Policy Democracy: Social and Material Participation in Biodiesel Policy-Making Processes in India

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Policy democracy: Social and material participation in biodiesel policy-making processes in India

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Abstract

Following its 2003 biodiesel mission, the Indian national government released its controversial policy on biodiesel in December 2009. Viewing the policy as a set of propositions that have been progressively assembled and constituted by many voices, we study its making on the basis of 72 qualitative interviews and ethnographic fieldwork. We consider the policy-making process to constitute *policy democracy* if its propositions were *well-articulated*. A well-articulated proposition is one that has registered the voices of many different human and nonhuman entities, including those that were hitherto mute. In addition, a well-articulated proposition must have allowed the entities to challenge and recompose it. And it must not have turned the entities' actions and voices into a repetitive singularity. Finally, a well-articulated proposition is not easily transferrable between different socio-ecological situations. We argue that the Indian government attempted to perform policy democracy, by being partially responsive to some entities' recalcitrance. However, it failed to register crucial voices associated with biodiesel production such as those of water and CO_2. It also turned many voices into repetitive singularities, discounting the different relations that allow an entity to speak in multiple voices. The policy's propositions remained easily transferrable between diverse socio-ecological situations, ignoring the immense diversity of India's lands, their inhabitants and their practices associated with biodiesel production. Finally, due to a severe disconnect between the various voices registered in its different propositions, we argue that the policy lacked overall consistency.

Keywords: Policy process; actor-network theory; India; biofuels; practice; Stengers

1. Introduction

Since India's National Mission on Bio-Diesel was released in 2003 (Planning Commission, 2003), biodiesel in India has been embroiled in a multi-sided and multi-dimensional controversy. Themes such as food versus fuel, landgrabbing, and income insecurity of smallholders and the landless are central to this controversy in India as well as globally (Vel, 2014; Rosillo-Calle and Johnson, 2010; Clancy, 2011). Focusing on India's subsequent 2009 National Policy on Biofuels (Government of India, 2009), we study if and how different voices in this controversy were registered by the Indian government in the making of its national policy on biodiesel.

Prominent academics and civil society organizations have debated the government's biodiesel plans. First, scholars such as Gopinathan and Sudhakaran (2009) argued that there are millions of hectares of so-called wasteland waiting to be cultivated for biodiesel feedstock, as correctly noted in the 2003 Mission. Others criticized biodiesel production for encouraging land grabs and displacing cattle grazing (Baka, 2014; Lahiri ,2009; Findlater and Kandlikar, 2011; Lavanya, 2007). Second, Kumar et al. (2012) and Misra and Murthy (2011) predicted that the cultivation of biodiesel cash crops will be highly profitable for farmers. This was convincingly challenged by Ariza-Montobbio and Lélé (2010) and Rittenburg et al. (2011), who argued that the cultivation of biodiesel feedstock crops such as Jatropha curcas can, under the most favourable conditions, be profitable only for large farmers while smallholders growing Jatropha are vulnerable to economic risk and crop failure. Third, research that came out of programs initiated by the Indian government was criticized for being insufficiently focused on the development of so-called high-yielding varieties (TERI, 2005; Raju et al., 2009). Yet others warned that a research agenda focused on high-yielding varieties, without taking into account the actual cultivation circumstances of farmers, is likely

to increase the gap between poor and rich farmers (e.g. Ariza-Montobbio et al., 2010; Ravindranath et al., 2011). These debates have resulted in a wide range of policy advice, including encouraging the use of locally available flora (Agoramoorthy and Patel, 2011) or multi-purpose short-duration annual crops (Rajagopal, 2008), amending land use policy to facilitate bringing 'under- or unutilized land reserves' under cultivation (Altenburg et al., 2009), or being more respectful of existing uses of government-owned 'marginal' lands such as cattle husbandry (Biswas et al., 2010).

Others including Nagar (2011) and Pradhan and Ruysenaar (2014) have explored the making of the 2009 policy. Nagar (2011) describes how the policy came out six years after the Mission due to the global food vs. fuel debate, and how (in making the policy) food security was considered important by the Indian government. Pradhan and Ruysenaar (2014) show how India's biofuel policy gained legitimacy through the use of 'win-win' narratives that combine environmental sustainability with poverty reduction (also see Ariza Montobbio et al. 2010), and support from a group of high-profile individuals. Yet, to the best of our knowledge, no studies have focussed on the role played by myriad human and nonhuman voices (through various spokespersons), especially those considered 'marginal', in constituting the process of policy-making.

In this paper, directing attention to the voices included in the policy, we analyse the openness of the policy-making process to diverse dissenting voices, studying how the policy registered the dissent. In doing so, we understand the 'policy-process' as distributed across multiple societal actors (Sabatier 1991; Rutland and Aylett 2008). This paper is therefore not concerned with India's 'formal' governmental, institutional decision-making procedures but rather with those places in Indian society where contestation was enacted. Starting out with a brief overview of different perspectives on policy-making, we begin our analysis by building

our theoretical framework using work by Isabelle Stengers (1997; 2010), Bruno Latour (1999; 2003; 2004a; 2004b; 2010) and Stuart Hall (1980). We then use this framework to analyse the politics of India's biodiesel policy, discussing our conclusions in a final section.

2. Perspectives on policy-making

Different perspectives on policy-making include Foucauldian discourse analysis, advocacy coalition framework, interpretive policy analysis, as well as other approaches from anthropology of policy, science and technology studies and (human) geography. In this literature review, we discuss these approaches, focussing in particular on the ways in which they engage with the themes of participation and democracy.

