

Article

Political Regime and Learning Outcomes of Stakeholder Participation: Cross-National Study of 81 Biosphere Reserves

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Abstract: Stakeholder participation in natural resource management has spread widely, even to nondemocracies, driven by expectations of beneficial outcomes such as multidirectional learning. However, can we expect participation to be equally effective in achieving multidirectional learning in democracies and nondemocracies? Unsurprisingly, previous studies indicate the relevance of power distribution for learning. Higher levels of repression and accumulation of political capital in nondemocracies should limit the distribution of power across stakeholders. Yet, the relationship between political regime, participation, and learning has rarely been studied empirically. I address this gap by analysing multidirectional learning in stakeholder participation in 81 Man and the Biosphere reserves across 35 countries using ordinary least squares regression, Firth logistic regression, and heat maps. The results suggest that the amount of stakeholders sharing knowledge and learning is similar in both regimes. However, a closer analysis reveals differences in the impact different stakeholders have on the learning process. More concretely, local actors share knowledge more often and have a greater impact on stakeholders' learning in democracies, while state actors display similar behavior across regimes in terms of learning and sharing knowledge. Thus, although there are notable similarities across regimes, multidirectional learning through stakeholder participation is influenced by the political context.

Keywords: biosphere reserve; political regime; learning; participation; stakeholder; natural resource management

1. Introduction

Stakeholder participation has been associated with increases in social capital, learning or empowerment [1]. Driven by these expectations, stakeholder participation has increased tremendously within natural resource management (NRM) [2] and is being promoted by international organizations worldwide as a means towards sustainable development (e.g., Agenda 21 [3], Man and the Biosphere Program [4]).

Demands for expanding participation implicitly assume that stakeholder involvement can be applied with equal success in all political regimes. Notably, participation has been recommended even for authoritarian states (e.g., [5]). However, an assumption that requires institutions to work “as if they are democratic” in contexts that are not provides a dim theoretical foundation [6] (p. 323) for predicting outcomes (see also [7]). The advantages attributed to participation are linked to practical and normative factors generally associated with democracies, like a shared capacity to voice opinions, a genuine consideration of alternative view points, or efforts for empowering participants (e.g., [8]). A more systematic integration of those concerns is necessary in the research and practice of participation. Yet,

studies addressing the relevance of the political regime for participation outcomes are scarce, and although some theoretical reflections exist, claims are rarely tested empirically.

This paper is an explorative study that engages in this underdeveloped comparative discussion of participation across political regimes. It aims at opening up the debate on the assumption that stakeholder participation in NRM produces similar outcomes independently of the political context where it is embedded by identifying similarities and differences in one outcome: multidirectional learning. Learning through participation is widely explored among NRM scholars [8] and it is one of the outcomes raising more hopes in terms of sustainability and participants' empowerment [2]. Rooted in the debate about democratization of expert knowledge, it is based on the assumption that expert knowledge is owned not only by specialists, but also by citizens [9]. Multidirectional learning, then, emphasizes equality in the distribution of the roles of learners and knowledge providers across different categories of stakeholders.

This paper is guided by two questions concerning multidirectional learning among stakeholders in NRM: (1) is multidirectional learning between participants occurring in both democracies and nondemocracies? And (2) does the political regime affect which stakeholder categories take the role of knowledge providers and learners? These questions will be explored using data from a survey to managers of UNESCO (United Nations Educational, Scientific and Cultural Organization) biosphere reserves (BRs) regarding their experiences of learning in stakeholder participation. Although the data cannot illustrate actual learning processes, it constitutes a good proxy for exploring flows of knowledge across stakeholder types. Moreover, it provides information about where managers perceive legitimate knowledge comes from and who is supposed to receive it.

By situating the political regime at the center of the analysis, the study confronts the lack of awareness in the literature about the potential and limitations for multidirectional learning through stakeholder participation in nondemocracies. In addition, data for 10 stakeholder types are presented. This enriches the analysis compared to the prevailing approach in the literature, which tends to focus on two or three stakeholder categories.

The next section defines the main concepts in the paper. This is followed by a literature review and a theoretical section on the impact of political regimes on learning processes. Hypotheses are also stated. Afterwards, the methodology and material for the empirical analysis are explained and the results presented. The paper ends with a discussion of the results and the conclusions.

2. Main Concepts

Learning has been defined differently by different theoretical perspectives, such as social learning [10], experiential learning [11], and transformative learning [12], emphasizing diverse learning targets and methods [13]. However, this paper sets no limitations on learning techniques or aims. Therefore, accommodating the most general characteristics of these approaches and focusing on learning within participation, learning is defined as the generation or acquisition of knowledge, or the transformation of stakeholders' perceptions in participatory settings. Additionally, learning in participation entails sharing knowledge. Multidirectional learning refers to the flows of knowledge across stakeholders. It is defined by how knowledge sharing and learning are distributed across stakeholders. The more spread both roles are, the more stakeholders will be learning from each other. In other words, the more directions knowledge takes (from and to more stakeholders), the more multidirectional learning will be. This idea has been referred to in the literature as mutual learning [14]. However, speaking about multidirectionality allows discussing processes with multiple actors where flows may not always be established as a two-way street but may still occur in multiple directions. In this paper, learning refers to issues which BR stakeholders are engaged in, such as biodiversity in the BR or social and economic development of the communities in it.

