

Analysis

The Boundary-Work of Science and Policy

WGEEP and HLWGWG were mandated to perform two kinds of functions such as producing scientific knowledge and proposing policy prescriptions. Though there is a commonsensical similarity between these two and are interrelated in the required approach and methodology, they are two different works that demand different set of knowledge bases and skills. Evoking the second sense of boundary-work would provide more insights to this difference. For instance, mandate for the WGEEP includes responsibilities related to scientific knowledge production as well as policy prescription. The first mandate "To assess the current status of ecology of the Western Ghats region" is a function of knowledge production which the Panel is capable of at least in principle. However, the capabilities in scientific knowledge production may not be adequate to address most of other mandates as given below:

(iii) To make recommendations for the conservation, protection and rejuvenation of the Western Ghats Region following a comprehensive consultation process involving people and Governments of all the concerned States. (iv) To suggest measures for effective implementation of the notifications issued by the Government of India in the Ministry of Environment and Forests declaring specific areas in the Western Ghats Region as eco-sensitive zones under the Environment (Protection) Act, 1986. (v) To recommend the modalities for the establishment of Western Ghats Ecology Authority under the Environment (Protection) Act, 1986 which will be a professional body to manage the ecology of the region and to ensure its sustainable development with the support of all concerned states. (vi) To deal with any other relevant environment and ecological issues pertaining to Western Ghats Region, including those which may be referred to it by the Central Government in the Ministry of Environment and Forests. (Gadgil et al., 2011c, pp. 22-23).

Performing these tasks require knowledge and skills in policy formulations that are different from the knowledge and skills required for scientific knowledge production. Similar is the case of HLWGWG Report. These panels have been constituted with an implicit presupposition about their capacities in the scientific knowledge production. The ability of their scientific methodologies to understand the complex socio-political factors associated with the ecological aspects is a problem; which the paper discusses in the next section. However, the Panels' qualification to propose policy prescriptions is the major question to be levelled against the ministry as well as the Panels. Will the same modalities of scientific knowledge production work in the policy regime?

To engage with the above said question, one has to engage with the debates on the epistemological aspiration of the discipline of conservation biology to consider the policy implications. Scholars of environmental law and conservation biology were aware of the role scientists can play in conservation policy and environmental governance regimes and have been arguing since the late 1980s for policy oriented scientific production. (Meffe & Viederman, 1995; Salzman, 1989). The literature has strongly admitted the key roles that the production, dissemination and application of knowledge would bear in the environmental governance and conservation policy scenarios (Black, 1988; Giebels et al., 2013; Lemos, 2015; Meffe & Viederman, 1995; Rose, 2014; Salzman, 1989). Multiple functions that knowledge performs in environmental governance particularly from the bio-physical aspect of environment have been identified by the scholars¹⁰. However, one specific aspect of knowledge-governance interface, that is crucial as far as WGEEP and HLWGWG are concerned, is about managing the boundaries between the scientific knowledge production and policy processes (Keulartz, 2009; Swart & Van Andel, 2007). Such efforts of managing the boundaries require serious consideration of

¹⁰ These multiple functions include educating the decision makers (Burns & Stöhr, 2011; Evans et al., 2011) consideration of various scientific and non-scientific knowledge and collaborative production of knowledge (Armitage et al., 2015) and in managing the disputes over knowledge claims (Dale et al., 2019; Hegger et al., 2020).

boundary-works (Nel et al., 2015; Owens et al., 2006), The boundary management would involve the organisational and institutional dialogical process between knowledge production and policy making. The Reports of both the Panels do not connote any apparent efforts to differentiate the knowledge production from policy processes. Instead, they give stress on the former and assume the same applies for the later. This casualness about policy-making is apparent in both the reports.

Boundary-Work in the First Sense and Difficulty in Locating the Social

The seminal scholarly conviction about boundary-work asserts that the demarcation between sciences and non-sciences are done not based on the intrinsic quality of science but through the rhetoric made by scientists in defence of science (Grieyen, 1983). This thesis is significant in the empirical cases analysed in this paper. The scientific and non-scientific debates that emerged consequent to the releasing of the reports of both the Expert Panels and the public protests against them often project that their version is the only scientific one and others' are not. This is particularly visible in the debates between WGEEP and HLWGWG.

The latter claimed that they are more scientific than the WGEEP, and Madhav Gadgil, the chairperson of the WGEEP is accused of not being scientific. For instance, there are many mentions in the HLWGWG report about its attempt to be scientific. See the excerpt from HLWGWG report "For the first time in conservation ecology and sustainable development, HLWG¹¹ with the help of NRSC¹² developed a scientific, objective and practical way of identifying Ecologically Sensitive Areas (ESAs)" (Kasturirangan et al., 2013, P. 31). The phrase "for the first time in conservation of the scientificity, objectivity and practicality of the WGEEP report which was released prior to HLWGWG report.