Foucauldian discourse analysis largely focuses on the study of language used in policy-making. It shows how common notions such as 'nature' are contested, and how discourses shape thinking and therefore policymaking, as well as how they might work to discipline society (Hajer and Versteeg, 2005; Beck, 1995; Killingsworth and Palmer, 1992; Darier, 1999). Materiality of things and bodies is, in general, not analysed. Discourse analytic studies also generally do not attempt to evaluate what makes for good, democratic or participatory policy-making. The 'advocacy coalition framework' (e.g., Sabatier, 1998; Weible et al., 2011) takes materiality into account but only in the form of resources deployed by coalitions of actors to help shape policies. Other things considered in this framework include financial and knowledge resources as well as the shared sets of beliefs that govern actors' behaviour. Also emphasized are changes in advocacy coalitions' composition due to learning or shocks, which are considered fundamental to policy change (Nowlin, 2011). A third approach of interpretive policy analysis focuses on meanings underlying policies. It places emphasis on the way policy-makers interpret and represent the world, articulating the problems at hand as well as the sciences deployed to find solutions (Yanow, 2003; Wagenaar, 2007). As such, it

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understands the role of both humans and non-humans in policy-making as open and malleable, to be examined empirically, rather than theorise policy-making on the basis of cause-and-effect relations.

Similarly, anthropology of policy directs attention to the empirical combinations of language, symbols and action in studying policies (Rabo, 1997; Mackey, 1997; Lewellen, 1993). Important work in this anthropology treats policies as entities that act, or even as assemblages, rather than as passive objects (Shore and Wright, 2011). Studies have shown how a policy can render its approach (to objectives such as gender equality or tenant management) neutral, objective and therefore incontestable, which may be instrumental in constituting self-disciplining subjects (Hansen, 1997; Rabo, 1997; Hyatt, 1997). More recent work in anthropology of policy has studied the ways in which policy's human subjects attempt to contest and reconstruct policies both before and during their 'implementation' (e.g. Però, 2011; Zinn, 2011; Kugelberg, 2011; Müller, 2011). In general, anthropology of policy goes beyond a focus on the role of policymakers or on the government's policymaking apparatus, by focussing on a range of people who are supposedly governed by the policy and whose subjectivities policy may constitute in its 'implementation'.

Work in science and technology studies has focussed on participation, and the relationship between the making of science and that of policy. For example, Jasanoff (2004: 2) uses the concept of "co-production" to propose that political choices are inseparable from how scientists know and represent the world, arguing that there is always some form of 'participation' (from scientists and the entities they represent) in policy-making. The co-production approach has been used to study how particular networks, institutions, identities, knowledge-claims become powerful while others remain contested (Swedlow, 2012).

Additionally, the inclusion of 'lay' or 'non-scientific' forms of 'expert' knowledge (e.g. of patient associations or environmental activists) has been described as a characteristic of good policy-making (e.g. Ng'ombe et al., 2012; Mosse, 2004; Marres, 2005; Wynne, 2007; Callon et al., 2009). This normative stance can arguably be supported in one of two different ways, on the basis of ontology and of accountability (Lövbrand, 2011; Barry et al., 2008). The ontological basis starts from the understanding that universal knowledge-claims marginalise the multiplicity of situated enactments of any entity including a disease (Mol 2002) or food (Mol 2008). Universal knowledge-claims also pre-empt political discussions on indeterminacies and uncertainties inherent to the sciences (Wynne, 1992; Wynne, 2007). In general, the argument is that 'lay' or 'non-scientific' knowledges may be capturing other aspects of reality than scientific knowledge. And therefore co-producing (policy) knowledge with non-scientists could generate debates and deliberations on the political questions implicated in the development of science and of policy (Wynne, 2007). Such deliberations may be crucial for strengthening democracy. To assist in this process of more inclusive and open co-production, public controversies about knowledge claims may help reveal groups that consider themselves implicated in an issue, but were shut out initially (Callon et al., 2009). Such co-production also highlights the importance of not simply including people after problems have already been defined. Instead the definition of the problem itself should be opened up for deliberation and reappraisal (Stirling 2007), also to bring to light new concerns that may have been originally overlooked (Marres, 2005).

Inclusion of 'non-scientific' actors for reasons of 'accountability' focuses on responding more adequately to societal problem-solving, so as to meet the needs of decision-makers (Lövbrand, 2011; Barry et al., 2009). Participation undergirded by this logic has often led to disappointing results by failing to render visible issues and voices that were hitherto

hidden, due to the instrumental and legalistic ways in which it has been *applied* in many participatory policy-making programs (Wesselink and Paavola, 2011; Stirling, 2006). In this way, such participation or co-production has also failed to question the premises and goals of a specific field of science and technology interacting with policy.

In our view, which builds on the foregoing while adopting an explicitly relational approach (Latour 1997; 2004a; 2004b), participation as the inclusion of diverse interests and concerns in policy-making processes, to varying extents, may be treated as a characteristic of all policy-making processes. Thus any policy-making intervention may be evaluated in terms of the extent to which it has enacted democratic inclusion and registration of divergent ('lay', 'expert', human, nonhuman) voices. Appreciating policies socially and materially constituted processes, taking place through the circulation and movement of various human and nonhuman entities (Freeman, 2012; Prince, 2010), we propose four criteria in the following section for examining specific ways in which a policy-making exercise has been participatory and democratic. In proposing these criteria we respond to Lövbrand et al.'s (2011) call for principles by which participatory and deliberative encounters can be evaluated, while recognizing that any prescribed principles may be deployed in multiple ways (used, resisted and remade), producing multiple effects, depending on the configuration of power relations and material resources underpinning the 'implementation' of principles and standards (Arora et al. 2013).

3. Theory: Democratic policy-making?

Following Latour (2003; 2004a; 2004b), we make a distinction between statements and propositions. A proposition, carrying in it the word 'propose', is literally an uttered proposal. As such, it is always up for discussion, it is malleable and does not carry any definitive *a priori* authority. The process of articulating propositions is an uncertain one and its outcome

is not predictable. The word articulation has two meanings: linking up and giving expression to (Hall, 1980). These meanings highlight the performative character of articulation: a) linking up two or more *different* things allows one to compose or give expression to something new, a composite proposition that upholds the difference between the things linked while transforming them (Stengers, 1997); b) giving expression to something helps to (trans)form relations between entities in specific ways (Latour, 2003). Focusing on the first aspect, we posit that policy propositions are articulated by assembling (and forming connections between) diverse entities. This implies that a different process of assembling, an alternate configuration of connections, will give rise to a different proposition. The concept of articulation thus foregrounds the fluid and situated character of connections that constitute propositions by emphasizing that propositions can always be re-articulated as new connections are made and/or older ones severed (cf. Featherstone, 2011).