The political regime can be democratic or nondemocratic, while degrees in between are recognized. How democratic a regime is depends on the existence of competitive elections [15] and civil rights [16]. Whether civil rights are constitutive of democracy or its outcome is controversial [17]. This paper

considers civil rights a precondition for meaningfully competitive elections [16], and thus integrates them into the definition. Nonetheless, the link between elections and civil rights is well established in the literature [18] so their inclusion generates no artificial linkage between both factors.

3. Learning and Context in Natural Resource Management

When studying outcomes of participation in NRM across regimes, the issue of whether meaningful participation can occur in nondemocracies becomes a concern. Although learning scholars have not explicitly explored this, deliberation studies suggest that participation based on exchanges of ideas can occur in nondemocracies, albeit with restrictions: while fear of retaliation and a lack of opposition limit discourse plurality, participants can express opinions [19], including moderate criticisms [20].

Although the NRM literature rarely discusses the role of the political regime, scholars have signalled the relevance of factors linked to it, such as rule of law [21] or community rights [22].

Underlying these theoretical claims is a concern over power. In a collective process, learning from other stakeholders implies their legitimization as sources of valid knowledge, which in turn affects their power as sociopolitical actors [23]. However, the empirical evidence on those effects is mixed. Some authors find few traces of power dynamics (e.g., [24,25]). However, others have found that power biases the interpretation of knowledge [26] and its perceived importance [27], or affects the openness of stakeholders to learn from others [13].

Yet the question is whether the distribution of power “as determined by the political regime” affects multidirectional learning in NRM. Thrupp [28] warned that authoritarian governments might object to a re-evaluation of local knowledge for fears that this could lead to challenges to their power. However, although learning has been explored in democracies and nondemocracies, the empirical studies reviewed here do not discuss the regime as a relevant factor (with the exception of [12]). This creates difficulties for understanding the role of political contexts in facilitating and obstructing an egalitarian treatment of stakeholders in learning processes.

Some studies report distributed learning across stakeholders (Stöhr et al. [29] in democracies; Marschke and Sinclair [12] in a nondemocracy). However, most find a more limited distribution of learning. In studies in democracies, scientists and state actors are found to be receptive towards others’ knowledge [30], but mistrusting nonscientific input (Ballard et al. [25] and Ravera et al. [27] for scientists; Hommes et al. [31] for state actors). Meanwhile, farmers learn when incorporated in the knowledge production process [30], but they will also not readily accept others’ knowledge [32] (however, it is worth noting that Ravera et al. [27] and Nygren [32] include Nicaragua in their analyses and Freedom House and Polity IV disagree on its democratic level at the time of these studies). In nondemocracies, Kellert et al. [33] identify fewer efforts to integrate local knowledge in Kenya and Nepal compared to the United States. Fayse et al.’s study in Morocco [34] found mutual learning between public staff and farmers, but only about interests and not about managerial problems. In a study of learning in democracies and a nondemocracy, Rist et al. [35] detected that state actors inhibit the participation of other stakeholders in democracies as well as in nondemocracies.

In short, a democratic regime may facilitate multidirectional learning but does not guarantee it. Simultaneously, a nondemocratic regime does not preclude it but research on deliberation suggests the existence of larger challenges, such as limited discourse diversity, in nondemocracies. Yet, a lack of explicit attention to the regime factor and few systematic analyses of knowledge integration in diverse political contexts makes it difficult to grasp whether differences in power dynamics yield different learning results between regimes, as Kellert et al. [33] inadvertently found, or if they are similar, as Rist et al.’s [35] finding suggests.

4. Theoretical Approach and Hypotheses

The previous section showed the potential relevance of power and the political context for accepting different ideas in the participatory arena. Therefore, two structural dimensions will be used to evaluate the interaction between multidirectional learning and the political regime: resource

distribution (drawn from Giddens' dualist theory) and the openness of the public sphere (stemming from the political opportunity structure (POS) theory).

Actors' relations encompass structures of domination based on asymmetries of power that originate in asymmetries of resources, like authoritative resources (or political capital) [36]. Limitations to freedom of expression and organization in nondemocracies arguably concentrate authoritative resources in the hands of state actors by restricting citizens' capacity to participate in the political game. Authoritative resources might be concentrated through the control of state institutions, which allows a privileged capacity for ordering, for instance, how stakeholder participation should take place. Indeed, participation in nondemocracies has been found to be especially dependent on the state, generating difficulties for establishing equal relationships between state and non-state actors [37]. If that is the case, non-state stakeholders in nondemocracies should have limited discursive and material agency, which in turn affects the prospects for multidirectional learning.

Multidirectional learning may also depend upon the openness of the public sphere. The POS theory focuses on opportunities for different actors to take part and promote their goals in the public sphere. The POS is the formal institutional structure within which actors operate [38]. It encompasses the procedures of authorities to deal with opponents and the configuration of power in the political arena. It impacts actors by determining costs and incentives. Important elements defining opportunities are repression and elite alignments and shifts in their position [39].

