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Title: Why do Foresters Plant Trees? Testing theories of bureaucratic decision-making in Central India

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12

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- This paper develops a framework of theories of bureaucratic action in development.
- Tree planting among foresters in India is a partially successful policy.
- Outcomes are driven by complex, multi-causal processes.
- Interplay between self-regarding behavior and a logic of appropriateness.
- Single-issue reforms unlikely to succeed.

1 I. INTRODUCTION

2 There is a growing awareness of the problems of applying blueprint approaches to public
3 sector management in developing countries (Manning & McCourt, 2013; Ostrom, Janssen, &
4 Anderies, 2007; World Bank, 2012), however public management scholars currently lack tools
5 for creating context-specific policy advice (Andrews, 2013; L. J. O'Toole & Meier, 2013). As a
6 result policy solutions continue to focus on single-issue panaceas. In the case of India these
7 include anti-corruption reforms (Gupta, 2012; Patibandla, 2013; Sengupta, 2012), customer
8 service reorientations drawn from new public management (Das, 2001, 2010; Sixth Central Pay
9 Commission, 2008), and rights-based reforms (A. Joshi, 2010; Kashwan, 2013). This paper uses
10 an ethnographic study of forest administration in central India to demonstrate how multiple
11 causal mechanisms interact as a public program moves from the plans of high-level policy
12 makers to the activities of street-level bureaucrats. The purpose of this exercise is twofold: to
13 demonstrate that the use of blueprint solutions to single problems is flawed because public sector
14 management is a multi-causal process, and to show how a multi-causal approach can be used to
15 address a particular policy problem.

16 In order to illustrate how multiple causes interact in the design and implementation of
17 public programs in developing countries, the paper focuses on understanding why India's forest
18 departments plant trees. Tree planting dominates the field work of these departments, and is
19 implemented in the ways intended by senior policy makers, but is ineffective in achieving the
20 stated goals of the forest departments or their funders. Although I use tree planting to illustrate
21 the value of a multi-causal approach, tree planting is also a substantively important policy issue:
22 Improved management of India's forests could support globally important biodiversity (Singh &
23 Bagchi, 2013) and provide vital resources for many of its poorest people (Gundimeda &

24 Shyamsundar, 2012). Tree planting is one of the most important strategies in use by Indian
25 forest departments to improve forest quality, cover, and production, and the activity is likely to
26 grow with the current focus on carbon sequestration (Kishwan, Pandey, & Dadhwal, 2012;
27 Ministry of Environment and Forests, 2010). Although tree planting's importance is growing
28 worldwide, there is little systematic evaluation of the large-scale impacts of government-led
29 reforestation programs in India or elsewhere (Le, Smith, Herbohn, & Harrison, 2012).

30 The importance of tree planting in India's forests is puzzling because tree planting has at
31 best an indirect relationship to the goals emphasized in national forest policies. The selection of
32 tree planting as a policy tool thus bears some resemblance to Cohen, March and Olsen's (1972)
33 "garbage can", in which policy problems and policy solutions are linked only by their
34 coexistence in the same garbage can of old ideas. While tree planting is a highly effective
35 method to establish commercial tree plantations for wood production, and thus appears to an
36 outsider to be a logical activity for foresters to engage in, it is an ineffective way of pursuing the
37 goals of India's forest policies, which emphasize restoring the ecosystem services, particularly
38 those related to watersheds, protecting biodiversity, and producing non-timber forest products
39 which the rural poor depend on for their livelihoods (Lindenmayer, et al., 2012; Lindenmayer &
40 Laurance, 2012; Locatelli & Vignola, 2009; Pathak, 1995). Tree planting is often unnecessary
41 for the restoration of forest cover, as many degraded forest fringe areas have extensive seed
42 banks and native rootstock that enable rapid regeneration once the sources of degradation are
43 removed. Thus, it might be expected that as India's policy goals for its public forests have shifted
44 from an emphasis on commercial wood production prior to the 1980s to an emphasis on
45 watershed protection, biodiversity conservation, and poverty alleviation today, the importance of

46 tree planting would decline. Instead, tree planting on government lands has increased
47 dramatically since 1980 (Ravindranath, Murthy, Chaturvedi, Andrasko, & Sathaye, 2007).

48 The vast majority of India's forests are governed by state-level government departments
49 under a sometimes contradictory legal framework that reflects a century and a half of conflict
50 over the appropriate use of forest resources (Guha, 1983, 2001; Suykens, 2009). Recent
51 statements of forest policy have emphasized the need to use forests to support rural livelihoods
52 while providing for long-term conservation of natural resources (Ministry of Environment and
53 Forests, 1988, 2010). In practice, officials in these departments have diverse responsibilities,
54 including conducting harvests of timber and non-timber forest products, protecting wildlife and
55 other natural resources from exploitation, reviewing the impact of development projects on forest
56 area, implementing programs to restore ecosystems, improve provisioning of ecosystem services,
57 and alleviate poverty, enforcing various laws which restrict public uses of forest lands, and
58 implementing various seemingly unrelated government programs that occur in or near forests.

59 Although tree planting has a limited ability to achieve goals beyond increasing
60 commercial production, it is frequently adopted as a tool to achieve other goals. For example,
61 several World Bank funded projects in the 1990s which aimed to restore forests through
62 participatory forestry reveals that each of these projects spent more than 60% of its budget on
63 tree-planting activities which were only indirectly related to the stated project goals (Agricultural
64 Operations Division, 1991, 1994; World Bank Sector and Thematic Studies Group: Operations
65 Evaluation Department, 2002). Perhaps more surprisingly given the reputation of India's
66 bureaucracies for poor governance, tree planting activities actually get carried out, even when
67 other aspects of these programs (such as the participatory forestry components) are not carried
68 out. The success in planting trees is limited however, since many plantations suffer from long-

69 term neglect and low survivorship, and since tree-planting is often an indirect or ineffective
70 method for achieving policy goals.

71 By developing an account of the causal mechanisms that drive tree planting behavior, this
72 paper aims to explain tree planting's successes and failures, and in so doing, provide an account
73 of how multiple causal mechanisms contribute to the outcomes of bureaucratic processes which
74 can inform contextually relevant reforms. In particular, while implementation successes and
75 failures are widely studied (Hill & Hupe, 2009), there has been less attention devoted to
76 understanding the causes of disconnects between project goals and tools – Cohen, March &
77 Olsen's garbage can (Bendor, Moe, & Shotts, 2001; Zahariadis, 2007). I focus on tree planting
78 here not to critique its use in India, but rather because it is an activity that is simultaneously
79 successful – in that it has widespread public acceptance and is actually implemented – and
80 unsuccessful – in that its implementation generally does not contribute to the desired outcomes.
81 As I will show, the disconnect between project goals and tools is not merely the result of policy
82 entrepreneurship as suggested by Kingdon (2003), but also the result of a system of professional
83 training and incentives that drives foresters to value tree planting activities. Recognizing the
84 particular drivers of bureaucratic malfunctions in this case leads to policy recommendations
85 which focus on changing the values and incentives of bureaucrats, rather than the conventional
86 focus on rights and curbing corruption.

87 The most important sets of causal mechanisms identified here are derived from two
88 distinctive types of institutional theories that are often seen as competing: rational choice and
89 sociological institutionalism (Hall & Taylor, 1996). I show that, consistent with rational choice
90 institutionalism, bureaucrats react to strong incentives that encourage them to adopt and
91 implement tree planting. At the same time, bureaucrats respond strongly to these institutionalized

115 behavior. Following March and Olsen (1989, 2006), I differentiate between two internal “logics”
116 that may motivate behavior. A logic of consequence emphasizes the role of incentives in driving
117 behavior in individuals who are calculating the costs and benefits of individual actions. Scholars
118 of this logic have developed complex models that account for the subtleties and biases of human
119 motivations – sometimes described as behavioral rational choice (Jones, 2001; Ostrom, 2005) or
120 rational choice institutionalism (Hall & Taylor, 1996; Ostrom, 2007). By contrast, a logic of
121 appropriateness assumes that “most of the time humans take reasoned action by trying to answer
122 three elementary questions: What kind of situation is this? What kind of person am I? What does
123 a person such as I do in a situation such as this?” (March & Olsen, 2006 p. 690). Calculations of
124 appropriate action are not based on individual costs and benefits, but instead on “organizational
125 arrangements that link roles/identities, accounts of situations, resources, and prescriptive rules
126 and practices (ibid).” Hall & Taylor (1996) classify this approach as a form of “sociological
127 institutionalism.”

128

129 (insert Table 1 here)

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131 Within each logic, different research traditions make different assumptions about the
132 external forces that influence internal action. In table 1, these are listed as “accountability
133 relationships,” since they describe who the research traditions describe as the primary source of
134 accountability. Three literatures rely on a logic of consequences but describe different
135 accountability relationships. I call these “rent-seeking bureaucrats,” “critical and power-centered
136 approaches”, and “institutionalized incentives.” Two literatures describe accountability

137 relationships within a logic of appropriateness. I call these “scientific bureaucracy” and
138 “professionalism.”

139 (a) Logics of Consequences

140

141 The dominant picture of a “logic of consequence” in many studies of development
142 agencies is the rent-seeking bureaucrat. The rent seeking bureaucrat is accountable primarily to
143 his or her self. There are three variations, however, in the kinds of personal advantage they
144 desire. Literature on corruption – dominant in many studies of India and other developing
145 countries – assumes that bureaucrats are out to line their own pockets. By contrast, Niskanen
146 (1971, 1975) proposed modeling bureaucrats as “budget-maximizers,” i.e. people who seek to
147 increase their power through increasing the size of the budgets they handle. A third and closely
148 related type of self-regarding behavior expands the self to include the broader organization, and
149 posits that officials seek to increase the commercial activities of their agencies. This approach
150 has been widely applied to studying forest agencies in the US (Clary, 1986; Hoberg, 2001; R.
151 O’Toole, 1988; Wilkinson & Anderson, 1985) as well as India (Gadgil & Guha, 1995; Guha,
152 1983)

153 Anthropologists and critical geographers also use models that assume that government
154 officials act with attention to the consequences of their actions, however in contrast to
155 economists and political scientists, scholars in this tradition draw on the ideas of Foucault to
156 emphasize discursive power (Ferguson, 1994). Agents in this tradition act to benefit the power
157 structure in which they are employed. As Mosse (2005) points out in critiquing this literature,
158 there is a tendency to presume a universally malignant bureaucracy, intent on maximizing its
159 power. Scholars studying Indian forest policy have described efforts by the forest departments to

183 this conception, bureaucrats behave not out of an evaluation of the costs and benefits of
184 individual action, but rather out of a motivation to do what is right for the public as defined by
185 orderly policy analysis and their organizational hierarchy, a logic of appropriateness. This
186 conception of bureaucracies was influential in the 19th century development of forest science,
187 when foresters believed that they had created tools to maximize the sustained yield of intensively
188 managed forests (Lowood, 1991; Scott, 1998), and when the globally influential American
189 forester Gifford Pinchot spoke of his agency's goal as delivering the "greatest good to the
190 greatest number" (Balogh, 2002; Barton, 2001; McGeary, 1960; C. Miller, 2001). Within the
191 development aid arena, Mosse (2005 p. 2-4) describes this approach to policy implementation as
192 the "instrumental view," (in contrast to the "critical view" described above) in which it is
193 assumed that policies are exclusively created out of a rational policy analysis.

194 In contrast to this "naïve" instrumentalism (Mosse 2005, p 5) March and Olsen (1989,
195 2006) emphasize the ways in which logics of appropriateness grounded in professional training
196 and/or organizational socialization drive behavioral outcomes. They argue that, when faced with
197 novel situations, bureaucrats turn not to calculations of costs and benefits (as dictated by a logic
198 of consequence), nor to a straightforward implementation of scientific principles, as in Weberian
199 organization, but to a sense, developed through their training or socialization, of what they
200 should be doing in the situation. In this view of appropriateness, the broad values held by an
201 individual, often deeply influenced by their professional training (e.g. their training into the
202 profession of forestry), are understood to be more important than rational calculations of costs
203 and benefits in influencing action. Although March and Olsen describe a broad array of
204 situations, In table 1 I refer to this theory as "professionalism" as foresters belong to a profession
205 (forestry) which has a particularly strong influence on the values held by its members.

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(c) Understanding Interrelationships Between Causal Mechanisms

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III. METHODS

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The final column of Table 1 provides a brief summary of the predictions each of these five theories make about why tree planting happens. It is conventional to present hypotheses as mutually exclusive claims which can be falsified through comparison (Platt, 1964), however in this case these diverse theories generate different predictions that are not mutually exclusive for two reasons. First, the causal process that leads to tree planting is long, involving actions taken at different levels of government: Causes that are active in one area may be absent in another area. Second, these causes are not fundamentally exclusive – rather, as we will see, they can fit together and may be joint causes of action (Mackie, 1974; Ragin, 2000).

This paper focuses on tree planting in two Indian states: Maharashtra and Andhra Pradesh. These states share a border in a heavily forested region, and I focused my fieldwork along this border region to insure that I would be studying forests with similar biophysical properties (see figure 1 for a map of the region). The two states have a reputation for different approaches to forest policy: while Andhra Pradesh is known for its enthusiastic adoption of innovative practices, including participatory approaches to forest governance (Rangachari & Mukherji, 2000), Maharashtra's forest department is known for sticking to the traditional forest department focus on territorial control and timber management. In spite of these differences, tree planting practices were similar in the two states, indicating that the patterns observed may have a

228 broader relevance for forest management in Indian states following a broad array of approaches
229 to forest management.