Articulating propositions is done by linking up not only humans but also non-human entities. It is through linking up with others (words, ideas, things, animals or humans) that individual humans and non-humans are able to speak (Stengers, 1997). For example, soil is able to speak, through entanglement with soil scientists using various kinds of measurements and tools (Latour 1999). Scientists, however, are not the only human actors who articulate with nonhumans and help them speak. Any (non-human) entity can speak in multiple voices depending on who/what it is articulated with. If non-humans are represented only or mostly through science in policy-making, it may lead to a "narrowing of vision" by excluding other relations and ways of knowing and articulating (cf. Scott, 1998; Palmer, 2014; Whitehead et al., 2011; Hertin et al., 2009).

A democratically-constructed policy proposition is one which, in its making, allows diverse human and nonhuman entities to raise their (relationally-afforded) voices and ask

perplexing questions (Latour 2004b). Constructing such propositions is likely to be a slow process. We refer to such a democratically constructed proposition as well-articulated (Latour 2010; 2004a). Inspired by Latour (2004a) and Stengers (2010), we present a set of criteria for analysing policy propositions, which we use to study India's 2009 biodiesel policy.

a. A policy proposition is well-articulated if it registers the voices of all interested entities, including those that were hitherto mute.

A human or nonhuman entity is deemed to have an interest in a focal proposition if it raises its voice in relation to any concern or issue being addressed in the proposition. As noted above, the process of raising a voice is relational, in which the speaking of an entity in question is afforded by other interconnected entities. Our first criterion demands that any interested entity should be allowed to play an observable role in articulating the proposition. This implies that its voice must be *registered*. The action of registering a voice involves the taking into account of the entity's voice in composing the proposition. The registered voice should be clearly recognizable in the articulated proposition. This first criterion also requires that voices of entities (human or non-human) that may have been silenced in past articulations of the same proposition, or of other propositions addressing the same issues and concerns as the current proposition, must be taken into account. In this way, those silenced entities must be explicitly invited to speak in successive re-compositions (Latour, 2004b).

b. A proposition is well-articulated if it allows the registered entities to challenge and redefine the proposition at hand.

If a newly registered voice in a proposition does not transform the proposition, and instead the voice of the entity is simply recorded in isolation from all other entities articulated in the proposition, then the registration of the entity is rather superficial. A well-articulated proposition should instead allow its newly registered voices to challenge the extant

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articulation of the proposition based on connections between other participating entities. The latter should respond to the challenge posed by a newly registered entity. In this way, as a new entity's voice is registered, a relational transformation is brought about in the extant proposition.

This second criterion (and the first) address relations of power. If the newly registered entities are unable to challenge and recompose a proposition, it implies that incumbent entities participating in the proposition dominate. The incumbents, deploying their power, are able to ward off transformations and re-compositions demanded by the newly registered entities. In a well-articulated proposition, the authority to make a difference in/to the proposition must have been opened up to include the voices of all interested entities (Latour, 2010; Stirling, 2008). The latter include voices that are articulated with humans (and nonhumans) other than scientists or policymakers.

c. A well-articulated proposition does not turn the entities' actions and voices into a repetitive singularity, registering instead their multiplicity.
A well-articulated proposition recognizes that multiple voices of any single entity can be registered, depending on who or what the entity is articulated (linked) with. Entities, particularly those that are mobile, may link up with many other human and nonhumans as they move from one setting to another. For example, a biodiesel feedstock crop may be developed by scientists in a laboratory, marketed by a firm, and cultivated by a farmer. In the three settings, the laboratory, the marketing office, and the farm, the crop is articulated with other entities that are quite different from each other and therefore afford the crop to speak in different voices. If such relationally-afforded different voices of an entity are erased, then entity's voice is turned into a repetitive singularity. Its multiplicity is not registered. This also implies that, if entities are not allowed to speak in multiple voices, they are robbed of their

ability to do 'ontological politics' (Mol, 1999). By engaging in the latter politics, entities are able to open up the ways in which problems and concerns are framed (Stirling 2007).

d. A well-articulated proposition is not easily transferrable between different socio-ecological situations.

A well-articulated policy proposition is *situated* in the socio-ecological situation that constitutes it. Viewing any socio-ecological setting as a web of relations between humans and non-humans, we argue that this web is not just the substratum that enables (and forecloses) specific voices and actions. Instead it may be treated as the collective that speaks or acts when an individual entity appears to speak or act (cf. Callon, 2008). Such a collective is specific to its own relational setting (a network) and cannot be fully replicated in another setting elsewhere (Latour, 2010). This means that there is no disembodied view or voice from nowhere and everywhere: there is no god-trick, only situated knowledges (Haraway, 1988). A proposition may therefore be articulated differently as its socio-ecological setting or constituting collective changes. Conversely, easy transferability of propositions from one setting to another would imply that the voices of the new entities encountered in the new setting are not being registered. As such, the relational web of the new socio-ecological setting in which a proposition arrives should be visible, if the proposition is to be considered well-articulated.

The foregoing four criteria are designed to qualitatively assess the democratic inclusion of diverse entities (without standardizing their voices) in a policy-making process. For us, the latter is located throughout society and not only in a country or region's formal, institutional decision-making procedures. A well-articulated policy-making process constitutes what we call *policy democracy*. The inclusion of diverse entities, as demanded by the four criteria, may require the slowing down of policy-making processes. Such slowing down may be

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argued to be problematic, especially in the case of policies addressing large and 'urgent' problems such as climate change. However, as Stirling (2014) has argued, there is simply no case for putting democracy 'on hold' in addressing such large and 'urgent' problems, especially if the emancipatory potential of any socio-ecological-technical change is to be realised. Furthermore, Bingham (2008: 115) argues that slowing down may be productive in the sense that it allows for paying more attention to "all those other things, other stories, other trajectories, other becomings that were defined as not counting in the name of progress". Challenging current distributions of power and working with fundamental uncertainty about the nature of solutions to these problems may indeed require time.