Repression may influence the willingness of stakeholders to speak up when dissenting from the official framing of problems and policies as research suggests limited tolerance to policy criticism in authoritarian states [40]. Although NRM may seem as a nonsensitive issue for the regime, "non-compliant 'talk' in public inherently constitutes (. . .) oppositional speech acts" [41] (p. 285). Therefore, one could expect learning to be limited to that which does not threaten the regime, suggesting that a diversity of knowledge should be harder to achieve compared to democracies. Additionally, it is possible to assume that democracies will enjoy greater diversity within the political elite due to more open rules of participation and contestation [42] and fewer dangers for elites to shift their positions and adopt alternative ways of knowing a resource/problem. This should increase the chances that more types of knowledge are meaningfully considered in the public sphere.

The distribution of resources and the openness of the political structure may differ across policy areas or participatory processes within a regime. However, this paper presumes that the overall distribution of resources and the openness of the political structure will still impact those arenas. One can plausibly argue that overall levels of repression in a nondemocratic context will inhibit participants even when they are allowed to speak up or that a generalized accumulation of political capital in the hands of the state will make it difficult for non-state actors to influence outcomes even in democratic pockets. For example, Tilt [43] described a situation where members of a Chinese local government were invited to brainstorm ideas on local environmental politics and although they scribbled in their pads no one dared to speak up when the time to share their notes arrived. Similarly, obstacles for a fully democratic participation in a democracy will not entail the same risks or limitations for participants to express their views or to protect their interests. They will tend to have more access to resources and more political allies to recur to than their counterparts in nondemocratic states if they need to check others' undemocratic behavior or even to ask for protection from abuse.

This discussion presupposes as well that local actors' knowledge differs from that of state officials. This seems probable and is one of the motivations behind learning processes. However, it also assumes that it is not in the interest of the authoritarian state to give citizens' knowledge a meaningful place in the public sphere. Although there might be knowledge which is useful for the state, this assumption is considered plausible due to the linkage between knowledge acceptance and actor legitimacy [23].

Additionally, a link between state and local level political contexts is presumed. Yet dictators may be less controlling in local politics. Examples exist where the opposition has entered the local administration through elections [44], and local democratic experiments have been conducted in China [45]. However, participation does not enjoy the anonymity of elections, and the expansion

of democratic experiments has been halted [45], but could local or regional politicians actively construct democratic spaces? On the one hand, they cannot act completely independently of the central government as far as it holds the instruments of repression [46]. On the other hand, local politicians can be conceived as necessary instruments for the dictator to maintain power (the idea of a critical mass, winning coalition in their terminology, is proposed by Bueno de Mesquita et al. [42]). If that is the case, the dictator must be careful with one-sided impositions [47]. In fact, the literature describes a balance between subnational politicians' freedom of action and central control (e.g., [46]). In sum, it seems that local governments in nondemocracies have some, but often limited, room to maneuver. What about democracies? Worries focus primarily on states with a recent dictatorial history (e.g., [48]) in which subnational authoritarianism may result from an unfinished transition process. It is, however, unclear if that is the typical trajectory or how old a democracy needs to be to guarantee the absence of subnational authoritarianism. In any case, it is both possible and prudent to control for recent transitions and still apply the power dynamics marked by the regime at the subnational level.

Hypotheses

Participatory processes in NRM are thus embedded in settings with different structural limitations. It is then plausible to assume that learning processes will reflect diverse power structures (see Ellis 2005 as in [23]) in different political contexts. Higher levels of concentration of authoritative resources and repression and lower levels of elite room for manoeuvre suggest that state actors have more chances to dominate learning processes in nondemocracies, while the lack of resources for local civil society actors and increased levels of repression suggest a lower profile of those actors. The study focuses on local and state actors, believed to be the most affected ones by the mechanisms described above. Although included in the concept of multidirectional learning, other actors, such as nongovernmental organizations (NGOs) or scientists will be affected differently depending on whether they are national or international actors, making individual predictions hard within the scope of this paper. Therefore, this paper explores the following hypotheses:

Hypothesis 1. *Multidirectional learning in participatory natural resource management will tend to occur more often in democracies than in nondemocracies.*

Hypothesis 2. *In nondemocracies, state actors involved in participatory processes to manage natural resources will be (a) more often knowledge sharers; and (b) less often learners, compared to democracies.*

Hypothesis 3. *In nondemocracies, local actors involved in participatory processes to manage natural resources will be (a) less often knowledge sharers; and, when they share knowledge, (b) others will learn from them less often, compared to democracies.*

5. Materials and Methods

5.1. Data

This study explores the relationship between multidirectional learning in participatory NRM and the political regime using a survey administered in 2008 to BR managers. The survey was conducted online in English, French, Spanish, and Chinese. An introductory letter with a link to the survey was sent by e-mail to 407 BRs with identifiable working e-mail addresses. The survey was open between the 15th of January and the 20th of June. Additionally, hard copies were distributed at the Third World Congress of Biosphere Reserves in Madrid (2008) given that 124 BRs were not accessible by e-mail. 107 responses were obtained on-line and 65 on hard copy [49]. The response rate was 27% (143 BRs), comparable to other global surveys of BRs [49]. Of the BRs that answered the survey, 125 provided information on whether they conducted learning activities. Of those, 110 engaged in such activities (93.94% of the BRs in nondemocracies and 85.87% of those in democracies). This study is based on

these 110 BRs. Missing values in control variables used in this paper led to a maximum n of 81, of which 26 BRs are in nondemocracies, covering 35 countries.