230

231 (insert figure 1 here)

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233 The focus of this paper is on the determinants of the decision-making of individual
234 government officials. Throughout this paper I refer to the officials of the forest department who
235 carry line authority interchangeably as “foresters” or “forest officials,” which are the terms that
236 these individuals used to describe their professional identity. The term forester can be confusing,
237 as in the international context it may refer to anyone with a training in forestry, regardless of
238 where they are employed, while in the Indian context it is sometimes used to refer to the rank
239 above forest guard (generally the lowest level field official), and below forest range officer (the
240 lowest supervisory position which requires a college education). In the region in which I did my
241 field work, there are almost no forestry professionals employed outside of the government forest
242 departments, and the intermediate rank between forest guard and forest range officer is more
243 commonly known as “block” or “section” officer. The term forester is thus synonymous in this
244 region with the term “forest official.”

245 This paper examines two interlinked but distinct processes using slightly different
246 methods. The first is the design and adoption of policies which involve tree planting – an activity
247 completed by senior forest department officials in interaction with other actors in the state and
248 national capitals. The identity of these policy-makers, as well as the relationships between them,
249 are diagramed in figure 2. The crucial foresters involved in this process include not only the
250 Principal Chief Conservator of Forests, who is the head of the department at the state level, but

251 also his subordinate Chief Conservators of Forests and Additional Principal Chief Conservators
252 of Forests, as well as foresters of similar rank serving on deputation in the central government.
253 All of these officials are highly educated officers with at least 20 years of service in lower-level
254 postings, and are members of the elite, centrally controlled Indian Forest Service (see Hannam,
255 2000 for a description of the Indian Forest Service). I conducted interviews with senior policy
256 makers in New Delhi and among senior forest officers in Andhra Pradesh and Maharashtra
257 during two visits to India – in July and August of 2009 and between May 2010 and March 2011.
258 I also gathered and analyzed relevant policy documents, including budgets, laws, directives, and
259 project evaluation documents.

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261 (insert figure 2 here)

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263 The second process is the implementation of tree planting by field foresters, a process
264 that leaves a less complete written record. The actors involved in the implementation process are
265 also diagramed in figure 2. Between August 2010 and March 2011 I conducted 2-3 week visits to
266 8 forest divisions – four forest divisions in each of the two regions of Vidarbha (eastern
267 Maharashtra) and Telangana (northwestern Andhra Pradesh). In both states forest range from
268 wetter and more productive forests in the east to arid, less productive forests in the west, and
269 social conditions vary systematically with distance from the major urban areas of Hyderabad and
270 Nagpur, so forest divisions were selected to insure that this diversity of conditions was captured
271 within both states. The exact location of these divisions is omitted to protect the identity of
272 informants. On each of these visits I interviewed dozens of foresters and other stakeholders while
273 observing the forest officials as they went about their daily routines – including supervising and

297 the adoption of tree planting as a policy tool. I argue that tree planting is adopted as a policy tool
298 because it is an activity which produces tangible results which can easily be monitored, because
299 senior foresters' values lead them to believe that tree planting is valuable, and because they are
300 effective at spreading their values into the public sphere, leading other decision-makers to
301 endorse their values. This complex causal story is illustrated in figure 3.

302

303 (insert figure 3 here)

304 (a) Scientific Bureaucracy

305 When asked why foresters are planting trees, most foresters began by explaining to me
306 how tree-planting was a response to the policy needs of the day, thus providing an explanation
307 based on what I call "scientific bureaucracy," a logical planning process on the part of
308 bureaucrats motivated by devotion to the public interest. The policy problem foresters identified
309 is that many forests in India are degraded and total forest cover lags significantly behind national
310 goals for forest cover. As I explained in the introduction to this paper however, the logical
311 linkage between tree planting and forest restoration is poor. Independent estimates show that
312 India is continuing to lose native forest cover, which is being gradually replaced by tree
313 plantations on both public and private lands, leading to losses in biodiversity and ecosystem
314 service provision (Davidar, et al., 2010; Puyravaud, Davidar, & Laurance, 2010a, 2010b).
315 Furthermore, India's national forest cover goals rest on rather dubious logic, and are probably
316 not attainable (A. K. Joshi, Pant, Kumar, Giriraj, & Joshi, 2010).

317 The actual way that tree planting is adopted bears little resemblance to the rational
318 planning process that senior foresters describe. The fundamental backbone of the forest
319 department's rational planning process is the preparation of Working Plans for each forest

320 division in the country. Supreme Court supervision has insured that no trees can be felled unless
321 the felling is in compliance with an approved working plan. Yet no such restrictions exist for tree
322 planting, and working plans are at best vague about tree planting, specifying vast areas as
323 suitable for planting, with long lists of potentially suitable species. Even these vague plans are
324 not followed – for example, most of the tree planting I observed in 2010-11 in Andhra Pradesh
325 was either *Eucalyptus* or *Pongamia* – species that were not even mentioned in any of the
326 working plans I reviewed for that state. When I queried an experienced divisional forest officer
327 about this, he cautioned me not to worry too much about the working plan. He said “at least you
328 have read. I haven’t read” (Author’s field notes, February 28, 2011). Instead, he explained, tree
329 planting activities were driven by annual work schemes developed by the state government.
330 These work schemes were driven by the availability of funds and the interests of politicians and
331 senior bureaucrats, and not by rational planning. When he received funds for tree planting, he
332 would select areas for tree planting on an ad-hoc basis, without consulting the working plan.
333 Although his interpretation contrasted with the explanations foresters most often gave about their
334 work, it was in fact more consistent with the way that tree planting activities were carried out on
335 the ground. Why did foresters’ actions conflict with their words?

336

337 (b) Professionalism: Forester Values

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339 At the level of state and national governments, foresters play a key role in formulating the
340 schemes that are funded which emphasize planting trees. As March and Olsen (1989; 2006)
341 would predict, foresters’ behavior is heavily influenced by the professional norms of the forestry
342 profession. The foresters who work in high-level policy making posts are the product of a system

343 of education and professional socialization which exerts a strong influence on their values.
344 Foresters begin their service by studying for the equivalent of a master's degree in forest
345 management at the Indira Gandhi National Forest Academy. These training courses follow a
346 standardized syllabus, set by senior forestry officials (Government of India, 2007; Goyal, 2004;
347 Indira Gandhi National Forest Academy, 2010), and are conducted entirely by senior forest
348 officers. The result is a narrow, conservative training that is slow to adapt to new information or
349 on-the-ground realities. According to one study of forester training, 19th century textbooks were
350 still in use in the 1990s, and focused primarily on silviculture as opposed to the broader fields of
351 social and natural sciences that would prepare foresters to work on issues related to ecosystem
352 services and poverty alleviation (Hannam, 2000). Although there have been significant reforms
353 to the training courses in the 15 years since Hannam's study, most foresters working on the
354 ground, and all in positions of authority, are in their 40s or 50s, and were thus trained before
355 these reforms.

356 This conservative training is reinforced for many foresters by the lack of outside
357 influence in their professional lives. Because joining the Indian Forest Service is considered very
358 high prestige, foresters commonly share the experience of a retired officer who reported to me
359 that prior to joining the service, he had never seen a forest. His understanding of the forest was
360 shaped entirely by his training & professional experience once he began working for the
361 department. While working in field postings, forest officers usually live in government housing
362 on a forest department compound, set off from the towns they live in. Since the forest department
363 also handles wildlife protection and other aspects of natural resource policy, they do not have
364 frequent interactions with professionals with different training, and they develop primary

365 friendships with colleagues who share similar life experiences (see Kaufman, 1960 for a
366 description of very similar socialization processes within the United States Forest Service).

367 The professional values foresters develop through these experiences lead them to propose
368 and advocate for the adoption of tree planting programs, while blinding them to many of the
369 limitations of these programs. Foresters thus act as policy entrepreneurs, in the sense described
370 by Kingdon (2003). Foresters believe they have a strong technical or scientific training, and they
371 have been taught that tree planting is an important way to achieve goals valued by the forestry
372 profession and in national policies – such as increasing forest cover, alleviating poverty, or
373 restoring ecosystem function. Their values also blind them to the limits of their technical
374 expertise. Foresters believe they are conducting scientific forestry, but the forest departments do
375 not conduct evaluations of the efficacy of tree planting for achieving policy goals. Foresters in
376 policy-making positions have years of experience in the field, and thus might have opportunities
377 to informally observe the success and failures of past programs, yet frequent rotations (every 2-3
378 years for most officials) mean that few foresters have had the opportunity to observe the long-
379 term impacts of individual projects. Independent evaluations of these programs are limited, but
380 are not particularly favorable (Balooni & Singh, 2007; Hunter, Hobley, & Smale, 1998),
381 however foresters are largely unaware of the existence of these independent evaluations, or
382 dismiss them out of hand because they believe that their technical training is superior to that of
383 professional scientists (Krishnadas, Srinivasan, Velho, & Sridhara, 2011).

384 Several past studies have emphasized the ways in which forester professionalism
385 inhibited the execution of participatory programs (Kumar & Kant, 2005, 2006; Kumar, Kant, &
386 Amburgey, 2007; Martin, 2003; Matta, 2003; Matta, Alavalapati, Kerr, & Mercer, 2005; Matta &
387 Kerr, 2007; Matta, Kerr, & Chung, 2005). This study extends these findings to show the ways in

388 which professional identity hinders aspects of programs that are not participatory. In particular,
389 while a technical training convinces many foresters that they have superior knowledge to forest
390 villagers, it also blinds them to the limited and often non science-based nature of their own
391 knowledge of local forests. Although foresters are responsible for conducting forest mensuration
392 exercises on a regular basis, current requirements for these exercise's focus only on measuring
393 those aspects of the forest that are convertible into commercial wood products (Government of
394 India Ministry of Environment and Forests, No date). As a botany professor in a remote rural
395 college pointed out to me, most of the foresters in his district could identify only a few dozen
396 commercially important tree species, and were unaware of the over 10,000 species of flower
397 plants, many of them quite rare, that could be found in the district (author's fieldnotes,
398 November 12, 2010). Put simply, foresters' training in the classroom and in the field teaches
399 them that standing trees are equivalent to the forests they are supposed to be providing to the
400 nation, and thus helps blind them to the nonequivalence of a plantation and a restored forest.

401 (c) Rent Seeking and Discursive Power: Influencing The Public for Bigger Budgets

402

403 Foresters do not merely promote tree planting because they think it is good. They also do
404 so because promoting tree planting helps them enhance their agency's power and budget. This is
405 the result of a combination of self-regarding behavior – a desire to increase their power by
406 increasing the size of the budgets they control, consistent with Niskanen's (1971, 1975) theory of
407 budget-maximizing bureaucracy – and their genuine belief that their agency's activities are
408 beneficial for society. Many have found that tree planting programs are easy to sell to state
409 governments, the central government, and donor agencies, and thus they promote them heavily to
410 these funding sources.

411 Why do funders see tree planting as beneficial? The answer is not obvious, as many tree
412 planting activities in the past have been highly visible public failures (Saxena, 1994) and current
413 programs share important characteristics with past failures. Funders involved in the social
414 forestry programs of the 1980s stopped funding these programs after their own studies showed
415 that they were not achieving goals (Misra & Bhatta, 1990). After a decade of funding Joint
416 Forest Management programs, most of which involved large amounts of tree planting, the World
417 Bank also pulled out of funding forest programs in India due to similar failures (Milne, Verardo,
418 & Gupta, 2005). Yet now tree planting programs are a central plank of India's well-funded
419 climate change strategies (Kishwan, et al., 2012; Ministry of Environment and Forests, 2010;
420 Rawat & Kishwan, 2008).

421 One major reason that funders see tree planting as beneficial is that most knowledge
422 about forest management in India comes from government foresters, who are widely respected as
423 experts, and who actively promote their perspectives in the public sphere. This is largely
424 consistent with theories of discursive power. Main roads that traverse forest land are often
425 peppered with advertisements promoting tree planting, and the department takes every other
426 opportunity to promote tree planting. Although the ecological and economic value of current tree
427 planting programs are questionable, systematic research on the efficacy of forest programs is
428 hindered by the forest department (Krishnadas, et al., 2011; Madhusudan, et al., 2006),
429 ecological research has tended to focus exclusively on charismatic species in protected areas
430 rather than on program evaluation (Ghosal, Athreya, Linnell, & Vedeld, 2013; Singh & Bagchi,
431 2013), and alternative sources of information are not available to the forest departments' field
432 staff or to most members of the public.

433

434 (d) Institutionalized Incentives: Ease of Monitoring Makes Spending Attractive

435

436 Another reason why senior policy-makers – including both foresters and funders – like
437 tree planting is that it is much easier to monitor than other potentially fundable forest activities.
438 In theories of institutionalized incentives, the ability to monitor bureaucratic behavior is a key
439 factor influencing the effectiveness of contracts that bureaucratic principles use to monitor their
440 agents (G. J. Miller, 1992, 2005). Monitoring tree planting is relatively easy because all of the
441 activities of tree planting produce tangible, visible results. Like many bureaucracies, Indian
442 forest agencies encourage their bureaucrats through the use of targets. Tree planting targets work
443 well because outcomes are easily measurable and connectable with results. Supervisors can go to
444 the nursery or plantation and physically count trees. This ease of monitoring limits the
445 opportunities for corruption, and gives supervisors a clear sense of what they've spent their
446 money on. Monitoring focuses on the short-term success of plantations, but generally stops after
447 the third year, and only evaluates tree growth, not the achievement of broader policy objectives,
448 so that while monitoring helps prevent corruption, it does not help the department detect the
449 failure of programs to achieve long-term goals such as improving forest cover, alleviating
450 poverty, or restoring ecosystem functions. Even in areas where the tree planting is being done for
451 explicitly commercial reasons (which have been deemphasized since the 1990s), harvests of
452 commercial plantations from forest department lands are infrequent due to the poor survivorship
453 of these plantations. In several areas I visited, foresters told me that while they had records of
454 tree plantations being established in the 1980s or 1990s, they were no longer able to relocate any
455 physical traces of those plantations.