Using the four criteria to analyse policy-making is not a truth-finding exercise. Our assessments based on these criteria may themselves be controversial i.e., when we argue that entities have been allowed to challenge and recompose propositions, others may disagree with us.

4. Methods

If non-human entities speak variously through different links with human entities, listening to them requires using a wide range of empirical materials from many different sources. Therefore, we rely on numerous documents on the topic of biodiesel in India, collected through internet searches, from libraries in India, and obtained from many people involved with the topic of biodiesels in India. Furthermore, the first author carried out multi-sited fieldwork from September until December 2012 (in Delhi, Hyderabad, Chennai, Bangalore and Coimbatore) and from September 2013 until March 2014 (in Bangalore and Hassan). She held 72 semi-structured interviews with people active in the field of biodiesel, including national- and state level policy-makers (25) from each of the ministries involved in biodiesel, researchers (26) from universities and research institutes such as The Energy and Resources

Institute (TERI), MS Swaminathan Research Foundation (MSSRF) and Tamil Nadu Agricultural University (TNAU), business representatives (11) and activists (8).[1] In addition, she visited agricultural research test fields, laboratories and biodiesel production plants to observe the materiality of these aspects of biodiesel production. The second period of fieldwork mainly consisted of engagement with farmers and project officers involved in a specific biodiesel project called 'Hassan biofuel park' in Karnataka. Throughout this multi-sited ethnography, attempts were made to strike a careful balance between 'following the actors' as they travelled between different settings and ensuring substantial depth of understanding of any particular socio-material setting (Boccagni, 2014).

5. Analysis: Articulating biodiesel propositions in India

In 2009, India's national government released its biofuel policy which addresses both bio-ethanol and biodiesel. Although controversies on these two products overlap, entities involved in their development are different. This study therefore analyses articulations in the biodiesel part of the India's 2009 biofuel policy. In the case of biodiesel, the 2009 policy was preceded by the National Mission on Bio-diesel, a policy document from India's Planning Commision in 2003. By studying the performative effects of this National Mission – the practices and controversies that arose – in relation to the 2009 policy propositions on biodiesel, we are able to identify which voices were included in the making of the 2009 policy (Asdal, 2015; Muniesa et al., 2007). We take the various practices and controversies arising out of the National Mission as constitutive of the process that led to the 2009 policy. Our analysis thus focuses on those practices and controversies, rather than India's formal,

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[1] The number of researchers is rather high because the author often had the chance to speak to a number of researchers in any one institute, while she usually met only one policy-maker when visiting a ministry or other government body.

institutional decision-making procedures that may traditionally be associated with the term policy process.

To facilitate detailed analysis, we identified five interconnected propositions that together form the 2009 biodiesel policy. Such a segmentation of the policy attempts to take into account the presence of specific entities in some propositions and their absence in others. Each of the five propositions selected from the 2009 policy has an equivalent in the government's 2003 Biodiesel Mission. In addition, we have tried to ensure that the selected propositions cover as many constituent entities of the biodiesel policy as possible, while listening carefully to our conversation partners in understanding which entities were controversial and therefore important to include in our analysis.

5.1 Why biodiesel?

The first policy proposition to be evaluated provides legitimization for biodiesels, claiming that they will contribute to "energy security, climate change mitigation, apart from creating new employment opportunities and leading to environmentally sustainable development" (Government of India 2009: 4). The four constituent categorical entities (energy security, mitigation, employment opportunities and environmentally sustainable development) of this proposition may have limited the entire policy's transferability by encouraging biodiesel production only when all four of them are actually enacted in a socio-ecological setting. The categories may have also foregrounded the socio-material politics from which the biodiesel policy emerged. They appear to have been critical for framing the policy's promotion of biodiesel production.

In the 2003 Biodiesel Mission, emphasis was on 'meeting rural energy needs' instead of energy security. The move towards energy security could be viewed as a widening of the

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policy's aims since 2003. However, the 2009 policy excluded and muted rural energy needs, dwelling instead on reducing dependence on oil imports through the use of biofuels. This disarticulation was undergirded by a number of socio-material practices between 2003 and 2009. Encouraged by the 2003 Mission, some non-governmental organizations (such as Chennai-based AHIMSA) set up biodiesel production chains explicitly in order to meet rural energy needs, operating without a profit motive. In practice, AHIMSA's project sold small quantities of seeds produced by Tamil farmers to a Swiss company and the Indian Railways. Some foreign companies started commercial joint ventures with domestic companies, such as D1 Mohan Bio Oils Ltd. This joint venture contracted farmers in Tamil Nadu to grow Jatropha curcas, but failed to keep their promise of buying the seeds that were supposed to be harvested three years after planting the saplings. The saplings also failed to deliver the kinds of yields promised to the farmers by the company's extension workers (Ariza-Montobbio et al., 2010). These practices indicate that the policy proposition's transition from 'meeting rural energy needs' to 'energy security' started soon after the 2003 Mission. Experience with biodiesel production after 2003 may have made apparent that meeting rural energy needs was not effective in meeting the interests of a wide range of firms, policy-makers and researchers involved. The latter voices appear to be more dominant than those of the inhabitants of rural areas with little or no access to electricity.

The active presence of foreign companies and the importing of feedstock also informed policy-making: their voices were clearly registered in the 2009 policy, as articulated by policy makers from relevant ministries, some researchers, and activists doing policy advocacy. This may have been crucial in producing the emphasis placed on 'energy security'. However, this explicit consideration of 'energy security' through domestic biodiesel

production may have been a discursive facade behind which imports of feedstock and the deep involvement of foreign corporations could conveniently hide.