BRs are nationally selected and internationally recognized areas within UNESCO's Man and the Biosphere Program [4]. They are designated based on their biodiversity, their representativeness of an ecosystem, and their potential for exploring sustainable development strategies [4]. They are divided between a core area, with a protective perspective on biodiversity conservation; and the buffer and transition zones, where the interaction between humans and the environment is gradually incremented [4] and major managerial activities occur. The Statutory Framework and the Seville Strategy of 1995 recognised the support to research, monitoring and education as key goals of BRs [49]. To fulfil this target, UNESCO encourages BRs to involve stakeholders [4], including state actors, NGOs, researchers, local resource users, or inhabitants. The combination of participation and learning gives BRs a great potential for multidirectional learning and in fact they have been described as "learning sites" [49] (p. 663). This emphasis on multidirectional learning should encourage BRs to pursue learning in participation across political regimes, thereby enabling a test of the hypotheses under study.

5.2. Dependent Variable

Multidirectional learning is captured through two survey questions about "who has learned" and "who has shared their knowledge" during activities oriented at learning about BR issues. Respondents could choose as many stakeholder categories as needed among 10 different alternatives: BR coordinating team, scientists, nonprofit organizations and volunteers, local farmers/fishermen/foresters/hunters, other people living or working in the reserve, staff from local governmental administrations related to conservation, local governmental administrations not related to conservation, staff from national governmental administrations, politicians, and UNESCO representatives. The responses are explored for each stakeholder type and through six indexes. Three indexes were created summing the amount of stakeholder categories sharing knowledge and three aggregating stakeholders learning. The three indexes are in both cases (a) an index aggregating all stakeholders (running from 0 to 10); (b) an index aggregating state actors (local and national administrations and politicians); and (c) an index aggregating locals (resource users and other locals). Exploring the (a) indexes will allow for studying general patterns of multidirectional learning (Hypothesis 1, multidirectional learning is more probable in democracies). Indexes (b) and (c) target Hypotheses 2 (state actors will share knowledge more often and learn less often in nondemocracies) and 3 (local actors will share knowledge less often and be learned from less often in nondemocracies). The disaggregated responses for each stakeholder type provide more nuanced analyses of the involvement of each actor in the process of learning. Multidirectionality is captured by the number of stakeholders learning and sharing knowledge and by the amount of stakeholders impacting others' learning.

5.3. Independent Variable

The main independent variable is the political regime in the country in which the BR is situated. It combines Freedom House [50] and Polity IV scores [51] and ranges from 0 (nondemocratic) to 10 (democratic). This measure strengthens the relevance of civil rights compared to using only polity IV. For some of the analyses, the variable has been dichotomized, democracies being countries scoring more than 7.5 (this mix of measures and cut point has been previously used by Åström et al. [52]). The 7.5 cut point excludes countries with a dubious level of democracy.

5.4. Control Variables

At the state level, GDP per capita (purchase power parity, in constant 2011 international dollars [53]) is controlled for due to potential impacts of wealth on participation outcomes [54]. The age of democracies is also considered, using the variable "durable" from Polity IV, for controlling

for subnational authoritarianism in democracies. These variables and the political regime are data from 2008.

At the BR level, the age and general level of participation of the BR are controlled for. Participation is computed by adding the stakeholders involved in the coordinating team, the steering committee, setting the goals, designing projects, implementing projects, day-to-day management, and monitoring changes in biodiversity. Each time a stakeholder category participates in each of these areas, it is recorded in the index. Age of BR and participation are included given that increased and long-lasting contacts facilitate learning [2]. Additionally, participation controls for potential differences in attitudes towards stakeholder involvement in the BR and among stakeholders, which could reflect or lead to more open attitudes to learning. The age of the BR also controls for the fact that reserves post-Seville were constructed with greater emphasis on participation and learning [49], although these strategies are nowadays common to all BRs.

The analysis also includes challenges to participation measured through the question: “What challenges have you experienced when trying to involve different groups in the activities of your biosphere reserve?” Respondents could select multiple options from: no significant challenges, time consuming, people have not been interested to participate, conflicts have hindered the process, power asymmetries between or within groups have led to biased results, we have reached unsatisfactory compromises, our staff is not sufficiently trained in engagement techniques, and our staff does not have sufficient personal contacts among the groups concerned. The responses were aggregated into an index where each declared challenge counted one point. The index ranges from 0 to 6. It controls for problems in the involvement of stakeholders that could obstruct learning processes.