HLWGWG, instead of revisiting the WGEEP report, repeated the cartographic exercise to demarcate the Ghats but with extensive use of remote sensing technology. When WGEEP framework was of a nine km grid, HLWGWG used satellite images of 24 m resolution. Kasturirangan's collaboration with Indian Space Research Organisation and National Remote Sensing Centre helped HLWGWG in availing a finer resolution. With this dataset, the HLWGWG distinguished vegetation types over the landscape of the entire Western Ghats. Gadgil, the chair of WGEEP outrageously expressed his despair at the HLWGWG report and wrote an open letter to Kasturirangan, the chair of HLWGWG. The title of the Indian Express news about this letter was "Ecologist Madhav Gadgil calls Kasturirangan panel report faulty and unscientific" (Thakur, 2021). V.S. Vijayan, a renowned wildlife biologist and a member of WGEEP, in a letter sent to the MoEF, also expressed similar opinions. To quote the news report "Former chairman of the Kerala Biodiversity Board V. S. Vijayan, who was also part of the Gadgil Panel on Western Ghats, termed the partitioning of natural and cultural landscapes by the Kasturirangan panel unscientific" (Gadgil's missive to Kasturirangan, 2013, para.7).

Many such claims about one's scientificity is visible throughout the scientific, policy-level and public debates related to the Western Ghats conservation. The major problem here is that both the Panels while making scientific claims, failed to propose a consensual and pragmatic plan to conserve the Western Ghats. This failure is the rationale for evoking boundary-work in the sense as used in the previous section that is between science and policy. The practicability of the Expert Panel Reports' scientific claims cannot be questioned even after their failed attempts to propose consensual policy proposals for Western Ghats, if they are considered only as scientific documents. However, this is not the case while considering the Panel Reports as policy documents.

¹¹ High Level Working Groups on Western Ghats used the abbreviation HLWG in its report whereas this paper uses HLWGWG.

¹² National Remote Sensing Centre, a centre of Indian Space Research Organisation (ISRO), tasked with establishing ground stations for satellite data reception, generating data products, and disseminating information to users.

This issue, in a different sense, is relevant evoking the first sense of boundary-work as well. Even while demarcating one's claims as science and others as non-science the inadequacy to scientise the domain of social becomes the major issue. WGEEP is vocal about the interests of local populations and strengthening of grassroot democracy. However, the problem the panel faced is to scientise these claims. While they succeed in developing a methodology for measuring the ecological values of the areas, they fail to put forward a sound methodology for measuring the aspects that they refer to as cultural. Gadgil though has connections with grass root movements for long is an expert in mathematical modelling of ecology, and he might have overrated the efficiency of such methods in making sense of the cultural sphere. See the below excerpt from WGEEP,

The Panel also suggested that important persons involved in the ecology of the Western Ghats be contacted; viz. Shri Jayant Kulkarni, Pune; Prof. Sharad Lele; Dr. N.R. Shetty; Prof. Vinod Vyasulu, IIM, Bengaluru; Dr. Janardhan Pillai, Centre for Budgetary Policy, Bengaluru, and also contacts be made with various institutions viz. Project Tiger of MoEF (Dr. Rajesh Gopal), Shri K.G. Tampi, IG (NAEB) and Forest Department MoEF (Dr. Dilip Kumar, DG & SS), Justice Dharmadhikari, Dahanu Authority, and Anthropological Society of India for Tribal-related information (Gadgil et al., 2011c, p.160).

Here, the only imagination of social for WGEEP is as Tribal. It may specifically be reminded here that anthropology is not only about "Tribal related information" now. There are many casual references in WGEEP such as "introducing incentive payments as ,conservation service charges" (Gadgil et al., 2011c, p.43). While there is a meticulous hard work put for methodology for ecological aspects of the Western Ghats, the suggestions for conservation service charges sound casual and arbitrary. The methodological rigour that took Gadgil to this suggestion is not reflected in the report. Such suggestions that remain outside the domain of scientific are left with no serious methodological and disciplinary considerations. The failure of the panels is not that it did not offer a cutting-edge community-wise analysis of various communities of the Western Ghats, their relationship with the ecology and natural world. The failure is also not that WGEEP does not propose such approaches, but that it is seemingly falls short of the very need for such approaches. For instance, the inadequacy is reflective in the failure in understanding the Kerala Society using broader frameworks¹³ of various social sciences¹⁴.