The second crucial entity constituting this proposition of legitimizing biodiesel production was *mitigation* of climate change, by avoiding CO_2 emissions (through biodiesel production). A number of academic studies have suggested that biodiesel based on Jatropha curcas does not necessarily result in carbon savings. CO_2 may behave in various ways. For example, models that take into account practices such as replacing existing biomass with Jatropha curcas, and the use of inputs to cultivate the crop (e.g. fertilizers), articulate that the amount and timing of CO_2 emissions (associated with biodiesel production) varies greatly (Reinhardt et al., 2007; Romijn, 2011). These differences in CO_2 emissions in relation to biodiesel production practices were not registered in India's biodiesel policy. In fact, the CO_2 particles were isolated from the many ways in which they can come into existence, and the potential benefits from biodiesel contributed much louder voices than possible dissenting voices of CO_2 particles and their relations. In this way, the latter voices were turned into a repetitive singularity of "reduced and avoided emissions" from producing and using biodiesel. The resulting proposition can also easily transcend individual socio-ecological situations, dissimulating general applicability.

Thirdly, biodiesel production was articulated with the generation of employment. To promote this, the policy linked biodiesel projects in various parts of India to the National Rural Employment Guarantee Act (NREGA) – a scheme through which the government provides 100 days of employment at relatively high wages to people living below the poverty line (Lavanya, 2007). In practice, people were paid to plant Jatropha curcas or other biodiesel bushes and trees on government-owned land, but in most cases not for recurring work such as taking care of the plants or for collecting seeds. The policy also envisaged employment

opportunities on large plantations or in biodiesel production facilities such as transesterification plants. However, very few companies and other organizations were still running by 2009 because of lower than expected yields achieved with Jatropha curcas after the 2003 Mission (Kant and Wu, 2011). Critically, the voices of the very people about whom it was assumed that they wanted such employment were only registered as 'people in need of employment' in the policy proposition, without any reference to their skills and their willingness to work in biodiesel production. Any complexities of their everyday life, in terms of domestic or other cultivation responsibilities, were also not articulated. Scientists and businesspeople, who observed farmers as being reluctant to join or continue being part of biodiesel projects, registered them as, for example, 'people who did not participate properly in biodiesel projects because they did not realize how much income they could earn from it'. The rural people's multiple voices were thus disconnected from their own experience, skills, everyday concerns (as farmers), alternative employment opportunities and materiality (of farms).

Similarly, the voices of biodiesel plants and technologies were only registered as entities able to generate employment in the policy, obscuring the multiple interconnected entities on which the plants/technologies have to rely in order to generate employment. The same plants were represented by scientists who modelled, bred or grew them in their research institutes as plants that did not perform [well in the farmers' fields] because they did not receive the right agricultural inputs or because they had not been carefully bred and selected. In this case, the scientists, for example at TNAU and JOil, articulated the plants with their own concern in the form of yields achieved through the use of 'right inputs'. At the same time, the responsibility of poor performance was shifted on to farmers and other (poor) people who were supposedly in need of rural employment.

Farmers (and their NGO partners) discussed the desirability of such employment in voices that were rather different from the versions registered in the policy or among scientists and businesspeople. Farmers, for example in Hassan district of Karnataka, argued that income from a day's work as a farm-labourer (coolie) is higher than from a day spent collecting and processing biodiesel feedstock seeds (see image 1).

Image 1: After collecting the seeds, each individual seed needs to be de-shelled, which is possible by hitting the seed with a stone or stick. This doubles the amount of time that is necessary to get the seeds ready for the market.

The initiator of the MGR Jatropha Biodiesel Project in Tamil Nadu, Mr Alagarsamy, similarly observed that a lack of people willing to take up this work against the wages offered

was one of the reasons why this Jatropha project failed. These (and other) voices of reluctant biodiesel labourers, if registered, could have challenged this policy proposition. Instead, as noted above, farmers and the plants and technologies which had to afford biodiesel production were turned into a repetitive singularity as entities that 'did not participate properly', being overruled by the interests of those who (felt they) could earn money from biodiesel production.

The plants and technologies that were supposed to generate employment opportunities could also have been registered differently, in articulation with conceptual categories such as energy security, climate change and environmentally sustainable development. For instance, the use of sizeable amounts of farm inputs such as water, pesticides and fertilizers to boost yields may not have been compatible with achieving environmentally sustainable development, mitigating climate change (fertilizer production tends to be very energy intensive) and achieving energy security (does domestically produced biodiesel lead to national energy security if that production depends on potentially imported inputs?). Had the farm-workers' voices or those of the technologies and plants been registered in their multiplicity and had they been allowed to recompose the proposition, the policy outcome could have been very different.

5.2 Setting targets

The 2009 policy announced: "An indicative target of 20% blending of biofuels, both for bio-diesel and bio-ethanol by 2017 is proposed. Blending levels prescribed in regard to bio-diesel are intended to be recommendatory in the near time" (Government of India 2009: 4). This differs from the text on targets in the 2003 Mission: "Targets need to be set up for bio-diesel production. The objective is to gradually raise it to take it to 20% in the year 2011-12

beginning with 5% in 2006-07" (Planning Commission 2003: x). The 2003 Mission also contained a calculation on the achievability of that target, using estimates of yield from a single stand-alone Jatropha curcas bush, number of bushes that could be grown on one hectare, oil percentage in Jatropha curcas seeds, and the projected diesel demand in 2011-12. It was calculated that a total of 11.19 Million hectares of land would be needed to reach a blending target of 20% in 2011-12. Many entities that play an important role in the production of oilseeds as elements of farmers' and labourers' practices, such as rainfall levels, irrigation, fertilizer use, diseases, and pruning techniques are not articulated in this calculation for the proposition. All Jatropha curcas production is thus turned into a repetitive singularity and the resulting proposition is easily transferrable between different socio-ecological settings.

This calculation from 2003 was criticized by many scientists, policy-makers and activists for its extrapolation of the observed yield of one stand-alone Jatropha curcas bush to the expected yield per hectare of a block plantation. They argued that it had been a mistake to take the yield of a stand-alone bush to be representative of a bush in a densely-planted field.[2] Between 2003 and 2009, a number of projects recorded highly variable yields articulated with different production practices. For example, scientists at the Tamil Nadu Agricultural University (TNAU) in Coimbatore and plant scientists working for the private company JOil, also in Coimbatore, recorded differences in yield articulated with carefully monitored maintenance practices and soil types (see image 2).