456 Since there is now a track record that the forest department can plant trees, foresters and
457 funders alike now that money allocated for tree planting will be used for its intended purpose.
458 This is in direct contrast to money spent on activities that might otherwise be more valuable for
459 achieving forest department goals. For example, increased spending on forest law enforcement
460 could be a more effective way to increase forest cover, but senior forest officers have great
461 difficulty determining when law enforcement activities are appropriate, and when field officers
462 are using their authority to arrest political or personal enemies while leaving poachers and illegal
463 loggers unharmed. Similarly, Joint Forest Management has been shown to be a powerful tool for
464 forest conservation in some circumstances, but it is very time consuming for senior foresters to
465 evaluate hundreds of local committees to determine which are truly joint and which exist only on
466 paper.

467 V. IMPLEMENTING TREE PLANTING

468 In this section I explain the reasons why field level foresters implement tree planting. As
469 in the previous section, I draw on the theories outlined in section 2, showing how several causal
470 mechanisms jointly contribute to the implementation of tree planting in the field. As a large
471 literature has documented, policy adoption often does not lead to policy implementation (Hill &
472 Hupe, 2009; Pressman & Wildavsky, 1973; Wildavsky, 1972). What is perhaps most striking
473 about tree planting is that in an environment where few policies are carried out, tree planting is
474 consistently implemented by field foresters. The reasons for this implementation success are
475 closely related to the reasons for policy adoption. Tree planting is consistently monitored,
476 limiting opportunities for corruption and providing a clear signal of the value the department has
477 for the activity. These signals combine with values learned in training programs to develop a
478 professional value structure that focuses on tree planting as a valuable contribution to rural

479 development. Finally, some field foresters report that tree planting provides a way foresters can
480 publicly proclaim ownership of their land. This causal process is illustrated in figure 4.

481

482 (insert figure 4 here)

483

484 (a) Forester values

485 As is the case for policy adoption, strong values encourage field officers to engage
486 enthusiastically with tree planting. Field foresters go through similar recruitment and training
487 process to their more senior superiors, although the entrance standards are lower and the training
488 shorter. The training courses, run by senior foresters, reinforce the same values that senior
489 foresters imbibe in their own training. Once in the field, forester training continues through
490 frequent visits with superior officers. Foresters in supervisory roles reported to me that they met
491 in person with their immediate subordinates more than once per week – either in field
492 inspections or in visits by the subordinates to the main office – providing ample opportunity to
493 continue training. When I joined inspection tours, I discovered that in most regions and times of
494 year, the primary focus of inspections was on visiting plantations and nurseries, with foresters
495 focusing their attention on the methods of planting or the speed of preparation for the planting
496 season. Apart from the direct effect of training, this constant monitoring of tree planting related
497 activity reinforced to forest officers the value that tree planting held in their profession.

498 Field foresters believe that tree planting is a valuable activity, but they also frequently
499 believe that other activities, such as law enforcement or Joint Forest Management, are valuable.
500 They told me that they choose to focus on tree planting because in contrast to these other
501 activities, it gives foresters a feeling of successfully helping their communities. Foresters who

502 live in villages face great social difficulties when they attempt to enforce forest laws on their
503 neighbors (Robbins, 2000, 2003; Vasan, 2002), and those who live in larger towns are blamed by
504 their colleagues for victimizing the poor. Engagement in Joint Forest Management exposes
505 foresters to the frustrating vagaries of politics within human communities. Tree planting presents
506 no such messiness: it can be accomplished, and foresters are often recognized by other
507 community leaders for their efforts in this area. As noted above in the section on forester values
508 which encourage adoption of tree planting, forester values also blind foresters to the limitations
509 of tree planting programs. Foresters described to me the warm feeling that they felt from having
510 helped their neighbors, while non-forester informants frequently mentioned that foresters helped
511 them by planting trees – even when the evidence on the ground did not necessarily support the
512 benefits from tree planting.

513 (b) Institutionalized Incentives

514 Tree planting is strongly reinforced through institutionalized incentives. As described
515 above, tree planting targets are relatively easy to measure. Supervisors can go to the nursery or
516 plantation and physically count trees planted by their subordinates. In fact, field visits by field
517 supervisors – divisional forest officers and range forest officers who sit in the middle between
518 state headquarters and the lowest rungs of the bureaucracy – are often little more than brief stops
519 at every nursery and plantation site within a particular area.

520 The existence of this monitoring of tree planting targets incentivizes lower-level forest
521 officials to work harder on tree planting than they do on other activities – such as law
522 enforcement or community development – which are less amenable to monitoring and
523 measurement. It also helps to suppress corruption, as outright diversion of funds from tree
524 planting is relatively easy to detect. As mentioned above, this frequent monitoring reinforces to

525 field-level officials the importance of tree planting. The ability of foresters to monitor tree
526 planting also helps to explain why funders prefer to fund tree planting.

527 (c) Discursive Power

528 Although not as important as institutionalized incentives or professional values, a desire
529 to visibly assert territorial claims played a small role in the decision of some foresters to invest in
530 tree planting. I once asked a divisional forest officer in Andhra Pradesh why he had chosen to
531 place a plantation in a particular area. He explained to me that the local farmers had noticed that
532 this patch of government land was highly degraded, and this made it a prime target for the
533 farmers to take over for agricultural production. In villages near forest areas, increasing the area
534 under cultivation is one of the few ways that farmers can improve their livelihoods, so farmers
535 often have a strong interest in encroaching lands, particularly if they have already been cleared of
536 competing vegetation. By planting trees, the forester believed he could provide visual evidence
537 to the farmers that this was government land, evidence that he claimed that local farmers would
538 pay attention to. This would enable him to prevent illegal encroachment onto his territory. Nearly
539 all government foresters are firmly committed to maintaining the territorial integrity of the
540 government forest estate (Suykens, 2009). As one forester told me “If you see illegal cutting it
541 makes your blood boil (fieldnotes, August 17, 2010).” As I heard versions of this story on few
542 occasions, it is unlikely to be a major driver of tree planting implementation.

543 VI. DISCUSSION

544 The entire multi-causal process which leads to tree planting in India is summarized in
545 figure 5. As I have shown above, a complex multi-causal process determines foresters’ choice to
546 plant trees. Although foresters present logical arguments about the need to plant trees due to past
547 forest degradation, these arguments do not mesh well with the actual practice of tree planting.

548 Instead foresters' professional identities and the visibility of tree planting activities play key
549 roles in influencing both policy adoption and policy implementation. The underlying
550 motivations behind these two causal mechanisms are fundamentally different. The visibility of
551 tree planting activities affects the rational calculations of individuals: as in classic economic
552 models of individual behavior, foresters respond to incentives that favor tree planting. At the
553 same time, foresters also follow a "logic of appropriateness" (March & Olsen, 1989, 2006),
554 pursuing goals that their professional training and environment lead them to value, regardless of
555 whether there are beneficial consequences to those actions. Thus, while foresters receive benefits
556 from tree planting, those benefits are not the sole motivating factor for them to pursue the
557 activity.

558

559 (insert figure 5 here)

560

561 The interaction between logics of appropriateness and logics of consequences can be seen
562 in the ways that foresters' values interact with public values. Consistent with Foucaultian
563 theories of discursive power, foresters play a large role in shaping public values. Foresters
564 consciously promote their perspectives on forestry in the public sphere. Foresters' opinions are
565 particularly important in public discourse because there are few other sources of expertise on
566 forest issues, and senior government foresters have the added prestige of working in one of the
567 most prestigious All-India civil services (Hannam, 2000). These promotional efforts could be
568 seen as consistent with a narrow self-regarding rationality, as foresters desiring larger budgets
569 promote their work in an effort to gain public acceptance. At the same time, I heard repeatedly
570 from foresters that they were promoting certain viewpoints because they genuinely believed they

571 would be beneficial for society, supporting the view that these activities were driven not only by
572 self-interest, but also by a professional logic of appropriateness.

573 A second form of interaction between the logics of appropriateness and consequences
574 related to the visibility and ease of monitoring of tree planting. The visibility of tree planting
575 activities contributed to both the adoption and implementation of tree planting, and thus served
576 as a second key contribution to the causal process. Ease of monitoring visible activities
577 encouraged policy adopters to design programs with tree planting at its core, limited
578 opportunities for corruption, and encouraged field officers to implement tree planting programs.
579 But this visibility also fed back to forester values. Field officials who observed that their
580 superiors monitored them for implementing tree planting more than they did for other activities
581 learned that tree planting was an activity that the high status members of their profession valued,
582 while public recognition of visible activities further reinforced to foresters that tree planting was
583 valuable. A result of all of this is to reinforce ideas within the bureaucracy that appear to be
584 counterproductive for addressing the real concerns of modern Indian forest management, which
585 include widespread poverty in forested regions, continuing forest degradation, and a desire to
586 increase the supply of ecosystem services such as watershed protection and carbon storage. None
587 of these problems are being addressed effectively in the current tree planting programs.

588 These multi-causal interactions demonstrate one pathway through which policies can be
589 adopted and implemented in spite of a poor fit between policy tools and problems. Although this
590 resembles the “garbage can” process described by Cohen, et al. (1972) and extended by Kingdon
591 (2003), it is a process driven not by randomness (as in Cohen et al’s model), nor primarily by
592 entrepreneurship (as with Kingdon, who focused primarily on agenda-setting), but rather by the
593 interactions of individual behavior within an institutionally constrained environment. Individuals

594 making predominantly well-meaning attempts to improve the world around them are misled by
595 the biases received in their training, and these biases are reinforced through institutional
596 procedures that hinder individual and organizational learning about past failures. Furthermore,
597 individuals face strong incentives to promote certain policies that fit well into the broader frame.
598 Although foresters have a strong technical training, their training emphasizes the measurement of
599 trees, as opposed to the analysis of the impact of forest policies and practices on ecosystem
600 services or poverty alleviation, and thus does not contribute to improving policy.

601 The complexity of these interactions raises a challenge for conventional approaches to
602 understanding development bureaucracies. Most studies focus on a small subset of potential
603 causal mechanisms, and are thus underspecified. As an example, Gupta (2012) argues that
604 bureaucratic corruption is the core reason for the Indian government's failure to alleviate
605 poverty. This argument is consistent with a long-standing strand in empirical studies of
606 bureaucracy in India, including Wade's (1982a, 1982b, 1985, 1988) studies of irrigation
607 management and Robbins' (2000) study of protected area managers, as well as with
608 contemporary Indian political movements (Sengupta, 2012). If we apply this argument to tree
609 planting, we should expect that tree planting will not suffer from the bureaucratic
610 mismanagement typical of the public programs described by Gupta from his fieldwork in
611 agricultural communities in the Indo-Gangetic plain: relatively easy monitoring of tree planting
612 limits opportunities for corruption. In fact, tree planting is well implemented, partially supporting
613 the importance of corruption theory. However tree planting is not an effective policy tool, since
614 it does not contribute to achieving the goals for which it is prescribed. This mismatch is not
615 related to corruption, but instead to the cognitive biases built into decision-makers following a

616 logic of appropriateness. Thus, a focus on corruption leads to an incomplete diagnosis of the
617 potential sources of failure.

618 Similar critiques can be applied to theories that emphasize discursive power, which have
619 become dominant in many discourses about forest management in developing countries. For
620 example, Springate-Baginski & Blaikie (2007) argue that power imbalances between South
621 Asian forest departments and rural people result in the failure of participatory forest management
622 programs. Tree planting is an important part of many of these participatory programs, and at
623 least some villagers are influenced by the forest department's pro-planting rhetoric, partially
624 supporting Springate-Baginski & Blaikie's argument. Yet if this power imbalance were removed,
625 and villagers were empowered to make their own decisions about forest management on a larger
626 scale, there would still be other strong factors favoring tree planting – such as its visibility to all
627 kinds of donor agencies and entrenchment within the value systems not only of professional
628 foresters, but also the wider public.

629 Site based, multi-causal analysis not only demonstrates the limitations of blueprint
630 approaches to public sector development, but it could also serve as a guide to more effective
631 reform proposals. Reform proposals follow conventional research in emphasizing changes that
632 target a subset of the important causal mechanisms. There is currently a large focus on corruption
633 and accountability systems, and the finding that effective implementation of tree planting is
634 related to the existence of a strong accountability system which limited opportunities for
635 corruption seem to support this focus. But I also found that professional and public values helped
636 to insure the success of tree planting adoption and implementation, and also contributed to the
637 failure of the forest department hierarchy to diagnose the lack of a connection between its
638 techniques and its goals. However there is little discussion in reform circles about the shaping of

639 public and professional values, and the existence of professional logics of appropriateness is too
640 often ignored by development scholars and practitioners.