5.5. Limitations

First, the study relies on a survey capturing managers’ perceptions rather than stakeholders’. Nevertheless, the data constitutes a proxy for identifying learning patterns and offers insights into who do managers perceive as contributing their knowledge and who are more receptive to others’ claims. Second, relationships across knowledge sharers and learners are established statistically. Thus, the analysis focuses on uncovering systemic or generic patterns of perceived relationships between knowledge sharers and learners. Third, managers in democracies and nondemocracies could have different standards as to what knowledge sharing or learning mean. Managers may have also answered what they thought their supervisors wanted them to reply. This could apply to both political regimes but it is a more salient concern in nondemocracies where the risks of giving an “inadequate” answer may be higher. The survey addressed this by ensuring the anonymity of respondents. Were that insufficient for them to respond freely, it would be difficult to assess the direction of the bias in managers’ replies. Respondents may have portrayed a more open process with higher multidirectionality in learning than reality was, which could mask differences across regimes. Or they may have wanted to give an image of control over learning processes with limits on some actors’ involvement, which could enhance differences with democracies. Confidence in the validity of the data both in terms of different standards for knowledge sharing or learning and incentives for giving distorted images of participation is derived from the fact that responses are normally distributed in democracies and nondemocracies. Finally, the low number of observations of BRs in dictatorships is occasionally problematic for obtaining unbiased and finite coefficients in logistic analysis. To correct for this, Firth logistic analysis is used [55,56] (Stata “firthlogit” package [57] was employed). This method corrects for maximum likelihood bias and avoids infinite parameters by penalizing the score function in a way equivalent to adding a weight of half an observation [55,56].

6. Results

Multidirectional learning entails knowledge sharing, learning, and the distribution of both elements across stakeholders. This conceptualization of multidirectional learning was explored with an OLS regression where the amount of stakeholders learning was regressed by the amount of

stakeholders sharing knowledge, including all controls described in the previous section. Standard errors were clustered by country to account for the hierarchical nature of the data. The results indicate that an increase of one stakeholder category sharing knowledge raises the number of stakeholders learning, by, *ceteris paribus*, 0.758 (99% level of confidence, robust standard error (rse) 0.073). The correlation between knowledge sharers and learners validates empirically the notion of multidirectional learning.

But what is the effect of the political regime on the amount of stakeholders learning and sharing knowledge? Table 1 shows the results of a regression analysis of the indexes capturing all the stakeholders sharing knowledge (model 1) and learning (model 2).

Table 1. Impact of the political regime on sharing knowledge and learning diversity.

Variables	(1)	(2)
	Stakeholders Sharing Knowledge	Stakeholders Learning
Political regime	0.094 (0.106)	−0.049 (0.091)
GDP/capita	0.001 (0.027)	−0.017 (0.027)
Years of democracy	0.006 (0.005)	0.011 (0.004) **
Biosphere reserve age	−0.014 (0.021)	0.005 (0.020)
Participation	0.108 (0.020) ***	0.106 (0.031) ***
Challenges to participation	0.420 (0.173) **	0.351 (0.151) **
Constant	1.653 (1.048)	2.373 (1.100) **
R ²	0.286	0.237
Root MSE	2.154	2.356
<i>n</i>	107	107

OLS regression, observations clustered by country. Robust standard errors (rse) in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Source: original.

The substantive value of the political regime effect is almost negligible both for knowledge sharing and for learning. Moreover, it does not have a significant impact in either case, contradicting Hypothesis 1. Multidirectional learning, then, does not seem to occur more often in democracies. However, the effect of the years after the last democratic transition is significant in model 2 (albeit very small), indicating that a longer democratic history may facilitate learning. Yet, the strongest significant effects are in participation and challenges to participation. An increase in the involvement of stakeholders in the BR leads to an increase of 0.108 in knowledge sharers and 0.106 in learners, holding everything else constant. The impact of challenges for participation is positive and high in both models. This is a counter-intuitive result. However, it is possible that facing difficulties in participation sparks learning processes. This is not incompatible with the idea that more overall involvement of stakeholders generates more exchanges of knowledge and more learning. Finally, the age of the reserve is irrelevant.

Hypotheses 2 and 3 predicted an impact of the regime on state and local actors' behavior in learning processes. Yet the political regime has no effect on the amount of state actors sharing knowledge or learning (coefficients −0.018 (rse 0.058) and −0.040 (rse 0.049) respectively). Moreover, the less democratic the political system, the fewer state actors share knowledge. The regime also has no significant effect for local actors' learning or sharing knowledge, although the sign is the expected one in this last case (coefficients 0.003 (rse 0.038) and 0.068 (rse 0.041), respectively). Regarding the controls, participation has a significant impact for state actors sharing knowledge and learning (0.055, rse 0.009, and 0.049, rse 0.017, both with 99% significance level); and for locals sharing knowledge (0.013, rse 0.007, 90% significance level). Challenges to participation have a significant impact for state actors sharing knowledge (0.280, rse 0.095, 99% significance level) and learning (0.1980, 0.085, 90% significance level). The fact that challenges are not significant for locals sharing or learning indicates that facing difficulties does not need to spark overall learning, as Table 1 would suggest. However, it could facilitate the participation of specific actors, such as state actors, in learning processes. All

models controlled for the same variables as models in Table 1. For state and locals sharing knowledge and learning, $n = 107$.