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[2] The work by Heller (1996) is frequently cited as the root of this 'mistake', who first extrapolated the yield of a large, single Jatropha curcas bush to the yield of a Jatropha plantation per hectare.

Image 2: Board that hangs in the maintenance shed of one of JOils trial plots. Each part of the trial plot (letters A-R) receives a different number of hours of irrigation on different weekdays.

Most smallholders growing Jatropha faced very low yields. There were also researchers starting to measure yields from experimental plots on which biodiesel varieties were intercropped with various kinds of lentils (for example in test fields around the office of Hassan biofuel park).[3] These diverse practices of Jatropha cultivation are each constituted by a different set of entities that had been muted in 2003, including water sources, irrigation patterns, rainfall, lentils, soil types, fertilizers etc. Through these varying practices, those

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[3] There are many ways in which Jatropha curcas and other crops were being grown. Here we list only the major characteristics of some of the most frequently used methods. Yet, as one zooms in on the particularities of each and every practice, the way one farmer grows a crop is likely to differ from the way her neighbour will do it (cf. Arora et al., 2013).

entities raise their voices differently due to the different sets of entities with which they are articulated. For example, in the fields of smallholder farmers growing Jatropha curcas, the absence of water got articulated as a factor reducing yields, while in JOil's test fields, water supply was something to be optimized (Ariza-Montobbio et al., 2010).

However, the 2009 policy only articulated "high-yielding planting material" as being able to facilitate more feedstock production and hence higher biodiesel blending percentages, regardless of the conditions that such 'material' may require in order to give those high yields with high oil content. In most research practices, such as those of JOil, TNAU and TERI, constraints on cultivation were hardly comparable to the constraints present in everyday life of smallholder farmers, regarding the availability of water and other agricultural inputs. A group of activists, for example from Grain and the Society for the Promotion of Wasteland Development (SPWD), as well as one scientist from the Directorate of Oilseed Research, flagged this problematic disjuncture between smallholders' conditions and research practices. Some environmental NGOs also questioned the desirability of using external farm-inputs in large quantities because of the environmental impact of their production (e.g. chemical fertilizer).

Few of these contradictory voices, particularly those emphasizing limits to high-input cultivation, are recognizable in the 2009 policy, which calls for research to produce high-quality planting materials, without noting any (smallholder) constraints on the inputs needed to grow them. The call for high-quality planting materials suits the needs of those who have the resources to invest heavily in biodiesel production, mobilizing the participation of entities such as water, fertilizers, mechanized harvesting tools etc., with the hope of high returns.

5.3 Where to grow

The 2009 policy stipulates the kinds of land on which biodiesel crops are supposed to be grown: "Plantations of trees bearing non-edible oilseeds will be taken up on Government/community wasteland, degraded or fallow land in forest and non-forest areas. Contract farming on private wasteland could also be taken up […]. Plantations on agricultural lands will be discouraged" (Government of India 2009: 7). Further specifications can be found a few paragraphs later: "In all cases pertaining to land use for the plantations, consultations would be undertaken with the local communities through Gram Panchayats/Gram Sabhas, and with Intermediate Panchayats and District Panchayat where plantations of non-edible oil seed bearing trees and shrubs are spread over more than one village or more than one block/taluk" (Government of India 2009: 7).

In contrast, the 2003 Biodiesel Mission claimed that a total of 13.4 Million hectares, subdivided among categories ranging from agro-forestry (Jatropha curcas plantations on land owned by absentee landlords, accounting for 2.0 million hectare) to fallow lands (of which an estimated 2.4 million hectare was to be used for Jatropha cultivation), would be available for biodiesel production. These propositions on land availability for the cultivation of Jatropha curcas were based on calculations carried out by the Planning Commission, without the consultations with local panchayats mentioned in the 2009 policy. How did the entity 'consultation' enter the 2009 proposition?

Between 2003 and 2009, activists, articulated with so-called wastelands and its users, raised their voices against the idea that there is uncultivated land waiting to be taken up for biodiesel cultivation. For example, a meeting of various civil society actors (including Anthra and SPWD) in Hyderabad in 2007 stressed that the so-called wastelands are at the core of

food sovereignty of many families (Lavanya, 2007). They also asked: if high yields of biodiesel crops could be gotten from so-called degraded lands or wastelands, then why could the lands not be used to grow food? Activists' voices on behalf of the land, its various uses and outgrowths, were informed by farmers with whom they had worked closely. When visiting the offices of NGO Anthra in Hyderabad, farmers narrated how government officials had entered their village's grazing lands between 2003 and 2009, and planted Jatropha curcas and Pongamia pinnata everywhere on these common lands without having asked anyone's permission. They had angrily uprooted the unwanted sapplings.

At the same time, other farmers, such as those who had no animals or animals that were fed industrially-produced feed rather than locally-grown grasses and shrubs, or who had enough private land to meet their own cattle-grazing needs, did not mind the plantation of biodiesel crops on non-privately owned land around the village. For example, in a village in Hassan district, a local leader took the initiative to invite the government to plant biodiesel crops on public land used by the village as grazing land. Thus, the voices of uncultivated land and its users, articulated in relation to a wide host of other entities such as different kinds of animals, privately owned lands and edible crops, were very diverse. These figured quite prominently in the deliberations that preceded the 2009 policy. By displaying the many uses of land referred to as wastelands, these entities perplexed – made controversial – the policy assumption that the lands presented as available for Jatropha curcas cultivation in the 2003 Mission did not perform any extant functions (Latour 2004b). These dissenting voices may have been critical in getting 'consultation' included in the policy.

However, it is unclear in the policy what 'consultation' means and how binding the outcomes of such consultations are. Also, no differentiation between differently articulated voices within 'local communities' was ever made: diverse community members, each with

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their own associations, are represented as a repetitive singularity. The diversity of so-called 'wastelands' and the user practices on them are also absent from the policy proposition. Due to this absence and the repetitive singularity of 'local communities', the policy proposition is made generally applicable to all socio-ecological settings across India.