Similarly, in the case of HLWGWG, there are instances in its report where it attempts to make sense of ecology as a socially and economically embedded category. For instance,

The Working Group also took note of the environmentally friendly practices in coffee plantations in Kodagu and cardamom plantations in Idduki and Wayanad where integration of natural landscapes with human settlements exists. Indeed, it is because of this harmony between people and nature in the Western Ghats, the HLWG recommended policies to incentivize green growth that promotes sustainable and equitable development across the Western Ghats region. (Kasturirangan et al., 2013, p. 3)

However, such attempts remain in the margins of the ecological concerns and turning futile with the over-dependence of scientism. While HLWGWG mentions such environmentalfriendly approaches, there is no serious attempt evident in the Report in understanding such

¹³ WGEEP is proposing such an approach in constitution of various ecological committees. For instance, the Report stresses "Discipline or domain experts include experts from the discipline of science, economics, law, sociology and the like" in the context of the constitution of Western Ghats ecological authority. However, the WGEEP didn't administer such a multidisciplinary approach.

¹⁴ Proposing a specific social science framework to address the issue is beyond the scope of this paper. Moreover, many social sciences traditions such as that of sociology have a disciplinary reluctance in catering such bureaucratic needs (Mills. 2000). Similarly, the array of critical debates on Popper's (1944) piecemeal social engineering is also highlight the inadequacy of instrumental knowledge production for social change. However, these limitations of social science need not stop one from attempting for gaining in-depth understanding of the complexities associated with the social relations of environment and the environmental relations of societies.

aspects. The methodology of the Panel, as mentioned in the beginning of this section, like using satellite images for understanding ecology, is incapable of seriously understanding the social dimension of ecology.

Salience Vs Sensitivity: The Boundary-Work and Implied Confusions

The WGEEP was meticulous in devising a scientific methodology for demarcation of ecological sensitivity of the Western Ghats. To reinstate the scientificity, it published a paper about the methodology in a reputed Indian science journal - Gadgil et. al. (2011a). The methodology included dividing the entire Western Ghats Ecologically Sensitive Areas (ESA) into 2200 grids and generating a database to determine the Ecological Significance based on composite scores derived from the database. As per the article, Gadgil et. al. (2011a) proposed three criteria for ESA demarcation : (a) abiotic attributes, (b) biotic attributes and (c) anthropological or socio-cultural attributes. The abiotic factors are physical, geological and climatic characteristics and biotic features are the biological characteristics. The criteria for biotic factors are biodiversity richness, species rarity, habitat richness, productivity and ecological resilience. Here the problem in boundary-works arises as there are no sound mechanisms proposed to measure the anthropological or socio-cultural attributes.

This difficulty in locating and placing the complex domain of social that is intrinsically connected to the ecology is evident in the WGEEP report. The report of Gadgil et al. (2011c) has appended the current science paper by Gadgil et al. (2011a) as appendix four (Gadgil et al., 2011b). However, the appended one is a revised version of the actual current science paper (Gadgil et al., 2011a) and the rationale for the revision is not clear from the WGEEP report. The difficulty in making sense of the social aspects is reflected in the way the paper is revised. The title of the original current science paper is "Mapping ecologically sensitive, significant and salient areas of Western Ghats: proposed protocols and methodology" and the one appended in the WGEEP report is "Mapping Ecologically Significant and Sensitive Areas of Western Ghats: Proposed Protocols and Methodology". The word "salient" is missing in the latter. This omission, more than a typo, has larger implications as far as the boundary-work is concerned. While the adjectives "significant" and "sensitive" denotes ecological aspects, "salience" connotes social factors, according to Gadgil et. al. (2011a). The original current science paper gives much importance to the aspect of salience. See the below excerpt from the original current science paper

Since 'sensitive' and 'significant' each has its specific connotation, it would be useful to employ another word for the broader concept. Such a word is salient, whose meaning includes: 'relative importance based on context'. Therefore, we propose to use the term 'ecologically salient areas' in lieu of 'ecologically sensitive areas' to capture both aspects, while retaining the abbreviation as ESA. Thus in the ensuing pages we use ESAs in this sense and not to refer merely to ecologically sensitive areas. (Gadgil et al., 2011a, P.177)

However, not only the word salience, but also the sense in which the word is used find missing when the paper is appended to the WGEEP report.

Both the papers provided a table (Table -1) titled "Terminologies used and the attributes suggested to be used while assigning 'ecological salience' scores" that lists the intrinsic biological, ecological service, economic, and socio-cultural values with respect to different terms used to denote ESA. While there is a serious engagement with the biological value, the economic, and socio-cultural values are rather ignored.