641 Adopting a multi-causal understanding of bureaucratic processes enabled this analysis to
642 identify alternative foci for forest sector reforms. Conventional approaches focus on curbing
643 corruption and increasing the rights of forest dwellers, while some past analyses have focused on
644 reforming the hierarchical nature of the forest departments (Kumar & Kant, 2005, 2006; Kumar,
645 et al., 2007; Matta, 2003; Matta, Alavalapati, et al., 2005; Matta & Kerr, 2007; Matta, Kerr, et
646 al., 2005). While these reforms are likely to have value in other areas, the analysis presented here
647 indicates that these strategies are not likely to contribute to improving the practice of tree
648 planting. Instead, this paper points to education, training, and monitoring as key areas that could
649 be reformed to improve the outcomes of forest sector programs. Education and monitoring
650 systems for Indian foresters have emphasized the values of trees, but have not trained foresters to
651 understand and measure the values forest create from contribution to ecosystem service
652 provision, poverty reduction, and biodiversity conservation. If methods of evaluating these
653 values were emphasized in training syllabi and in the preparation of working plans and other
654 planning documents, foresters might learn to value these more. Furthermore, if forest department
655 internal monitoring cells focused on evaluating the contribution of plantations towards achieving
656 improved watershed protection or non-timber forest product provision, rather than merely
657 measuring survivorship, it might enable departments to learn what kinds of activities enable them
658 to achieve their goals. Finally, some reforms that have been recommended elsewhere, such as
659 increasing the period between transfers (Iyer & Mani, 2011; Zwart, 1994) and creating more
660 specialization within the department (Maheshwari & Moosvi, 1995; Sixth Central Pay
661 Commission, 2008), both of which could facilitate more effective department

662 VII. CONCLUSION

663 Large-scale policy organizations are increasingly recognizing the importance of
664 developing context-based approaches to public sector reforms (World Bank, 2012), yet public
665 administration offers limited insight into the ways that context affects performance (L. J. O'Toole
666 & Meier, 2013). This study points to the importance of understanding multiple potential drivers
667 of change. The importance of different causal drivers, and the types of interactions between them
668 are likely to vary greatly between contexts. Within India, corruption appears to be an important
669 driver of policy failures in irrigation (Wade, 1982b, 1985, 1988), social and agricultural
670 programs (Gupta, 2012), and the management of protected areas (Robbins, 2000), but this does
671 not mean that it affects all policy areas equally. Similarly, discursive power may be particularly
672 important in the management of participatory programs (Springate-Baginski & Blaikie, 2007),
673 but less important in other areas. Although these drivers matter for tree planting, we have
674 evidence here that dealing with these problems alone will be insufficient to improve
675 development management. In this paper I presented an organizing framework for major theories
676 about bureaucratic behavior. While in this case values and incentives appeared to be most
677 important, further comparative research building on this framework is needed to understand
678 when different drivers matter, and how they interact.

679

680 Works Cited:

681

682 Agricultural Operations Division, Country Department II, South Asia Regional Office. (1991). Staff

683 Appraisal Report: India: Maharashtra Forestry Project. In. Washington, DC: World Bank.

684 Agricultural Operations Division, Country Department II, South Asia Regional Office. (1994). Andhra

685 Pradesh Forestry Project, Staff Appraisal Report. In. Washington DC: The World Bank.

- 686 Andrews, M. (2013). *Limits of Institutional Reform in Development*. Cambridge, GBR: Cambridge
687 University Press.
- 688 Balogh, B. (2002). Scientific forestry and the roots of the modern American state: Gifford Pinchot's path
689 to progressive reform. *Environmental history*, 7, 198.
- 690 Balooni, K., & Singh, K. (2007). Prospects and problems of afforestation of wastelands in India: A
691 synthesis of macro- and micro-perspectives. *Geoforum*, 38, 1276-1289.
- 692 Barton, G. A. (2001). Empire forestry and the origins of environmentalism. *Journal of Historical*
693 *Geography*, 27, 529-552.
- 694 Bendor, J., Moe, T. M., & Shotts, K. W. (2001). Recycling the Garbage Can: An Assessment of the
695 Research Program. *The American political science review*, 95, 169-190.
- 696 Bernard, H. R. (2006). *Research methods in anthropology : qualitative and quantitative approaches*.
697 Lanham, MD: AltaMira Press.
- 698 Clary, D. A. (1986). *Timber and the Forest Service*. Lawrence: University Press of Kansas.
- 699 Cohen, M. D., March, J. G., & Olsen, J. P. (1972). A Garbage Can Model of Organizational Choice.
700 *Administrative Science Quarterly*, 17, 1-25.
- 701 Collier, D. (2011). Understanding Process Tracing. *PS: Political Science & Politics*, 44, 823-830.
- 702 Das, S. K. (2001). *Public office, private interest : bureaucracy and corruption in India*. New Delhi; New
703 York: Oxford University Press.
- 704 Das, S. K. (2010). *Building a world-class civil service for twenty-first century India*. New Delhi: Oxford
705 University Press.
- 706 Davidar, P., Sahoo, S., Mammen, P. C., Acharya, P., Puyravaud, J.-P., Arjunan, M., Garrigues, J. P., &
707 Roessingh, K. (2010). Assessing the extent and causes of forest degradation in India: Where do
708 we stand? *Biological Conservation*, 143, 2937-2944.

- 709 Ferguson, J. (1994). *The Anti-Politics Machine: "Development," Depoliticization, and Bureaucratic Power*
710 *in Lesotho*. Minneapolis: University of Minnesota Press.
- 711 Gadgil, M., & Guha, R. (1995). *Ecology and Equity*. New York: United Nations Research Institute for Social
712 Development.
- 713 George, A. L., & Bennett, A. (2005). *Case studies and theory development in the social sciences*.
714 Cambridge, Mass.: MIT Press.
- 715 Ghosal, S., Athreya, V., Linnell, J. C., & Vedeld, P. (2013). An ontological crisis? A review of large felid
716 conservation in India. *Biodiversity and conservation*, 1-17.
- 717 Gibson, C. C., Andersson, K., Ostrom, E., & Shivakumar, S. (2005). *The Samaritan's Dilemma: The Political*
718 *Economy of Development Aid*. Oxford: Oxford University Press.
- 719 Government of India, Ministry of Personnel, Public Grievances and Pensions (Department of Personnel
720 and Training). (2007). the Indian Forest Service (Probationers Final Examination) Regulations,
721 2007. In Government of India, Ministry of Personnel, Public Grievances and Pensions
722 (Department of Personnel and Training) (Ed.), *GSR 281(E)*. Gazette of India, Extraordinary, Part
723 II, Section 3, Sub Section (i).
- 724 Government of India Ministry of Environment and Forests. (No date). National Working Plan Code. In
725 Government of India, Ministry of Environment and Forests (Ed.). New Delhi.
- 726 Goyal, A. K. (2004). Course Contents for Forest Range Officers Course. In Directorate of Forestry
727 Education (Ed.), (Vol. 3-17/99-RT (II), 21st June 2004). Dehra Dun: Ministry of Environment and
728 Forests, Government of India.
- 729 Guha, R. (1983). Forestry in British and Post-British India; A historical analysis. *Economic and Political*
730 *Weekly*, 18, 1882-1896, 1940-1887.
- 731 Guha, R. (2001). The Prehistory of Community Forestry in India. *Environmental history*, 6, 213-238.

- 732 Gundimeda, H., & Shyamsundar, P. (2012). Forests, sustainability and poverty in India. *Environment and*
733 *development economics*, 17, 373-378.
- 734 Gupta, A. (2012). *Red Tape : Bureaucracy, Structural Violence, and Poverty in India*. Durham, NC, USA:
735 Duke University Press.
- 736 Hall, P. A., & Taylor, R. C. R. (1996). Political Science and the Three New Institutionalisms*. *Political*
737 *Studies*, 44, 936-957.
- 738 Hannam, K. (2000). Educating an Environmental Elite: The Training of the Indian Forest Service.
739 *INTERNATIONAL RESEARCH IN GEOGRAPHICAL AND ENVIRONMENTAL EDUCATION*, 9, 285-295.
- 740 Hill, M., & Hupe, P. (2009). *Implementing public policy : governance in theory and practice* (2 ed.).
741 London [u.a.]: Sage.
- 742 Hoberg, G. (2001). The Emerging Triumph of Ecosystem Management: The Transformation of Federal
743 Forest Policy. In C. Davis (Ed.), *Western Public Lands and Environmental Politics* (pp. 55-85).
744 Boulder, CO: Westview Press.
- 745 Hunter, I. R., Hobbey, M., & Smale, P. (1998). Afforestation of degraded land—pyrrhic victory over
746 economic, social and ecological reality? *Ecological Engineering*, 10, 97-106.
- 747 Indira Gandhi National Forest Academy. (2010). *Training Handbook: Professional Training Course*. Dehra
748 Dun, India: Indira Gandhi National Forest Academy.
- 749 Iyer, L., & Mani, A. (2011). Traveling Agents: Political Change and Bureaucratic Turnover in India. *Review*
750 *of Economics and Statistics*, 94, 723-739.
- 751 Jones, B. D. (2001). *Politics and the architecture of choice : bounded rationality and governance*. Chicago:
752 University of Chicago Press.
- 753 Joshi, A. (2010). Do Rights Work? Law, Activism, and the Employment Guarantee Scheme. *World*
754 *Development*, 38, 620-630.

- 755 Joshi, A. K., Pant, P., Kumar, P., Giriraj, A., & Joshi, P. K. (2010). National Forest Policy in India: Critique of
756 Targets and Implementation. *Small-scale Forestry*.
- 757 Kashwan, P. (2013). The politics of rights-based approaches in conservation. *Land Use Policy*, 31, 613-
758 626.
- 759 Kaufman, H. (1960). *The Forest Ranger: A Study in Administrative Behavior*. Washington D.C.: Resources
760 for the Future.
- 761 Kingdon, J. W. (2003). *Agendas, Alternatives, and Public Policies* (Second edition ed.). New York:
762 Addison-Wesley Educational Publishers INC.
- 763 Kishwan, J., Pandey, R., & Dadhwal, V. (2012). Emission Removal Capability of India's Forest and Tree
764 Cover. *Small-scale Forestry*, 11, 61-72.
- 765 Krishnadas, M., Srinivasan, U., Velho, N., & Sridhara, S. (2011). Turning the Page in Forest Governance:
766 Science and Bureaucracy. *Economic & Political Weekly*, 46, 11.
- 767 Kumar, S., & Kant, S. (2005). Bureaucracy and new management paradigms: modeling foresters'
768 perceptions regarding community-based forest management in India. *Forest Policy and*
769 *Economics*, 7, 651-669.
- 770 Kumar, S., & Kant, S. (2006). Organizational resistance to participatory approaches in public agencies: an
771 analysis of Forest Department's resistance to community-based forest management.
772 *International public management journal*, 9, 141.
- 773 Kumar, S., Kant, S., & Amburgey, T. L. (2007). Public Agencies and Collaborative Management
774 Approaches: Examining Resistance Among Administrative Professionals. *Administration Society*,
775 39, 569-610.
- 776 Lasswell, H. D. (1971). *A Pre-View of Policy Sciences*. New York: American Elsevier Publishing Company,
777 Inc.

- 778 Le, H. D., Smith, C., Herbohn, J., & Harrison, S. (2012). More than just trees: Assessing reforestation
779 success in tropical developing countries. *Journal of Rural Studies*, 28, 5-19.
- 780 Lindenmayer, D. B., Hulvey, K. B., Hobbs, R. J., Colyvan, M., Felton, A., Possingham, H., Steffen, W.,
781 Wilson, K., Youngentob, K., & Gibbons, P. (2012). Avoiding bio-perversity from carbon
782 sequestration solutions. *Conservation Letters*, 5, 28-36.
- 783 Lindenmayer, D. B., & Laurance, W. F. (2012). A history of hubris – Cautionary lessons in ecologically
784 sustainable forest management. *Biological Conservation*, 151, 11-16.
- 785 Locatelli, B., & Vignola, R. (2009). Managing watershed services of tropical forests and plantations: Can
786 meta-analyses help? *Forest Ecology and Management*, 258, 1864-1870.
- 787 Lowood, H. E. (1991). The Calculating Forester: Quantification, Cameral Science, and the Emergence of
788 Scientific Forestry Management in Germany. In T. Frängsmyr, J. L. Heilbron & R. E. Rider (Eds.),
789 *The Quantifying Spirit in the 18th Century* (pp. 315-342). Berkeley: University of California Press.
- 790 Mackie, J. L. (1974). *The Cement of the Universe: A Study of Causation*. Oxford: Clarendon Press: Oxford
791 University Press.
- 792 Madhusudan, M., Shanker, K., Kumar, A., Mishra, C., Sinha, A., Arthur, R., Datta, A., Rangarajan, M.,
793 Chellam, R., & Shahabuddin, G. (2006). Science in the wilderness: the predicament of scientific
794 research in India's wildlife reserves. *Current Science*, 91, 1015-1019.
- 795 Maheshwari, B. L., & Moosvi, A. H. (1995). *Andhra Pradesh Forest Department and Forest Development*
796 *Corporation: Institutional Development Study: Final Report*. Hyderabad: Centre for Organization
797 Development.
- 798 Manning, N., & McCourt, W. (2013). The World Bank's Approach to Public Sector Management.
799 *International Review of Administrative Sciences*, 79, 391-397.
- 800 March, J. G., & Olsen, J. P. (1989). *Rediscovering institutions : the organizational basis of politics*. New
801 York: Free Press.

- 802 March, J. G., & Olsen, J. P. (2006). The Logic of Appropriateness. In M. Moran, M. Rein & R. E. Goodin
803 (Eds.), *The Oxford Handbook of Public Policy* (pp. 689-708). Oxford: Oxford University Press.
- 804 Martin, A. (2003). On knowing what trees to plant: local and expert perspectives in the Western Ghats of
805 Karnataka. *Geoforum*, 34, 57-69.
- 806 Matta, J. R. (2003). *Transition to participatory forest management in India : problems and prospects from
807 the perspectives of foresters*. Michigan State University, Lansing, MI.
- 808 Matta, J. R., Alavalapati, J., Kerr, J., & Mercer, E. (2005). Agency Perspectives on Transition to
809 Participatory Forest Management: A Case Study From Tamil Nadu, India. *Society & Natural
810 Resources*, 18, 859 - 870.
- 811 Matta, J. R., & Kerr, J. (2007). Barriers Beyond the Partners: Bureaucratic and Political Constraints to
812 Implementing Joint Forest Management in Tamil Nadu, India. *Environment, Development and
813 Sustainability*, 9, 465-479.
- 814 Matta, J. R., Kerr, J., & Chung, K. (2005). From Forest Regulation to Participatory Facilitation: Forest
815 Employee Perspectives on Organizational Change and Transformation in India. *Journal of
816 Environmental Planning & Management*, 48, 475-490.
- 817 McGeary, M. N. (1960). *Gifford Pinchot, forester-politician*. Princeton, N.J.: Princeton University Press.
- 818 Miller, C. (2001). *Gifford Pinchot and the Making of Modern Environmentalism*. Covelo, CA: Island Press.
- 819 Miller, G. J. (1992). *Managerial dilemmas : the political economy of hierarchy*. Cambridge [England]; New
820 York: Cambridge University Press.
- 821 Miller, G. J. (2005). The Political Evolution of Principal-Agent Models. *Annual Review of Political Science*,
822 8, 203-225.
- 823 Milne, G., Verardo, B., & Gupta, R. (2005). India: Unlocking Opportunities for Forest-Dependent People
824 in India. In. New Delhi: The World Bank Agriculture and Rural Development Sector Unit, South
825 Asia Region.