Further exploration of the hypotheses led to a disaggregation of the analysis into stakeholder categories. Table 2 describes the proportion of stakeholders perceived as sharing knowledge or learning by regime type. The data shows the proportion of BRs that identified a certain type of stakeholder as sharing knowledge or as learning. This may be due to a higher presence of that type of actor in a reserve or due to an actor being more prone to learn or share knowledge. Although it is not possible to distinguish which mechanism is at play, both may signal similarities or differences across regimes. Despite few statistical differences, in democracies three stakeholder categories are perceived as sharing knowledge more often than in nondemocracies, while UNESCO is perceived as sharing knowledge less often in democracies, compared to nondemocracies. This provides some support for Hypothesis 1, which states that multidirectional learning is more difficult to achieve in nondemocracies. Most of this difference is accounted for by a larger involvement of locals in democracies, consistent with Hypothesis 3(a). Hypothesis 2 on state actors seems unsupported, since there are no statistical differences in their behavior. However, the national administration and the local administration related to conservation seem more involved in nondemocracies. The opposite occurs for politicians and the local nonenvironmental administration. This suggests more centralized and targeted processes in nondemocracies. Finally, NGOs are less involved in nondemocracies, potentially reflecting weaker civil societies.

Table 2. Percentage at which stakeholders were perceived as sharing knowledge and learning in learning-oriented activities, by regime.

Stakeholder	Who Shares Knowledge?			Who Learns?		
	Democracies	Nondemocracies	χ^2	Democracies	Nondemocracies	χ^2
Coordinating team	74.36	75.00	0.005, 0.944	69.23	68.75	0.003, 0.960
Scientists	78.21	78.13	0.000, 0.993	60.26	62.50	0.048, 0.827
NGOs and volunteers	78.21	40.63	14.555, 0.000	66.67	40.63	6.366, 0.012
Farmers, fishers	67.95	50.00	3.127, 0.077	73.08	65.63	0.611, 0.434
Other locals	65.38	43.75	4.394, 0.036	56.41	62.50	0.346, 0.556
Local adm (conservation)	73.08	75.00	0.043, 0.835	64.10	81.25	3.124, 0.077
Local adm	44.87	31.25	1.742, 0.187	46.15	40.63	0.281, 0.596
National adm	55.13	62.50	0.504, 0.478	44.87	59.38	1.910, 0.167
Politicians	44.87	37.50	0.504, 0.478	39.74	34.38	0.277, 0.599
UNESCO	21.79	37.50	2.883, 0.090	15.38	31.25	3.570, 0.059

NGOs: nongovernmental organizations; UNESCO: United Nations Educational, Scientific and Cultural Organization. Percentages of positive cases in each regime with association measure (Chi-squared followed by p -value). $n = 78$ for democracies and $n = 32$ for nondemocracies, both for data on knowledge sharing and learning; 1 degree of freedom for all calculations. No controls. Source: original.

Table 2 clarifies the start and end points of knowledge flows, but not whose knowledge has an impact on whose learning. This is explored through the heat maps in Figure 1. The maps plot the coefficients of multiple models where each stakeholder category learning was regressed by each of the other categories sharing knowledge, with the usual controls. Thus, for example, the second square at the upper left in the graph corresponds to the coefficient for scientists sharing knowledge when the coordinating team learning is the dependent variable, controlling for GDP per capita, years of democracy (only for democracies), BR age, participation in the BR, and challenges to participation. Blue indicates a negative effect and red a positive one. The more intense the color, the bigger the effect.

Hypothesis 2 argued that, in nondemocracies, state actors would be more often knowledge sharers and less often learners. Yet, in dictatorships the effects of all stakeholders sharing knowledge is higher when state actors learn. Significant impacts on state actors' learning concentrate on locals

and the public administration. In democracies, the national administration and politicians learn from slightly fewer stakeholders than in nondemocracies, but the local administration learns from almost all stakeholder types. Consistent with Table 2, this indicates that the local administration is a central state actor in learning processes in BRs and its openness to learn from multiple stakeholders contrasts both with other state actors in democracies and with state actors in nondemocracies. Thus, although the support for Hypothesis 2 is weak, state actors' learning displays different patterns in different regimes.