Crucially, a number of recent reports on the topic of landgrabbing have been published (e.g. World Bank, 2010 in Baka, 2013; Lahiri, 2009; Shiva and Shankar, 2008). The reported land grabs took place before 2009, yet their voices were not registered in the policy. Instead, the voices of those with the political and economic ability to acquire these wastelands, and who are associated with a wide set of resources, possibly including real-estate knowledge or high-yielding varieties and the inputs they require, that enables them to make money from these lands, are much better registered than those of the diverse current user groups.

5.4 India's 'unique' feature: avoiding food versus fuel competition

"The Indian approach to biofuels, in particular, is somewhat different to the current international approaches which could lead to conflict with food security. It is based solely on non-food feedstocks to be raised on degraded or wastelands that are not suited to agriculture, thus avoiding a possible conflict of fuel vs. food security" (Government of India, 2009: 3-4). In 2003, the choice for Jatropha curcas, a crop to produce non-edible oil, was explained on the grounds of being productive without requiring a lot of inputs. The only reference to avoiding competition with other uses of oil can be found in a foreword to the Mission by deputy prime minister L. K. Advani: "The nation is facing a shortage of edible and non-edible oil. The existing high price of edible oil and the full use of tree borne oil seeds for various purposes suggest that organized biodiesel production for blending is possible only if plantation of selected species is taken up in compact areas" (Planning Commission, 2003).

L. K. Advani's understanding of competition with alternative uses of non-edible oilseeds was absent from the 2009 policy. Yet, such competition did often take place, for example in Hassan district of Karnataka where Pongamia pinnata seeds were and still are a key ingredient for the soap industry. Pongamia pinnata oil is also popular as lamp-oil in religious settings. A proportion of these seeds became feedstock for biodiesel. Oil from another biodiesel candidate, neem (Azadirachta indica), has traditionally had a wide range of (medicinal and bio-pesticidal) uses. However, the voices of these diverted trajectorues of Pongamia pinnata seeds (and of neem in an avoidable future), which most oilseed traders and one ex-member of India's administration who is currently an activist were aware of, was never articulated with India's biodiesel activities during the post-2003 policy-making process.

The 2009 policy proposes to avoid a food versus fuel conflict by using a non-edible crop and growing it on land that was not previously used to grow food. However, none of the other entities involved in growing a crop – water, labour, farm-inputs, sunlight, root-space – were included in the policy proposition on resource competition between food and fuel. However, in Hassan district, farmers were advised to grow biodiesel crops, particularly Pongamia pinnata, on the boundaries of the land on which they grow food. However, large Pongamia pinnata trees took away sunlight that the food crop adjacent to the trees needed. The extensive root system of the tree also made it harder for the roots of food crops to grow, and many farmers complained about this (see image 3). Yet none of these entities ever got to raise their voices in relation to food vs fuel competition, through articulation with researchers, industrialists, policy makers, and even activists. Only through articulation with farmers did they get to raise their voices, for example when farmers demonstrated them to the first author while working in their fields.

Image 3: The trees' large canopies create shade on the main cropland. According to farmers, this shade as well as the trees' extensive root systems limits the productivity of the main cropland.

Secondly, if biodiesel crops are planted on the bunds around farmers' lands, there is competition with the many other uses such bunds may have. This may be growing fruit or timber trees, grazing or walking to access other people's lands. No one we met throughout this research, except farmers in Hassan district, raised these issues. Additionally, Baka and Bailis (2014) calculated that the Prosopis juliflora currently growing on many lands classified as wasteland actually yields much more energy than Jatropha curcas could do – something which never got registered between 2003 and 2009. Activists did point out that if land is currently used for grazing and firewood collection, then growing biodiesel crops on those lands competes with access to fodder and fuel (e.g. SPWD). Also, there may be competition with biodiversity and wider ecological aims and values if any of the targets on biodiesel

production are reached (e.g. Lavanya, 2007). These multiple forms of competition were rarely registered by non-agrarian and non-activist actors in India. As such they stayed almost completely mute in the policy realm and remained disarticulated from the 2009 policy. If registered, these entities (as parts of farming pratice) would have created perplexity in the policy proposition because they contradict the proposition (Latour 2004b). Conversely, by excluding them, the proposition became very easily transferable, assuming that growing non-edible oilseeds in any location where food cultivation is not taking place will not result in food vs. fuel competition.

5.5 Jatropha curcas and 399 other non-edible oilseed species

From which feedstock should biodiesel be produced? The 2009 policy writes: "There are over 400 species of trees bearing non-edible oilseeds in the country. The potential of all these species will be exploited, depending on their techno-economic viability for the production of biofuels" (Government of India, 2009: 7). The 2003 Mission states:

> "There are many tree species which bear seeds rich in oil having properties of an excellent fuel and which can be processed into a diesel-substitute. Of these some promising tree species have been evaluated and it has been found that there are a number of them such as *Pongamia pinnata* ('Honge' or 'Karanja') and *Jatropha curcas* (Ratanjyot) which would be very suitable in our conditions. However, to start the programme, the advantage is clearly in favour of Jatropha" (Planning Commission, 2003: 111).

Going from a focus on Jatropha to more than 400 oilseed species is a clear widening of the scope of biodiesel production in the country. However, the choice out of these four hundred different species rests on techno-economic viability, a term that is left unarticulated. The lack

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of a definition makes it possible to adopt a situation-specific definition but also takes the politics of defining the term out of sight. The situation was different in 2003, when Jatropha curcas was selected for a number of concrete reasons: its supposedly high yield, low input requirements and short maturing time, as well as having specific medicinal value of the plants' non-seed parts and carbon storing ability.