- 826 Ministry of Environment and Forests. (1988). National Forest Policy Resoultion, 1988. In. New Delhi:
827 Ministry of Environment and Forests, Government of India.
- 828 Ministry of Environment and Forests. (2010). National Mission for a Green India (Under the National
829 Action Plan on Climate Change) Draft Submitted to Prime Minister's Council on Climate Change.
830 In Ministry of Environment and Forests, Government of India, (Ed.). New Delhi.
- 831 Misra, D. N., & Bhatta, Z. (1990). Final Evaluation of Maharashtra Social Forestry Project. In. Washington,
832 DC: United States Agency for International Development.
- 833 Mosse, D. (2005). *Cultivating development : an ethnography of aid policy and practice*. London; Ann
834 Arbor, MI: Pluto Press.
- 835 Niskanen, W. A. (1971). *Bureaucracy and representative government*. Chicago: Aldine, Atherton.
- 836 Niskanen, W. A. (1975). Bureaucrats and Politicians. *Journal of Law and Economics*, 18, 617-643.
- 837 O'Toole, L. J., & Meier, K. J. (2013). Public Management and Performance: A Theory of Context. In
838 *Southern Political Science Association*. Orlando, FL.
- 839 O'Toole, R. (1988). *Reforming the Forest Service*. Covelo, CA: Island Press.
- 840 Ostrom, E. (2005). *Understanding Institutional Diversity*. Princeton, NJ: Princeton University Press.
- 841 Ostrom, E. (2007). Insitutional Rational Choice: An Assessment of the Institutional Analysis and
842 Development Framework. In P. Sabatier (Ed.), *Theories of the Policy Process*. Boulder, CO:
843 Westview Press.
- 844 Ostrom, E., Janssen, M. A., & Anderies, J. M. (2007). Going Beyond Panaceas Special Feature: Going
845 beyond panaceas. *Proceedings of the National Academy of Sciences*, 104, 15176-15178.
- 846 Pathak, A. (1995). Law, Private Forestry and Markets. In N. C. Saxena & V. Ballabh (Eds.), *Farm forestry in*
847 *South Asia*. New Delhi; Thousand Oaks: Sage Publications.
- 848 Patibandla, M. (2013). New Institutional Economics: Its relevance to curbing corruption. *Economic &*
849 *Political Weekly*, XLVIII, 55-63.

- 850 Platt, J. R. (1964). Strong Inference. *Science*, 146, 347-353.
- 851 Pressman, J. L., & Wildavsky, A. (1973). *Implementation: How Great Expectations in Washington Are*
852 *Dashed in Oakland; Or, Why It's Amazing that Federal Programs Work at All, This Being a Saga*
853 *of the Economic Development Administration as Told by Two Sympathetic Observers Who Seek*
854 *to Build Morals on a Foundation of Ruined Hopes*. Berkeley: University of California Press.
- 855 Puyravaud, J.-P., Davidar, P., & Laurance, W. F. (2010a). Cryptic destruction of India's native forests.
856 *Conservation Letters*, 3, 390-394.
- 857 Puyravaud, J.-P., Davidar, P., & Laurance, W. F. (2010b). Cryptic Loss of India's Native Forests. *Science*,
858 329, 32.
- 859 Raadschelders, J. C. N. (2011). *Public administration : the interdisciplinary study of government*. New
860 York: Oxford University Press.
- 861 Ragin, C. C. (2000). *Fuzzy-Set Social Science*. Chicago: The University of Chicago Press.
- 862 Rangachari, C. S., & Mukherji, S. D. (2000). *Old roots, new shoots : a study of joint forest management in*
863 *Andhra Pradesh*. New Delhi: Winrock International.
- 864 Ravindranath, N. H., Murthy, I. K., Chaturvedi, R. K., Andrasko, K., & Sathaye, J. A. (2007). Carbon
865 forestry economic mitigation potential in India, by land classification. *Mitigation and Adaptation*
866 *Strategies for Global Change*, 12, 1027-1050.
- 867 Rawat, V. R. S., & Kishwan, J. (2008). Forest Conservation-Based, Climate Change-Mitigation Approach
868 for India. *International Forestry Review*, 10, 269-280.
- 869 Robbins, P. (2000). The rotten institution: corruption in natural resource management. *Political*
870 *Geography*, 19, 423-443.
- 871 Robbins, P. (2003). Beyond Ground Truth: GIS and the Environmental Knowledge of Herders,
872 Professional Foresters, and Other Traditional Communities. *Human ecology*, 31, 233-253.
- 873 Saxena, N. C. (1994). *India's Eucalyptus Craze: The God that Failed*. New Delhi: Sage.

- 874 Scott, J. C. (1998). *Seeing Like a State*. New Haven: Yale University Press.
- 875 Sengupta, M. (2012). Anna Hazare and the Idea of Gandhi. *The Journal of Asian Studies*, 71, 593-601.
- 876 Singh, N. J., & Bagchi, S. (2013). Applied ecology in India: scope of science and policy to meet
877 contemporary environmental and socio-ecological challenges. *Journal of Applied Ecology*, 50, 4-
878 14.
- 879 Sixth Central Pay Commission. (2008). Report of the Sixth Central Pay Commission. In. New Delhi:
880 Government of India.
- 881 Springate-Baginski, O., & Blaikie, P. M. (2007). *Forests, people and power : the political ecology of reform*
882 *in South Asia*. London; Sterling, VA: Earthscan.
- 883 Springate-Baginski, O., Sarin, M., & Reddy, M. G. (2013). Resisting Rights: Forest Bureaucracy and the
884 Tenure Transition in India. *Small-scale Forestry*, 12, 107-124.
- 885 Suykens, B. (2009). The Tribal-Forest Nexus in Law and Society in India -- Conflicting Narratives. *Critical*
886 *Asian Studies*, 41, 381 - 402.
- 887 Tendler, J. (1997). *Good government in the tropics*. Baltimore: Johns Hopkins University Press.
- 888 Tilly, C. (2006). Afterword: Political Ethnography as Art and Science. *Qualitative Sociology*, 29, 409-412.
- 889 Vasan, S. (2002). Ethnography of the Forest Guard: Contrasting Discourses, Conflicting Roles and Policy
890 Implementation. *Economic and Political Weekly*, 37, 4125-4133.
- 891 Wade, R. (1982a). Corruption: Where Does the Money Go? *Economic and Political Weekly*, 17, 1606.
- 892 Wade, R. (1982b). The System of Administrative and Political Corruption: Canal Irrigation in South India.
893 *Journal of Development Studies*, 18, 287.
- 894 Wade, R. (1985). The market for public office: Why the Indian state is not better at development. *World*
895 *Development*, 13, 467-497.

- 896 Wade, R. (1988). Politics and graft: Recruitment, appointment and promotions to public office in India. .
897 In P. Ward (Ed.), *Corruption, development and inequality: Soft touch or hard graft*. New York:
898 Routledge.
- 899 Weber, M. (1947). *The Theory of Social and Economic Organization*, trans. A. M. Henderson and Talcott
900 Parsons. New York: The Free Press.
- 901 Wildavsky, A. (1972). Why Planning Fails in Nepal. *Administrative Science Quarterly*, 17, 508-528.
- 902 Wilkinson, C. F., & Anderson, H. M. (1985). Land and Resource Planning in the National Forests. *Oregon*
903 *Law Review*, 64, 1-373.
- 904 Wilson, J. Q. (1989). *Bureaucracy*. New York: Basic Books.
- 905 Wilson, W. (1887). The Study of Administration. *Political Science Quarterly*, 2, 197-222.
- 906 Wolcott, H. (2001). *Writing up Qualitative Research* (2 ed.). Thousand Oaks, CA: Sage.
- 907 World Bank. (2012). *The World Bank's Approach to Public Sector Management 2011-2020: "Better*
908 *Results from Public Sector Institutions"*. Washington DC: World Bank.
- 909 World Bank Sector and Thematic Studies Group: Operations Evaluation Department. (2002).
910 Performance Assessment Report: India: Andhra Pradesh Forestry Project: (Credit 2573-IN). In.
911 Washington, DC: World Bank.
- 912 Zahariadis, N. (2007). The Multiple Streams Framework: Structure, Limitations, Prospects. In P. Sabatier
913 (Ed.), *Theories of the Policy Process* (pp. 65-92). Boulder, CO: Westview Press.
- 914 Zwart, F. d. (1994). *The bureaucratic merry-go-round : manipulating the transfer of Indian civil servants*.
915 [Amsterdam]: Amsterdam University Press.

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Figure(s)



Figure 1: The study region shown in shading within the context of India.

Adoption

Implementation

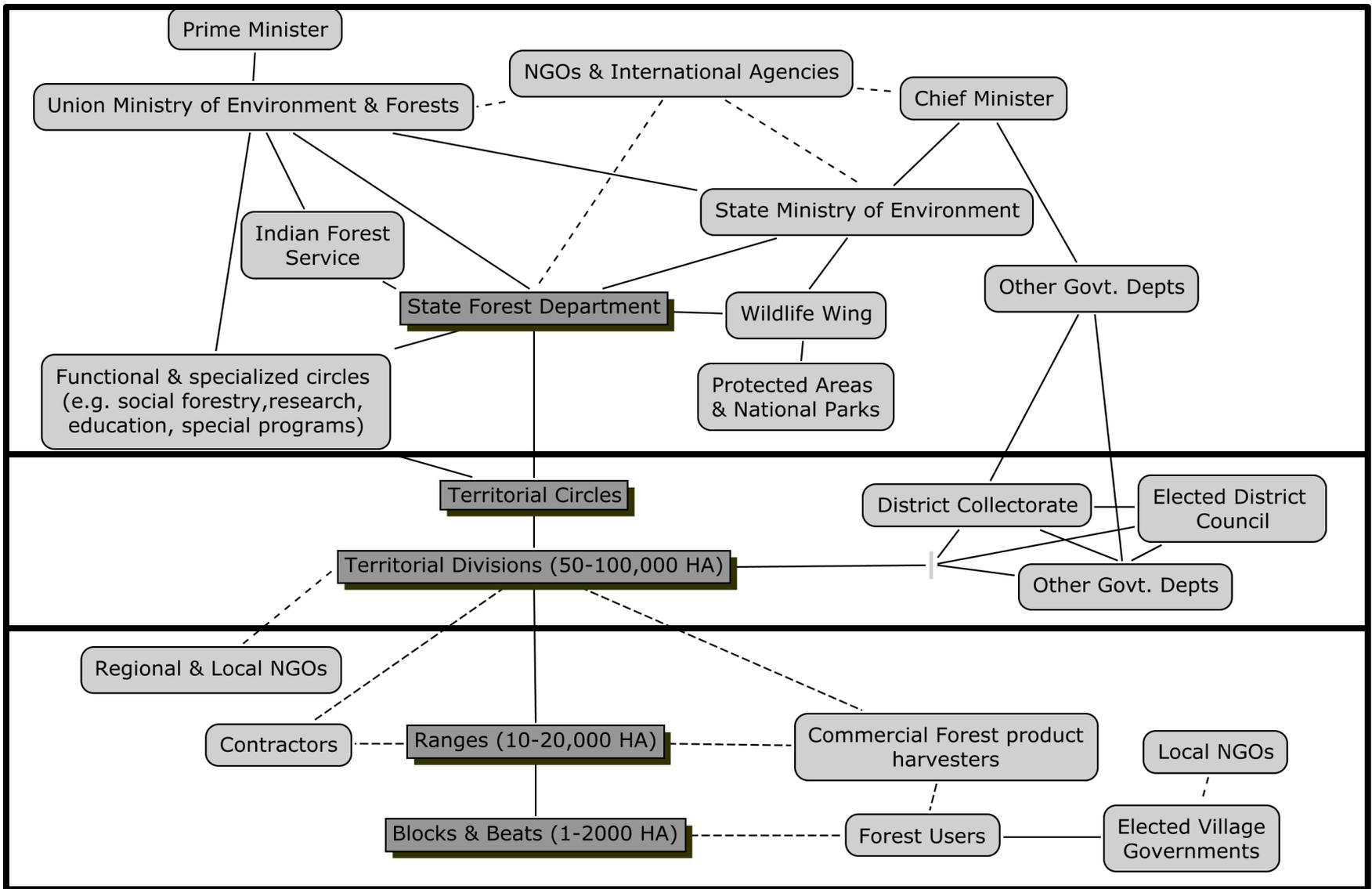


Figure 2: The Indian Forest Policy Network. Actors in the upper part of the diagram are responsible for policy design. Actors in the bottom third of the diagram are involved in implementation, while those in the middle play a role in both processes.