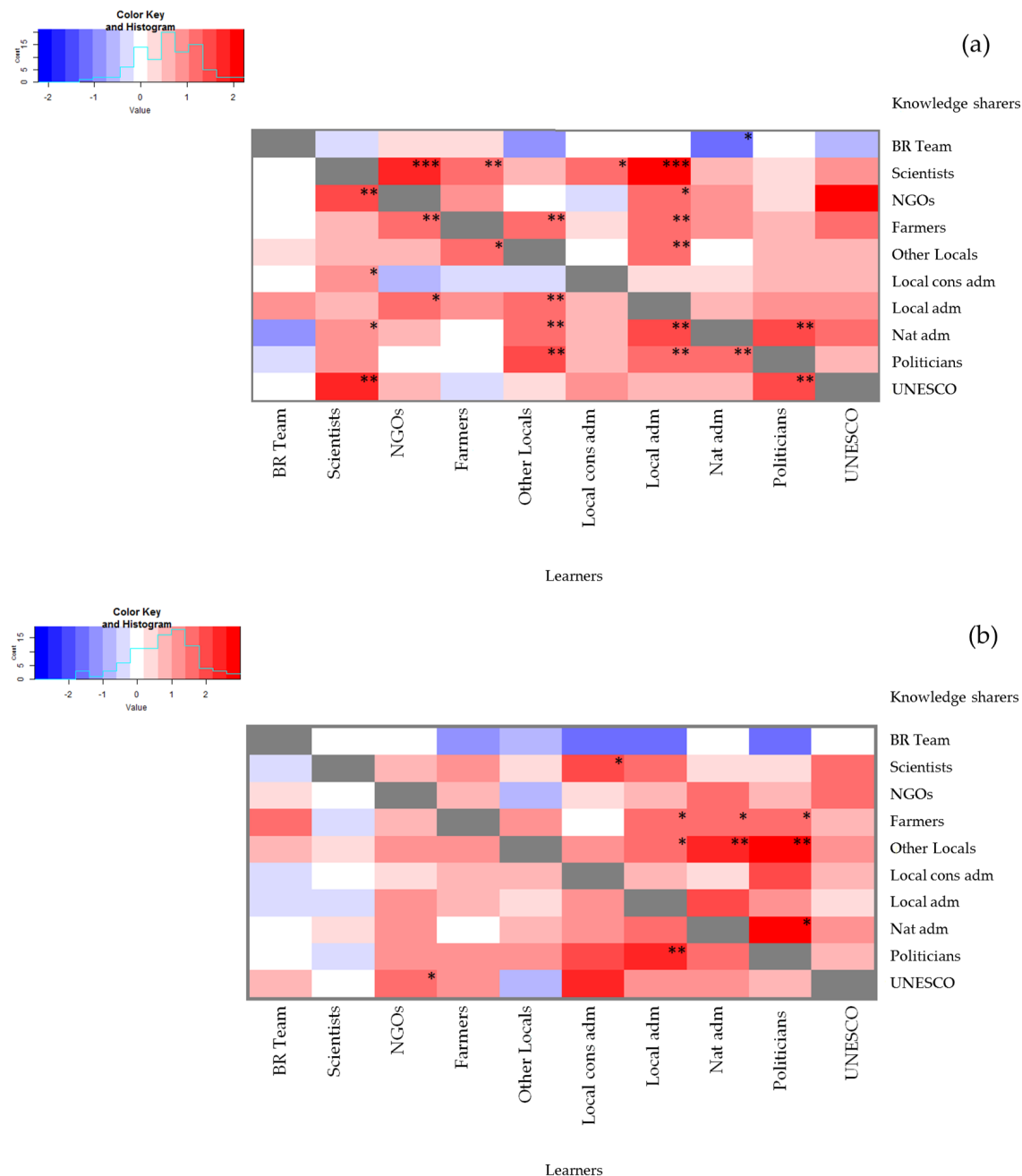


Figure 1. Heat map of the effects of individual stakeholder categories sharing knowledge on each stakeholder type log odds of learning in (a) democracies; and (b) nondemocracies. Firth logit coefficients. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Observations not clustered by country.

The maps show no clear support for Hypothesis 3(b): locals do not see their knowledge more often accepted in democracies. Nonetheless, there is a qualitative difference. Locals' knowledge is

accepted by state and non-state actors in democracies, while non-state actors in nondemocracies are not affected by locals sharing knowledge.

The maps also show a negative effect of the coordinating team of the reserve sharing knowledge on other actors' perceived learning and vice versa. This result may indicate mistrust towards the coordinating team and a surprising lack of receptiveness. This applies to both regimes although is more acute in nondemocracies. In nondemocracies, scientists are also perceived as nonreceptive while their effect on other actors learning is higher (yet generally insignificant), suggesting an asymmetry benefiting scientists.

The graphs support Hypothesis 1: when observing the impact of knowledge sharers on learners, democracies display higher potential for multidirectional learning as indicated by the higher prevalence of significant coefficients and the more wide-spread distribution of positive intense effects. However, when analyzing stakeholders as learners, the maps do not offer a clear image of multidirectionality when coefficients are insignificant. This nonsignificance can mean nonreceptiveness or learning from multiple stakeholders but with different combinations in different BRs. Therefore, similar calculations were conducted as those in the maps but regressing stakeholders learning against the amount of stakeholder categories sharing knowledge (Table 3). A significant impact would indicate that the more sources of knowledge are activated, the higher the log odds are of individual stakeholders learning, which in turn implies that the actors' learning is less dominated by single actors sharing knowledge.

The impact of the amount of categories sharing knowledge is more often significant in democracies. In democracies, the local administration and politicians are some of the actors for whom the impact of multiple sharers is higher while the coefficient of multiple sharers is lower for the national and the local environmental administration. This is reversed in nondemocracies. Again, as in Table 2, this may indicate a more decentralised and targeted process in nondemocracies, leading to a higher need for the local environmental administration to absorb information. In nondemocratic regimes, state actors and UNESCO are the actors whose learning is significantly impacted by increases in knowledge sharers, contradicting Hypothesis 2. In general, however, multidirectional learning seems stronger in democracies, where almost all stakeholders' learning is significantly increased by more stakeholders sharing knowledge.

Table 3. Logistic regression coefficients for the impact of index of stakeholders sharing knowledge on stakeholders learning, by regime.