Between 2003 and 2009, Jatropha curcas plants, afforded by the fields on which they grew, the care they received and the inputs applied to them, had refused to yield the amounts mentioned in the 2003 document. Some plants yielded lots of seeds, but little oil in each seed, while others just grew branches. Plants also needed much longer than the two years mentioned in the 2003 Mission to start giving any kind of sizeable yield. Many of these issues got registered in the research reports produced in research insitutes as well as during biofuel meetings organized by government bodies (e.g. Singh et al., 2006), in which large farmers, businesses and researchers participated. As such, the voices of these Jatropha curcas plants became more audible through spokespersons among the researchers and farmers. Yet the diverse ways in which the Jatropha curcas plants behaved in relation to a range of entities such as irrigation, different kinds of land, fertilizer etc was never fully recorded. As a result, Jatropha's poor performance, which was afforded by a range of other agrarian entities as documented above, was turned into a repetitive singularity. Despite the repetitive singularity, however, this poor behaviour created perplexity (Latour 2004b): feedstock was difficult to create, hence impeding the ability to fulfill the blending targets. As a result, the scope of the policy was broadened by the inclusion of a large number of oilseed species in order to keep the hope that meeting blending targets will be possible if a large variety of oilseed species participated.

6. Conclusions

Using our four criteria to evaluate the democratic making of policy propositions on biodiesels in India has brought a host of important considerations to the fore. Firstly, there were some voices that were not registered in the 2009 policy. These entities, such as CO_2, labouring farmers and food crops that were deprived of resources due to biodiesel bushes/trees, could have posed serious challenges to the already articulated propositions had their voices been registered. Also, even if one voice of an entity, such as Jatropha's disappointing oil-yields, was registered in a proposition, the multiplicity of articulations of Jatropha remained rather limited. Relationships between Jatropha and water, Jatropha and nutrients, Jatropha and its distance to other Jatropha plants got to raise their voices, but they were only registered through formal scientific research. Other articulations, different voices, as recounted by farmers (for instance, to us) were not invited and not registered in the 2009 policy.

Secondly, some form of re-composition of policy propositions took place based on the registration of many new voices, even if they were biased toward particular types of scientists. The number of oilseed species was increased, targets were delayed, consultations with village-level politicians were included, research for high-quality planting materials was more explicitly encouraged, and 'meeting rural energy needs' was replaced by 'achieving national energy security'. Yet these re-compositions, by being driven by a limited range of 'scientific' voices, also closed down other possible re-articulations of the policy propositions (cf. Stirling 2007).

Thirdly, a wide range of entities got turned into repetitive singularities: CO_2 emissions were always lower when replacing fossil diesel with biodiesel, irrespective of how the biodiesel was produced, land always yielded a fixed amount of oilseed-yield, and differences within local communities were immaterial to feedstock cultivation. On the other hand, the

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inclusion of 'public consultation' on land use change may mean that there is an implicit recognition of differences between diverse communities and socio-ecological settings.

The fourth criterion, which states that a well-articulated proposition is not easily transferrable between different socio-ecological situations, turned out to be of crucial importance. Many important elements of the specific socio-ecological situation that constituted the policy as a set of discursive propositions were registered as if they were universal. In this way, the policy propositions were deemed easily transferrable to other settings. For example, the limited availability of water was important in shaping the choice to encourage growing Jatropha on non-irrigated land. However, water was rarely considered as a factor of limited availability in relation to potential yields, making propositions on potential yield easily transferrable and compromising the consistency among the policy's propositions. Similarly, the first policy proposition, legitimizing India's biofuel policy, could have played an important role in ensuring that the policy is not easily transferrable to situations in which the legitimation criteria (of enhancing energy security, climate change mitigation, creating new employment opportunities and leading to environmentally sustainable development) do not hold. However, such an articulation of the first proposition was not attempted. The involvement of foreign companies and dependence on imports of feedstock do not bode well for 'national energy security'. Climate change mitigation may vary depending on land use changes and farm-inputs used, but such contingency was not registered in the policy. Most importantly, environmentally sustainable development got almost completely erased in discussions on the potential blending targets that were to be achieved through biodiesel plantations, no matter how much water, chemical fertilizers and pesticides they consumed. This further enhanced the lack of consistency among the policy's propositions. Indeed, had the first policy proposition truly limited the transferability of the policy as a whole, then

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India's national policy on biodiesel promotion would have looked very different or perhaps would not have been made at all.

Our analysis clearly underlines the importance not just of Foucauldian discourse analysts' understanding of knowledge and truth as principally contestable, or of public controversies in Science Studies, but also of opening up authority garnered through articulation with other humans and non-humans beyond scientists or policy experts (Feindt and Oels, 2005; Latour, 2010; Stirling, 2008). For example many crucial voices about biodiesel production, such as the unattractive economics of collecting oilseeds or the many ways in which bunds around farmland may already be in use, are not visible in mainstream (social) scientific research on biodiesel. These voices were only articulated, by some activists/NGOs and in our narrative, through the links established with and by farmers and workers. Thus, a well-articulated and slow policy-making process, a policy democracy, has to invite not just many recalcitrant and hitherto silent entities to speak, it also has to register multiple voices of each entity which are produced as the entity gets articulated with *different* other entities.

Throughout this research, we have attempted to capture the voices of as many interested entities, in as many diverse registers, as possible. This process was facilitated by close reading of multiple documents, by speaking to many different people and observing their material practices. Ours was thus an attempt to practice 'slow' research (Stengers, 2011). Yet, surely there are many interested (and interesting) voices which we have missed out on. And perhaps in the future, these unheard, unregistered entities will 'raise their heads' and force us to recompose this paper.

Finally, overall, we believe our set of four criteria has been useful to study the making of India's biodiesel policy. The criteria have enabled us to show which entities were included in the policy, and how their voices were registered (through what kind of articulations, in what kind of voices), and which entities were excluded and eventually left without recognition in the policy's text. This is a fruitful basis for understanding how things could have been differently articulated i.e., how the policy could have been alternately composed by registering other voices, by including other entities. We hope that our work contributes to a wider reflection about strengthening policy democracy, asking how policies can be (re)constructed through processes that are open, inclusive and democratic, leading to policies that are better able to care for the complex and multiply-entangled entities they try to govern.

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