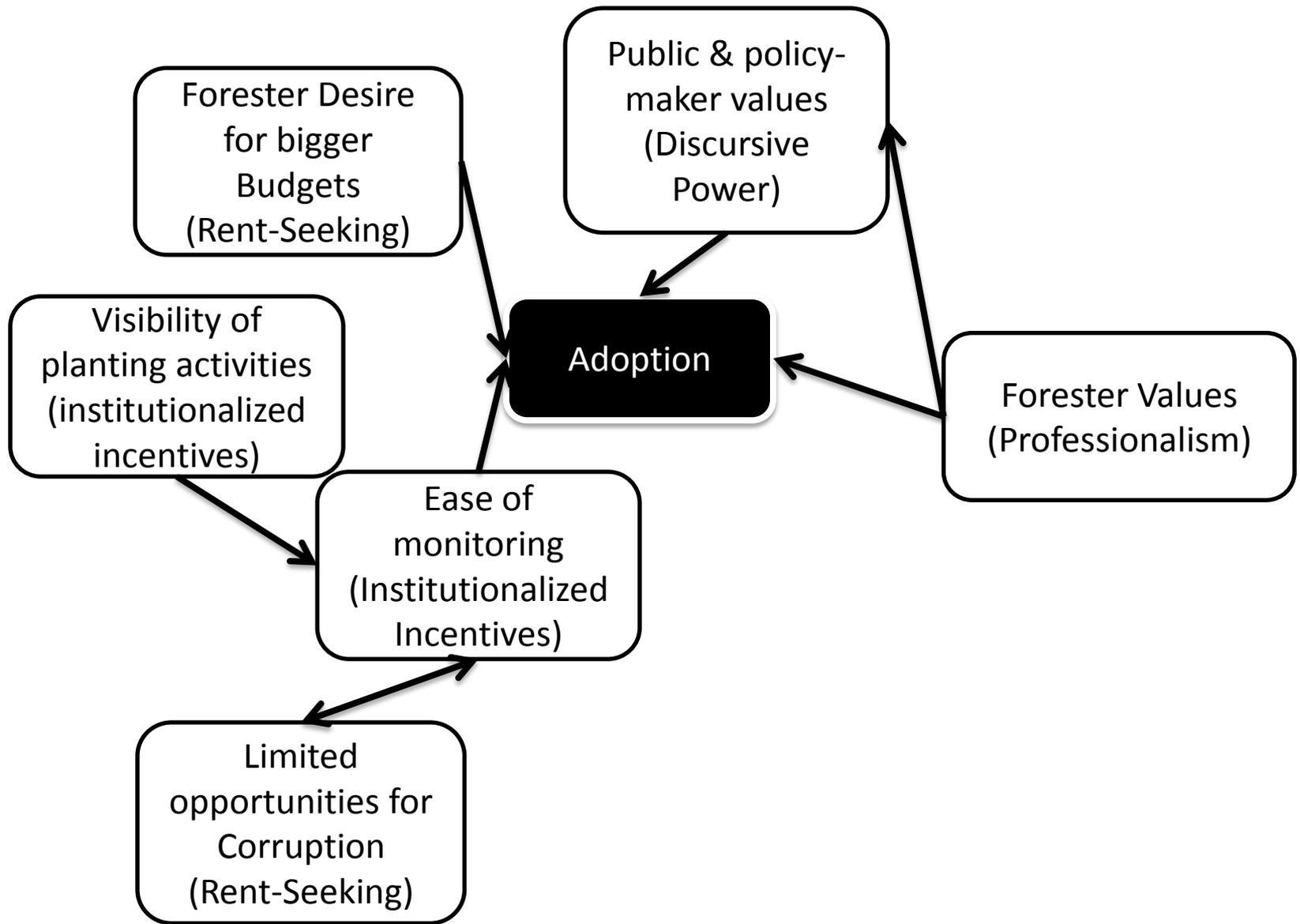


Figure 3: Path Diagram showing the process through which tree planting is adopted as a policy at the state and national level.

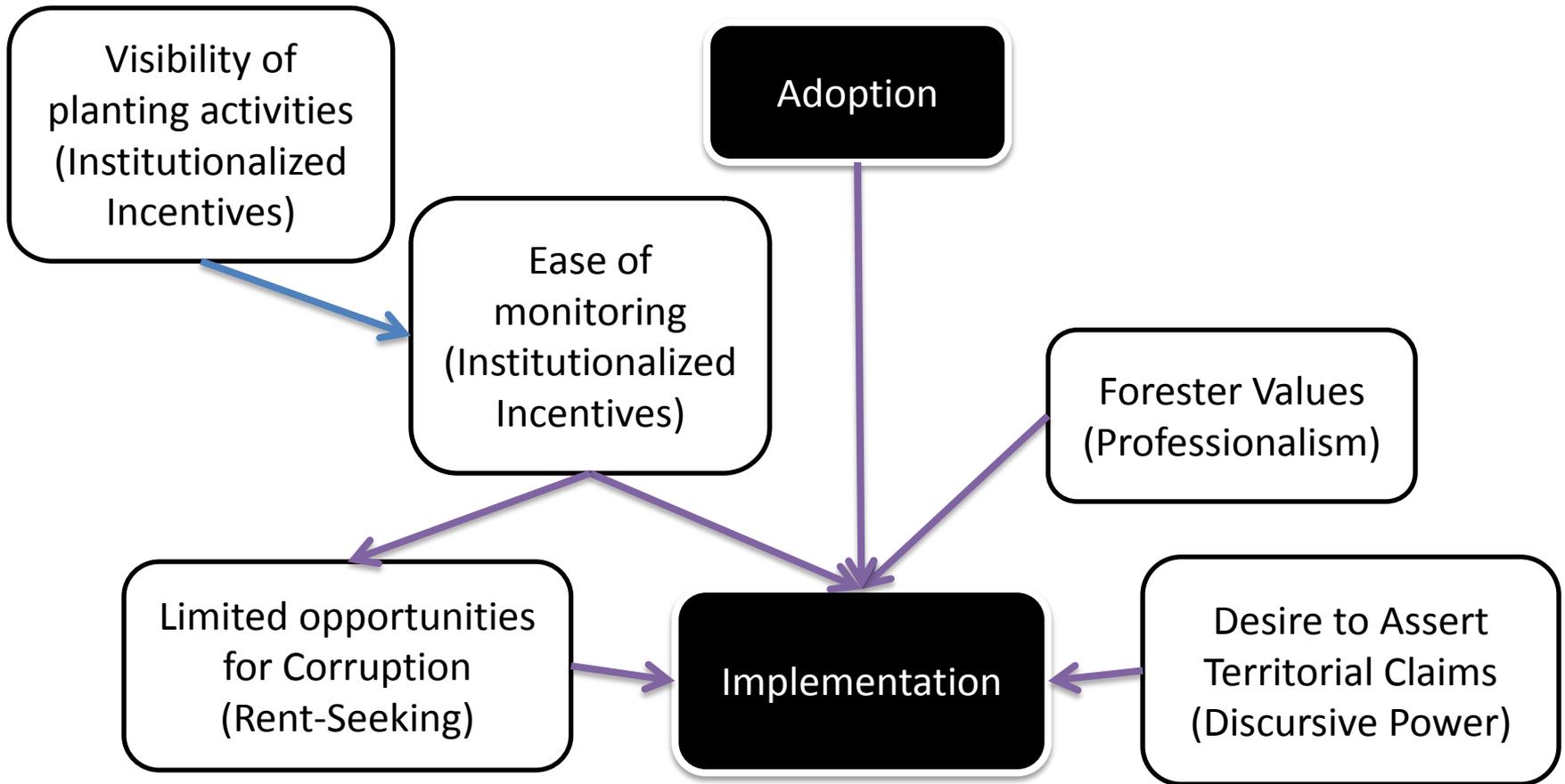


Figure 4: Path Diagram showing the process through which tree planting is implemented at the field level.

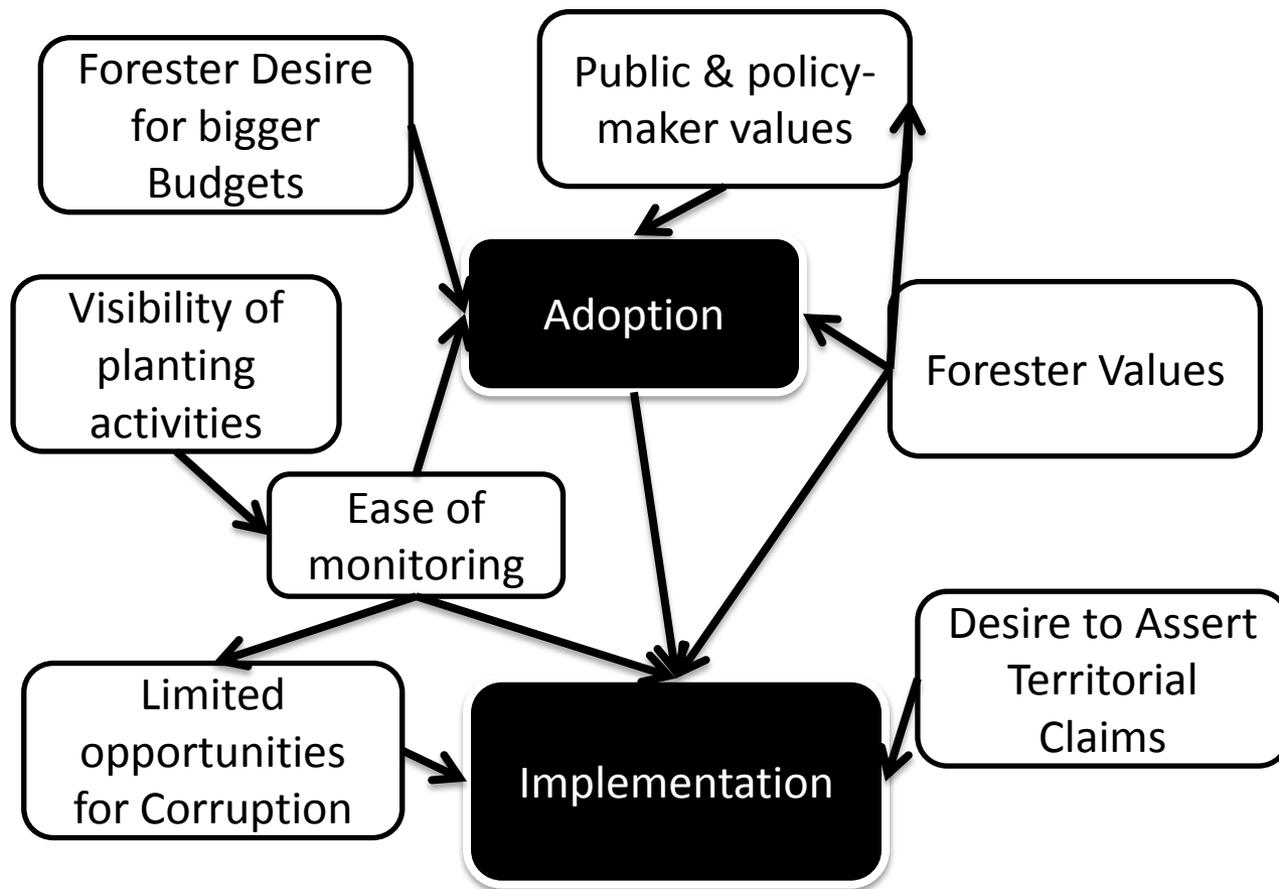


Figure 5: Flow diagram indicating the complete process through which tree planting is adopted and implemented.

Table 1: Framework of bureaucrat theories

Theory	Accountability relationship	Key sources	Expectation
Logics of Consequence			
Rent-seeking bureaucrats	Self; budget; agencies	Niskanen, Rose-Ackerman, Gupta, Indian public opinion	Tree-planting happens because it brings private or organizational benefits to bureaucrats.
Critical and power-centered approaches	Employer, power structure.	Foucault, Ferguson, many activists in India	Tree-planting happens because it reinforces the discursive power of the government.
Institutionalized Incentives	Rule makers in the broader society; public recognition	Tendler, Ostrom, Miller	Tree-planting happens because institutionalized incentives reinforce it.
Logics of Appropriateness			
Scientific Bureaucracy	Abstract science, public good.	Weber, Wilson, Indian foresters	Tree-planting happens because it is a logical solution to problems.
Professionalism	Profession.	March and Olsen	Tree-planting happens because it is seen as an appropriate professional activity by foresters.

Dear World Development Editors and Reviewers,

Thank you for taking the time to provide detailed and helpful comments on my manuscript. I have revised the attached manuscript based on your comments, and I believe it has improved substantially. Please find below my point-by-point response to your comments. The editor indicated that I should pay particular attention in my revisions to consistency in use of terms, better use of data, and greater description of the organizational context, and I addressed these both in the text and in the response to detailed comments, below. I have used italic text to indicate my responses, with plain text indicating the original comment.

Reviewer #2: This paper addresses policy adoption and implementation in forestry sector, using cases of tree-planting in two Indian states. The author attempts to explain diverse causal mechanisms and organizing framework and claims that there is a complex causal process behind foresters' choice to plant trees. Although not many research papers have been published about rationales of tree-planting and its consequences of and/or impact on bureaucratic systems, research angle presented in the manuscript are unique. In this sense, the manuscript's novelty is perceived to some extent. However, I cannot help feeling this paper somewhat loses research focus and a good flow of discussing points.

First, the manuscript's title expect readers to find more information and rationales/reasons of planting trees by Indian foresters, positive and negative, incentive, compulsory or other context-specific reasons. Going through the manuscript, however, the reasons are mainly easy visibility at monitoring and foresters' values based on the training received at earlier stages of foresters including senior forestry officials. In my understanding, the reasons are very common place worldwide.

Then, I was expecting to read how the organizing frameworks work to explain any rationales or provide supporting explanations about the reasons. There is no good point in the figure and tables to illustrate the organizing frameworks to promote and deepen readers' understanding.