This is more evident in WGEEP report. While discussing about defining ESAs, Gadgil et al. (2011c) assert that a defining characteristic of ESA according to them is not merely ecological sensitivity but ecological significance. They list four types of values that define the significance of ESA. The last one is cultural and historical values,

Clearly, as being practiced or being suggested world over for demarcating them, ESAs are not merely sensitive areas but are also Ecologically Significant Areas. They are significant for their biological value, ecological value, economic value, cultural and historical (both biological and anthropological) values and also significant because they are sensitive to external and natural pressures. (Gadgil et al., 2011c, p.199)

The efforts and rigour of the panel in deciding the economic, cultural and historical values are not reflected in the report. There are many such differences between the original current science paper and the appended paper. The abstract of the current science paper stresses on managerial aspects of the Western Ghats. See the following excerpts from the abstract of the current science paper,

The Western Ghats Ecology Expert Panel (WGEEP) of the Ministry of Environment and Forests, Government of India (GOI) has been asked to identify ecologically sensitive areas (ESAs) along the Western Ghats, and to suggest how to manage them¹⁵.

Furthermore, there are no clear <u>guidelines on the management regime</u> that should prevail in ESAs, and the Pranob Sen Committee has not addressed this issue at all.

We hope to shortly prepare a companion paper that will address the <u>equally vital</u> <u>management issues.</u> (Gadgil et al., 2011a, p.175)

The usage of the word management indicates the social aspects of conservation that needs agentive involvement of people. However, this aspect and the above mentioned excerpts are missing in the appended paper. Instead, the appended paper stresses on conservation.

One of the objectives assigned for the Western Ghats Ecology Expert Panel (WGEEP) of the Ministry of Environment and Forestry, GOI, was to identify the Ecologically Sensitive Areas (ESAs) along Western Ghats, and thence to suggest regulatory procedures to conserve them. (Gadgil et al., 2011b, p. 117)

Here, the change from managerial aspects to "regulatory procedures to conserve" overlooks the social embeddedness of Western Ghats ecology and environment. Both these committees manifest an aspiration to be scientific with an apparent diligence for it. However there hasn't been any similar rigorous efforts to understand the complexities of non-science aspects of human environment interaction. How are the social, economic and cultural lives of human beings organised in these landscapes and what are the nature and characteristics of their relationship with environment has been either ignored or poorly addressed. While there is a reduced focus on the social aspects, one would see, as discussed earlier, a protracted presence of the phrases such as science and scientific in the Panel Reports and the consequent debates. This aspiration to be scientific is the major distinguishing characters of not only the camps of the environmentalists but also their opposition. Even within the environmentalists, the major difference of opinion is about the nature of their science claims¹⁶.

Discussion

By evoking two senses of boundary-work to understand the demarcation problem, as detailed in analysis section, the Panels adopted certain methodologies for knowledge production and assumed that the same would apply for policy prescriptions. Both the WGEEP and HLWGWG and the consequent public discussion were stressing that they were scientific. However, the panels failed to propose any methodological scheme to understand the complex

¹⁵ Some phrases from the excerpts are underlined by the authors to denote the tensions between the drives for conservation and management.

¹⁶ For details see (K, 2022)

domain of the social. This failure is particularly evident in the way in which the current science paper is revised when WGEEP appended this paper in its report.

The scientific methods that the Panels proposed might help in deciding the ecological significance. However, the casual assumption of the Panels about the effectiveness of such methods for deciding the ecological significance/sensitivity/salience is to be questioned. How to bring social and political variables more effectively and forcefully along with ecological significance/salience is the concern here. A series of work majorly in the context of marine ecosystem conservation in the European academia would help one at social constructionist conceptualisation of boundaries as complex systems. (Bäckstrand, 2004; Bremer & Glavovic, 2013; Wesselink et al., 2013; Janssen et al., 2015). Following Jasanoff, there are increasing works that challenge the linear understandings of the knowledge-governance relationship (Atkinson & Klausen, 2011; Hegger et al., 2012; O'Toole & Coffey, 2013; Wyborn, 2015). The meeting point of these works is the understanding that, one is not using knowledge in governance but knowledge and governance are co-produced. In such a co-productionist understanding, the different senses of the term boundary-work such as the demarcation between science and policy and demarcation between science and non-science intersect. Such co-productionist conceptualisations might be complemented with insights from social sciences (Agrawal & Ostrom, 2006), storytelling (Leslie et al. 2013), interpretive policy analysis (Hajer, 1995) and narrative policy framework (Lawton and Rudd, 2014).