At the same time, one simple question occurred: what are research questions in the first place?

In response to these three comments, I have worked to clarify the chief contribution of the paper to the scholarly and practical literature, as well as the underlying theoretical framework that I have used. The primary research question for this study is identified in lines 16-18, "In order to illustrate how multiple causes interact in the design and implementation of public programs in developing countries, the paper focuses on understanding why India's forest departments plant trees." As I now make clear in the introduction, public sector reforms in India have focused on a relatively small set of panaceas (see lines 6-9). While I think the reviewer is probably correct in noting that the reasons I identify are probably found elsewhere (and have in fact been described in some past studies – see for example Tendler 1997, Gibson et al. 2005 cited in the paper), these analyses are not being utilized in India or elsewhere to inform policy-making. Thus, my contribution is not to describe a unique process, but to highlight how a multi-causal analysis can contribute to improving policy analysis for public sector reforms. I have particularly focused on this issue in the discussion, lines 639-659. I have worked in these sections as well as throughout the manuscript to clarify how the organizing framework is used to understand and inform the analysis of tree planting.

Secondly, much more care should have been paid to wording overall. In relation to the title, for example, it is not clear what the author means or defines by "foresters" in the manuscript. Foresters could mean only field foresters or include forestry officers "who have never seen a forest" (line 223) or lack of on-the-ground realities. Personally I have never met such forestry officials as neither had field experience nor seen forests, and the usage of the word 'foresters' in the manuscript tends to be a bit confusing. It should be clarified or explained at the first time the word appears because the word is important as used in the title.

I have made two changes to address the concern with the use of the term forester, and make sure this important term is understood, as it has several distinct meanings, and I use the term in a specific way (i.e. to refer to officials employed by forest departments). First, I have added a section in the methods section which specifically aims to clarify the use of the term foresters as a unit of analysis and place it in context (see lines 234-44) as well as adding to the description of the interviewees in the subsequent 2 paragraphs (see lines 245-281).

Second, I have worked to clarify the paraphrased description of a forester who had never seen a forest which the reviewer refers to here (formerly on line 223, now line 354-9). This quote describes a forester's experience prior to joining the forest department, not to their actual work experience (this particular forester had subsequently spent nearly 30 years working in forested areas). I have reworded this section to make clear that this refers to the background of the forester prior to joining their job, not to their current work responsibilities. The reviewer is correct that all forest officers with more than a few years of seniority have extensive on-the-ground knowledge of forest realities.

In addition, I have to point out that there are several words that need to be clarified or to be consistent throughout the manuscript and table/figures. Such efforts will help readers to follow. For additional examples, some words, listed below, are hard to grasp meanings, if words are interchangeable or each word has some intention to use to differentiate.

- Scientific forestry (line 122), administrative science (line 120), scientific bureaucracy (Table 1, Theory column)

The entire paragraph including the discussion of "scientific forestry" and "administrative science" has been restructured to clarify that it is offering a definition of the use of the term "scientific bureaucracy" as used in table 1 (see lines 179-93). I have eliminated the term "administrative science" which was a term defined by the references of the previous sentence, and now use the term "orderly policy analysis," which is more specific to what I mean. I changed the term "scientific forestry" to forest science, as I believe it is more intuitive to understand, and explained that this was a 19th century movement aimed at developing "tools to maximize the sustained yield of intensively managed forests." The movement is discussed in much greater detail in the references provided.

- Professions (line 135), professionalism (Table 1, Theory column), professional values (lines 208, 311 etc), Foresters Values (Figures 3, 4, 5)

I have amended the discussion in lines 194-205 to more clearly indicate how these terms are related. In addition, I have in most cases replaced the term "professional values" with the

more specific term “forester values,” as the values of foresters are the specific values that the paper discusses. The only place I have left the term “professional values” in the paper is in the conclusion when I discuss the more general relationship between bureaucrats and public programs in India, which is not specific to forestry.

These are some examples as often appeared in the manuscript as below, but not all. I suggest the author pay more careful attention in choosing words to revise the manuscript.

Thirdly, it seems that the author is not certain what messages he/she wanted to present as conclusion. Although it is stated as "This study points to the importance of understanding multiple potential drivers of change." in line 445 and hereinafter, no specific idea and proposal for change is stated. Readers would be more interested in what action could/should be taken by which stakeholder/whom as a next stage to improve the current forest governance, based on the research results. It is obvious only tree-planting alone does not serve enough to improve development management.

Although the manuscript refers to only interpretation of organizing frameworks and analysis on tree-planting incentive based on interview results that are seemingly related to general status of countries' forest sector, there is almost no discussion on what kind of challenges and risks as well as opportunities for the two Indian states with contrasting forestry governances/approaches can be brought with and without innovative approaches or any changes, and what impact and benefit can safeguard ecosystem reduce poverty in India in addition to tree-planting, how to leverage resources and experience of current forest governance to at the national level. Accordingly, I cannot see where the manuscript aims to lead readers.

Finally, I cannot see how much impact with convincing points the manuscript will bring, no matter what groups of audience the journal is intended to. Given the journal's scope of development process or processes of change, the manuscript should include either practical, innovative or more specific actions and recommendations for future potential change, but no such proposals are stated.

The purpose of this paper is to illustrate how a multi-causal approach to the design and implementation of public programs can be utilized to understand contemporary policy adoption and implementation. As such, my primary purpose in this paper is not to provide specific policy recommendations or proposals. I am working on such proposals based on this literature, and recently returned from presenting these proposals to policy makers in the Indian states under study, as well as elsewhere in India. In the future, I hope to publish these more policy oriented pieces in venues that are widely read among Indian forest policy makers (e.g. Economic & Political Weekly, Indian Forester, etc). That said, I have aimed to improve the clarity of the manuscript by demonstrating how the policy recommendations emerging from this study differ from those emphasized in most policy research. I introduce this topic in lines 6-9, but discuss it much more depth in lines 639-659. This goes along with a broader reworking of the discussion section, which should add additional clarity here.

The paper would benefit from elaborating words, choosing discussion focus, how to argue the findings and some of the above points to reflect to public sector management system, especially

Indian forestry schemes, if that is the author's intention and discussing points, and refining the discussion section.

Reviewer #3: The paper addresses a very relevant question for advancing public sector management in developing countries: how to analyze and understand shortcomings (or path dependencies) of public sector action from a perspective which includes both the peculiarities of the specific public administration and the state of the art of the sector in which it acts. The specific question the author wants to answer is: Why do Indian foresters insist on tree planting programs as a contribution to biodiversity protection and rural development/poverty reduction if the failure of these programs in these two areas is manifest?

For this purpose, the author develops an analytical framework which discusses the role of incentives (financial benefits; power; recognition by the institution/the public) and the role of identity (foresters as scientifically trained professionals). The paper is well written and thought through. The discussion of the complementary nature of the literatures on incentives and on sociological institutionalism is as convincing as the way in which the analytical framework is used for presenting and analyzing the empirical data collected among foresters at national and state levels.

I understand that the main message the author wants to bring across is that incentives together with identity can explain the path dependency of forestry in India with regards to tree planting. With this focus, the author concentrates on the public administration side of the analysis and leaves the literature on forestry as a sector aside, although the technical failure of tree planting programs is fundamental for justifying the research question. This is the weakest part of the analysis presented by the author because the reader is left alone with the question why the unsatisfying outcomes of tree planting programs apparently do not matter to the foresters who identify themselves, I repeat, as scientifically trained professionals.

One possibility of addressing this shortcoming is by going a bit deeper into the analysis of Joint Forest Management (or community-based forest management): why it was adopted, how it changed self-perception and identities of foresters (or not), what should have been changed in the organization and way of working of the forest department in order to facilitate implementation. The articles by Kumar/Kant (2005), Matta/Kerr/Chung (2005), Matta/Alavalapati/Kerr/Mercer (2005), Saxena (2000), Sharma (2000), Hannam (2000) are relevant in this regard, and they also offer further explanations on why the hierarchical structure and way of working of forest departments is not conducive to overcome path dependency - very much in line with the analysis the author proposes here! Reference to this literature could strengthen the argument.

Another approach is not only to look at foresters but also at peasants, their priorities and attitudes to tree growing (Mahapatra/Mitchell 2001), the perceptions foresters have about peasants and viceversa (Dhanya/Viswanath/Purushothaman 2011) and differences in their interests (Martin 2003).

Such a perspective would enrich the analysis with a more specific definition of the professional identity of foresters and the frictions it produces when it meets non-foresters in the field. And it would facilitate an analysis of path dependency in foresters' strategies which includes reflections and evidence on failing strategies. This is elementary for policy analysis and is not "naïve

instrumentalism" (line 129) as stated by the author with regard to a policy analysis that assumes that there are relationships between policy design and policy objectives. Of course power and other interests also influence policy design, but we should not assume that there is no relation with objectives. When proposing policies as a respected expert it is necessary to say something on the results to be obtained, and to base that on empirical evidence. And this is also necessary from the perspective of appropriateness.

I will address this fairly long set of comments together, as the issues raised here by the reviewer are closely linked. The reviewer sees the main limitation in the submitted draft as being a lack of linkage to discussion of the forest sector. I have addressed this comment primarily by substantially reworking the introduction, adding substantial new material that situates the discussion of planting trees within the broader debate over Indian forest management. See lines 27-86. In addition, I have added material where appropriate throughout the text that links my work with past work on the forest bureaucracy by Matta, Kumar & Kant, and others, including the works mentioned by the reviewer. See in particular lines 382-398 & 639-645, in which I discuss the ways that findings from these past studies are relevant to this study, and highlight the ways in which my findings differ from theirs. Note that in doing so, I have taken a somewhat different tack than suggested by the reviewer, which I believe is more appropriate for this study. The reviewer suggests adding analysis of JFM, which I have chosen not to do because, while much tree planting has been done under the aegis of JFM, tree planting and JFM are only loosely linked – there are many JFM activities that do not involve planting trees, and many trees are planted not under the aegis of JFM. This fits also with the conceptualization foresters have of their own work – i.e. many field foresters spend large amounts of time planting trees and even if these plantations are part of JFM projects, they often conceive of the work as being planting trees, and not as JFM. I have also chosen not to explore the relationship between tree planting by peasants on their own land and the forest department, as this issue was simply not very prevalent in my research material. In my study area during the time I visited it, government foresters had very little engagement in private land tree planting (which farmers were pursuing autonomously or with the support of other agencies, for example ITC-Bhadrachalem's paper mill, which contributed to the work the reviewer cites later by Prasad et al). Thus, in the setting I studied, these issues were not closely linked.

The term naïve instrumentalism was actually taken from Mosse (2005, p. 5). Thanks for pointing this out, as I otherwise might have missed the error of not citing this as a quotation. I have fixed this and now cite it as a quotation from Mosse, rather than my own words (see line 194). Mosse's point was that focusing on policy analysis as the source of ideas in policies, while ignoring other aspects of the policy process which lead to outcomes (i.e. such as politics, or individual values), is naïve. This opinion is well supported in the literature on the policy process & policy analysis – going back to the work of Lasswell. i.e. see Sabatier's (2007) edited volume on theories of the policy process. To be clear, in using this quote I am not implying that it is naïve to believe that there is a relationship between rational policy analysis and policy selection, but rather that it is naïve to believe that it is the only consideration. I think this is now clear in the writing.

Other points:

There is a contradiction between line 153 "similar biophysical conditions of forests studied" / and line 181: "maximize the diversity of ecological and social conditions within these regions" - please clarify!

I have clarified this in the second instance, where I now state, "In both states forest range from wetter and more productive forests in the east to arid, less productive forests in the west, and social conditions vary systematically with distance from the major urban areas of Hyderabad and Nagpur, so forest divisions were selected to insure that this diversity of conditions was captured within both states." See lines 267-271.

p. 10 section on professional values: forestry training comes across as an extreme case but is very similar to foresters' training in the US and Germany; the narrowness in training, however, comes not only from senior foresters as trainers and old teaching material, but from the absence of social sciences in the syllabus (see Kumar / Kant 2005 and Matta et al. 2005)

I agree with the reviewer that social sciences were historically absent from the syllabi, and I now mention this, citing Hannam (2000) who was the first I am aware of to present this critique (lines 349-352). However, the implications of this for this particular research are not clear. First, reforms to the syllabi in 2004 (not reflected in the work of Hannam, Kumar/Kant and Matta) have substantially increased the social science component of forester training courses, although foresters working in the field today were predominantly trained before this change. In fact, I would argue that there is more social science on the forester training syllabus in India now than in many programs elsewhere in the world. Second, while the implications of a lack of social science training for the execution of Joint Forest Management are clear, since JFM required social engagement, they are less clear for tree planting programs writ large, many of which could justifiably be seen as purely technical reforestation problems.

263-74: "systematic research on the efficacy of forest programs is hindered by the forest department ... ecological research is insufficient ... alternative sources of information do not exist" - these are very strong statements! A quick search with Scopus on "tree plantations in India" and on "foresters India" shows that there is research, not only in forestry journals but also on agroforestry (agronomy, agriculture) (Dhyani et al. 2009; Prasad et al 2010; Dhanya et al. 2011; Balooni / Singh 2007 and 2001; Khan et al. 2006; Pal / Sharma 2001; Hunter/Hobley/Smale 1998). So this statement should be qualified a bit.

I have qualified this statement to read: "Although the ecological and economic value of current tree planting programs are questionable, systematic research on the efficacy of forest programs is hindered by the forest department (Krishnadas, et al., 2011; Madhusudan, et al., 2006), ecological research has tended to focus exclusively on charismatic species in protected areas rather than on program evaluation (Ghosal, Athreya, Linnell, & Vedeld, 2013; Singh & Bagchi, 2013), and alternative sources of information are not available to the forest departments' field staff or to most members of the public."

The change I made emphasizes that whatever sources of alternative information may exist (e.g. such as evaluations of JFM programs made in peer reviewed journals), they are not available to the people tasked with making decisions in the field, which is the empirical focus of this paper. Apart from this, I stand behind the original text. The hindering of research by the forest

department is well documented in the paper by Madhusudan et al. (2006), and is also something that I have observed in the field and is widely discussed informally among forest and wildlife researchers in India. The focus on charismatic species and protected areas is a critique arising from prominent ecologists' work (see the citations I provided), and I have searched in vain for systematic research that evaluates common notions of the forest department – e.g. there is essentially zero research being done on the hydrological impacts of different forest practices, very little being done at the field level on carbon, and almost none being done on the impact of forest practices on biodiversity apart from charismatic mega fauna. There is a large literature evaluating the impacts of JFM, but as emphasized in my altered text, field foresters – and many policy-makers, are unaware of this research which is published predominantly in peer reviewed journals which foresters do not have access to or otherwise are not aware of. In fact, few foresters read sources of information on their work apart from government orders and circulars issued by their superiors.

Apart from the fact that foresters and forest policy makers rarely have access to or read the journals referenced by the reviewer, the references located by the reviewer are not systematic research on the efficacy of forest programs, in fact, only 2 of them evaluate programs that involve the forest department (Balooni & Singh from 2007, and Hunter, Hobley, & Smale). The rest are on planting of trees by farmers on village common lands or private lands without involvement by the forest department. This is outside of the empirical focus of the paper, which is not about any tree planting, but only about tree planting by foresters. For example Dhyani discusses agroforestry in broad terms, without reference to specific agroforestry systems. Prasad et al., Khan et al., and Dhanya et al. discuss agroforestry systems on private land in which the forest department plays no role (Prasad discusses systems in which trees are planted on private land in cooperation between private industry and small farmers, and their main focus is on finding ways to make the systems more appealing to smallholders, a focus which is not relevant for the forest department, which is not a smallholder. Dhanya discusses planting of trees on farmland that is done entirely autonomously by small farmers, and Khan et al, again, discuss autonomous tree planting by farmers). Balooni & Singh (2001) discuss the Tree Growers Cooperative Societies, a reforestation model for village common lands which expressly did not include the forest department (see also Saigal, Sushil. "Life and Afterlife of a Development Project: Origin, Evolution, and Outcomes of the Tree Growers' Cooperatives Project, India." PhD Dissertation, Cambridge University, 2011, for a more detailed discussion of how these cooperatives worked. Note that Saigal's study 10 years after Balooni & Singh's finds that many of Balooni & Singh perceptions of opportunities had not been borne out). Pal and Sharma discuss an 8 HA tree plantation established on an experimental basis on village common lands by TERI, which, again, did not include the forest department. While some of these findings may have a broad relevance to improving silvicultural treatments that the forest department could apply, they are not program evaluation that is directly relevant to foresters' experiences.

Repetition of the same text in lines 276-279 and 337-340; please correct

Thanks! I've fixed the second instance so it is no longer a repetition, but refers back to the first instance.

Line 353 tree planting is done due to a "desire to visibly assert territorial claims" - this needs further explanation, why should foresters want to do that? What are the interests of villagers? Look at the broad literature on afforestation / tree planting on wasteland and degraded land (i.e. Pal / Sharma 2001).

I have revised this section to clarify the interests of villagers and foresters, and have added reference to the broader literature which is consistent with this claim.

Figures 3-5: the figures are not so clear to me as the text, maybe they are not necessary as they do not add much

I have kept the figures in this version of the manuscript, as at least some readers appear to find them useful.

Figure 2: "chief minister" is accountable to whom? Why is the forest department looked at in isolation? Are there no relations with other departments, e.g. agriculture/agroforestry?

The chief minister is accountable to his party and the electorate, however this accountability is felt very indirectly by the forest department, therefore it is not necessary to include it. The territorial forest divisions do have linkages to various other line departments, including the agricultural department and the horticulture department – these are represented in the diagram as “other govt. departments”. I spent months in the field and heard about these departments only on rare occasions, indicating that they are not very important relationships, thus I have chosen to include them in the box with “other govt. departments.”

Table 1: Second column, 3rd row: write "self/budget/agencies"; second column, 5th row: write "rule makers in the broader society / public recognition"; fourth column, 3rd row: write "tree planting happens because it brings private / organizational benefits to bureaucrats"

Thanks. These changes were made.

Literature quoted in this review:

Thank you for including citations in your review! I appreciate it, and I've used several of these in revising.

Balooni, K. / K. Singh (2007): Prospects and problems of afforestation of wastelands in India: A synthesis of macro- and micro-perspectives, in: Geoforum, Volume 38, Issue 6, pp. 1276-1289

Balooni, K. / K. Singh (2001): Tree plantations for restoration of degraded lands and greening of India: a case study of tree growers' cooperatives, in: Natural Resources Forum 25 (1), pp. 21-32

Dhanya, B. / S. Viswanath / S. Purushothaman (2011): Ficus trees in rainfed agricultural systems of Karnataka, southern India: An analysis of structure, benefits, and farmers' perceptions, in: Journal of Tropical Agriculture, 50, pp. 59-62

Dhyani, SK / R Newaj / AR Sharma (2009): Agroforestry: its relation with agronomy, challenges and opportunities, in: Indian Journal of Agronomy 54(3), pp. 249-266

- Hannam, K (2000): Utilitarianism and the identity of the Indian Forest Service, in: *Environment and History* 6(2), pp. 205-228
- Hunter, IR / M Hobley / P Smale (1998): Afforestation of degraded land - Pyrrhic victory over economic, social and ecological reality?, in: *Ecological Engineering* 10(1), pp. 97-106
- Khan, MA, JC Tewari, R Singh, P Narain (2006): Structure, production attributes and management strategies in a traditional extensive agroforestry system in an arid region watershed of India, in: *Forests, Trees and Livelihoods* 16(3), pp. 227-246
- Krishnadas, M. / U Srinivasan / N Velho / S Sridhara (2011): Turning the page in forest governance: science and bureaucracy, in: *Economic and Political Weekly*, 46(50), pp. 10-13
- Kumar, S / S Kant (2005): Bureaucracy and new management paradigms: modeling foresters' perceptions regarding community-based forest management in India, in: *Forest Policy and Economics*, 7(4), pp. 651-669
- Mahapatra, AK / CP Mitchell (2001): Classifying tree planters and non planters in a subsistence farming system using a discriminant analytical approach, in: *Agroforestry Systems*, 52(1), pp. 41-52
- Martin, A. (2003): On knowing what trees to plant: Local and expert perspectives in the Western Ghats of Karnataka, *Geoforum*, Volume 34, Issue 1, pp. 57-69
- Matta, JR / J Kerr / K Chung (2005): From forest regulation to participatory facilitation: forest employee perspectives on organizational change and transformation in India, in: *Journal of Environmental Planning and Management*, 48 (4), pp. 475-490
- Matta, JR / J Alavalapati / J Kerr / E Mercer (2005): Agency perspectives on transition to participatory forest management: A case study from Tamil Nadu, India, in: *Society and Natural Resources* 18(10), pp. 859-870
- Nath, T.K. / M. Inoue / M. De Zoysa (2013): Small-Scale Rubber Planting for Enhancement of People's Livelihoods: A Comparative Study in Three South Asian Countries, *Society & Natural Resources*, Volume 26, Issue 9, pp. 1066-1081
- Pal, RC / A Sharma (2001): Afforestation for reclaiming degraded village common land: a case study, in: *Biomass and Bioenergy*, 21(1), pp.35-42
- Prasad, JVNS, GR Korwar, KV Rao, UK Mandal, CAR Rao, YS Ramakrishna, B Venkateswarlu, SN Rao, HD Kulkarni, MR Rao (2010): Tree row spacing affected agronomic and economic performance of Eucalyptus-based agroforestry in Andhra Pradesh, Southern India, *Agroforestry Systems*, 78(3), pp. 253-267
- Prasad, JVNS, GR Korwar, KV Rao, K Srinivas, CA Rama Rao, CH Srinivasarao, B Venkateswarlu, SN Rao, HD Kulkarni (2010): Effect of modification of tree density and geometry on intercrop yields and economic returns in Leucaena-based agroforestry systems for wood production in Andhra Pradesh, Southern India, *Experimental Agriculture* 46(2), pp. 155-172

Saxena, NC (2000): Research issues in forestry in India, in: Indian Journal of Agricultural Economics 55(3), pp. 359-383

Sharma, RC (2000): Beyond joint forest management, in: Indian Forester 126(5), pp. 463-476

Reviewer #4: This is an interesting paper and a very important issue to understand in the context of forest management in India. This paper offers a set of theories and hypothesis emerging from these theories that may be applicable to tree planting in India. The paper is well written and the multi-causal process that it identifies is useful.

One major comment is related to the data the researcher gathered in India, which is used minimally to make his/her various points. The author collected data from 143 foresters. It is likely that the author is using these data for developing a different paper, but this paper would be vastly enriched by this information. As it stands, the paper left me asking, what do the foresters have to say about all of this theorizing? There is only a limited literature on how bureaucrats in the forest department act and why (relative to the richer literature on how households participate in forest related activities) in India. Thus, this paper could provide a more complete and more useful story if it drew in the empirical/quantitative data collected by the author.

I have worked to include more direct quotations from the foresters themselves, as well as paraphrases of their quotes, in the text. I did not systematically ask all 143 foresters about tree planting – I only discussed tree planting with those foresters who were actively involved in the activity. Furthermore, these 143 foresters were located through snowball sampling, and thus are neither a census nor a statistically valid random sample. Therefore I believe the results are more compelling reported, as I currently do, qualitatively.

A second comment is that the author should try to give a fuller picture of what the roles and responsibilities of the forest department (FD) are. As far as I understand, the FD have several major functions: stemming deforestation, reducing degradation of forests, improving yields/revenues and supporting other forest services through better management, and growing trees. The author should outline and discuss tree-planting in the context of all of these 'major' functions. He makes the case that tree planting is easier than say JFM (true), but is it somehow prioritized relative to revenue management, where there may be more rent-seeking options? I am not suggesting that the author expand his analyses to look at each of these functions separately. However, without a clear understanding of what else the Forest Department is responsible for, it is hard to examine causal mechanisms for tree planting.

I now include a much more detailed discussion of the roles and responsibilities of the Forest Department in the revised introduction, and use this to more clearly explain the role of tree planting in these major functions.

The author seems to suggest that tree planting is not as important a function (eg. he/she states that the actual practice of tree planting is not scientifically tested, 233 - what does this mean?) of the forest department. No doubt there have been criticisms of tree planting activities. But are the criticisms focused on tree planting per se or on the types of trees (Eucalyptus under Social Forestry) that have been pushed through? I believe India has a public policy goal of some 30% (?) of land under forests. Much of these forested lands are deforested or degraded. In this

context, the public policy question is how much effort needs to go into afforestation versus stemming deforestation and degradation. The author seems to suggest that afforestation is the dominant response to this problem of maintaining 30% (or so) forest cover. This may well be true, but it would be appropriate to see a discussion around: a) what is the public policy goal and what are potential Forest Department functions that are meant to respond to this goal; b) why do we think that tree-planting is the dominant response (is there some budget related information that is the basis of this argument?). By contextualizing the discussion around why plant trees, the author would move this paper a bit closer to empirical analyses and make it more useful.

I have clarified this issue throughout the manuscript, but particularly in the introduction. To summarize here, my point in this paper is not to critique the use of tree planting – which probably can help the forest department achieve its goals in certain situations, including certain kinds of highly degraded areas. Rather, it is to point out that the superficial reasons given for choosing tree planting do not match the policy goals for which tree planting is being selected, yet it is one of the few activities which are successfully implemented. See lines 77-80.

There is no government program that sets out to plant trees. There are clear goals laid out in policy documents at the national and state level which focus on various forms of ecosystem restoration and poverty reduction, and afforestation is seen as a route to these goals. These goals, as the reviewer suggests, include increasing forest cover, but also include various other goals – i.e. biodiversity and watershed protection, poverty alleviation, and other goals related to ecosystem service provision. I have discussed these goals in lines 30-47 in the introduction. In lines 59-65, I discuss how tree planting is often adopted to achieve these goals. While tree planting is a valuable tool for creating commercial tree plantations, it is often unnecessary for restoration of forest cover, because native forests regenerate rapidly in many forest areas as soon as pressures from grazing, firewood gathering, or illegal timber harvests are removed. Furthermore, tree plantations have at best an unknown, and at worst a negative impact on provision of ecosystem services that are valued from forests (see lines 37-42). The use of tree planting for achieving these goals is rarely tested in the Indian context, but those examinations that do exist – often from other parts of the world, but some from India, i.e. see Pathak 1995 – show that relative to naturally regenerated forests, tree plantations may have lower biodiversity, be less effective at watershed protection, and produce significantly fewer valuable non timber forest products for use in rural livelihoods. In other words it is not obvious that tree-planting serves the forest department's goals. See also the discussion in lines 305-335.

The importance of tree planting is largely the result of extensive interviews with a large number of field personnel, who told me, and I observed, that they were spending much of their time on tree plantation-related activity. To corroborate this, I have included analysis of World Bank project documents which suggest that 60% of JFM project funds were spent on tree planting (lines 61-5), references to several government project documents and analyses by policy makers that point to the importance of tree planting (i.e. see MOEF 2010) as well as the results of remote sensing estimates that show the growth in area of plantations (lines 310-314). A difficulty in presenting budgetary data is that since tree planting is not usually the focus of programs, budgets do not usually describe what percentage of money will be spent on tree planting.