Unless understanding the relationships between the difficulties associated with geographical demarcation of environment from non-environment and science from nonscience, the policy crises might recur. Any proposal that is devoid of an understanding of this historical relationship would remain merely a technological fix¹⁷. The debates on Indian environmentalism underscores that a neat demarcation between environments and non-environments is almost impossible in global southern contexts like India (Gadgil & Guha, 1995). Furthermore, WGEEP report ensures that its philosophy is driven from Indian environmentalism and citing the case of Soliga Community of BRT hills¹⁸ as an example. See the excerpt from the section titled "Problems of tight control over Protected Areas" from the WGEEP report;

There is a wide-spread belief amongst urban conservation activists, endorsed whole heartedly by the forestry establishment, that it is the local community members and their subsistence requirements that are the main threat to India's wildlife. The case study of BRT hills brings out how erroneous this line of thinking has been, as does the experience of the Bharatpur wetland. WGEA should therefore focus on promoting proper implementation of the Forest Rights Act which confers on forest dwellers certain rights and responsibilities inside Wildlife Sanctuaries and National Parks also. (Gadgil et. al., 2011c)

The WGEEP is so enthusiastic in narrating how people's lives are interconnected with the environment and such interconnections are leading to conservation than destruction. Such a line of thinking cannot offer the rationale for the demarcation of Western Ghats in general and

¹⁷ In philosophy of technology technological fix refers to offering technical solutions to complex problems by overlooking the political and social dimensions that is "the solution of a problem by a technical solution, that is, the delivery of an artifact or artifactual process, where it is questionable, to say the least, whether this solves the problem or whether it was the best way of handling the problem" (Franssen et al., 2023).

¹⁸ BRT hills are a forest covered ranges in Karnataka to the east of the Nilgiris. It is the traditional homeland of Soliga Adivasi community, who earlier practised hunting-gathering and shifting cultivation. They have protected a large sacred grove, harbouring a magnificent Michelia Champaka tree. When this area was declared a Wild life Sanctuary, Soligas could no longer hunt or practice shifting cultivation. So, gathering of honey, medicinal plants and Amla (Phyllanthus emblica) became the mainstay of their subsistence. A voluntary organisation, Vivekananda Girijana Kalyana Kendra, has organised them effectively and helped set up a system of regulated collection, processing and marketing of forest produce. Another organisation, ATREE, has been engaged in a study of the Soliga forest produce collection practices and their impact on resource stocks. They have roceme to the conclusion that these practices are entirely sustainable. The Soliga earnings had also improved because of their own processing industry. Most regrettably, the Forest Department has banned all collection of forest produce for marketing, forcing Soligas into destitution.

ecological sensitive/significant areas in particular. Despite the lack of sound justification emerging from the WGEEP report, the Panel is proposing scientific methods for demarcation instead of advancing the process with a deep understanding of the social and political processes in the Western Ghats region. This gap has led to mistrust in the conservation recommendations by both panels, triggering widespread protests in the Western Ghats and resulting in a policy conundrum.

Conclusion

If knowledge is intrinsic to policy, it is intrinsic to the policy making and policy crisis. This paper attempted making sense of the policy crisis by focusing on the policy-driven knowledge production mechanisms. Knowledge and policy are found co-produced in a specific way that caused a policy crisis in the case of Western Ghats conservation in Kerala. Evoking the different senses of the concept of boundary-work, the study has illuminated the challenges encountered by expert panels tasked with both generating scientific knowledge and formulating policy recommendations. The analysis underscores a fundamental tension within these expert panels, where a meticulous emphasis on scientific methodologies for understanding ecological dynamics often fails to adequately incorporate socio-cultural dimensions essential for effective policy formulation. While the reports produced by the WGEEP and HLWGWG demonstrate commendable scientific rigor, they exhibit a notable oversight in grappling with the intricate social and political realities that shape conservation efforts in the Western Ghats.

Both the WGEEP and HLWGWG were tasked with proposing mechanisms for demarcating the Western Ghats. This paper, as explained in the analysis sections, highlights the relationship and difficulty between geographical demarcation and the epistemological demarcation. The discussion section also briefly mentions another aspect of this demarcation problem in the context of debates in Indian environmentalism. The foundational scholarship on environmental social sciences in India asserts that the geographies and epistemologies of the social and environmental as complexly intertwined and a demarcation of geography without considering the epistemology is almost tedious. An overt fixation on scientism without understanding the complexities may again take one to the similar labyrinths. Though the social sciences might be incapable of instrumental policy prescriptions, they might be helpful in understanding the complexities associated with the policy crisis and offer novel ways of addressing the same.

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