	Coordinating Team	Scientists	NGOs	Farmers	Other Locals
Democracies (stakeholders sharing knowledge)					
Coefficient	0.172	0.482	0.413	0.401	0.409
rse	(0.133)	(0.148) ***	(0.162) **	(0.165) **	(0.142) ***
Odds Ratio	1.188	1.619	1.512	1.494	1.505
Nondemocracies (stakeholders sharing knowledge)					
Coefficient	0.135	0.019	0.484	0.433	0.181
rse	(0.185)	(0.164)	(0.207) **	(0.228) *	(0.163)
Odds ratio	1.144	1.019	1.622	1.543	1.198
	Local Cons Adm	Local Adm	Nat Adm	Politicians	UNESCO
Democracies (stakeholders sharing knowledge)					
Coefficient	0.286	0.845	0.346	0.546	0.632
rse	(0.130) **	(0.205) ***	(0.139) **	(0.170) ***	(0.230) ***
Odds Ratio	1.331	2.328	1.413	1.726	1.881
Nondemocracies (stakeholders sharing knowledge)					
Coefficient	0.533	0.426	0.702	0.671	0.425
rse	(0.396)	(0.193) **	(0.304) **	(0.282) **	(0.225) *
Odds Ratio	1.705	1.531	2.019	1.955	1.530

Firth logit coefficients and odd ratios. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Observations not clustered by country, $n = 76$ for democracies, $n = 31$ for nondemocracies. Controls: political regime, GDP/capita, years of democracy, biosphere reserve age, participation, participation challenges. Source: original.

7. Discussion

That participation differs across regimes may appear as an obvious observation. Yet this seems neglected by practitioners promoting widespread participation within NRM and by researchers that do not reflect on the regime in which the studied processes take place. This results in a silent assumption that participation will be equally beneficial independently of the political context where it takes place. However, as the results from this study show, participation tends to be affected by the context in which it is embedded.

This paper contributes to the literature by demonstrating that learning through stakeholder participation is affected by the political context but also by signalling the limitations of that impact. Although the study relies on manager rather than stakeholder data, the analyses show consistent patterns that indicate points of convergence and divergence across regimes. In addition, the paper employs a large-n approach, thereby avoiding selection bias problems often encountered in case studies. Finally, the study presents analyses with 10 stakeholder types that permit a nuanced picture that departs from the literature, which generally has focused on two or three stakeholder categories.

The paper started asking whether multidirectional learning in participatory NRM could be equally possible in all political regimes. This question requires a nuanced answer. The data suggests that the regime has no impact on the amount of stakeholders learning or sharing knowledge at the aggregate level. In fact, at this level, the involvement of stakeholders in the BR and even the challenges to participation that reserves encounter seem more important for achieving multidirectional learning than how democratic a state is. However, differences increase when analyzing the perceived performance of each stakeholder category. In democracies, more stakeholders seem to have a prominent role in the learning process and, at the same time, the amount of stakeholders sharing knowledge seemed more relevant for the probability of each of the stakeholders learning. Therefore, the frequency of multidirectional learning is similar across regimes, contradicting Hypothesis 1, although multidirectionality seems deeper in democracies.

The data does not allow evaluating where the similarities at the aggregate level come from. One answer may lie on the assumption that different stakeholders would present different types of knowledge. Similar amounts of stakeholders may share knowledge in both regimes but presenting alternative perspectives more often in democracies. Additionally, it is possible that stakeholders' capacity to act upon structural limitations in nondemocracies needs to be considered (e.g., [10]). Alternatively, the structural barriers to participation in democratic states may have been underestimated. According to the path dependence hypothesis, democracies may be using such processes as a façade while capturing more control over management [58].

Second, the paper asked whether stakeholders would take on similar roles in learning processes in democracies and nondemocracies. It was hypothesized that state actors will learn more often in democracies and dominate knowledge sharing in nondemocracies (H2), and that local actors will share more knowledge and will be more listened to in democracies (H3). The results showed little support for Hypothesis 2. Rather, differences lie in the involvement of diverse state actors. The national administration and the local environmental administration seem more implicated in nondemocracies, whereas the local administration not linked to conservation is more involved in democracies. This may suggest more centralised and targeted processes in nondemocracies. In nondemocracies, state actors seemed more active in learning than other actors, both in knowledge sharing and acceptance, compared to non-state actors. This contrast between state and non-state actors was absent in democratic states. Mixed support was found for Hypothesis 3. Local resource users have a significant impact on a similar amount of actors learning in both regimes, but those actors differ across regimes. Moreover, they tend to share knowledge more often in democracies.

8. Conclusions

This paper has investigated the effect of the political regime on multidirectional learning among stakeholders in participatory NRM. Building on Giddens' dualist theory and political opportunity

structure theory, it was hypothesized that differences in the distribution of resources and the openness of the political sphere would make it harder for biosphere reserves in nondemocracies to attain multidirectional learning. In particular, it would be less likely that state actors would learn and locals share knowledge and impact other actors' learning. Three mechanisms were expected to be at play. First, an unbalanced distribution of authoritative resources would facilitate the reproduction of structures conditioning the value assigned to knowledge provided by different stakeholders. Second, repression would lead to similar results by limiting accepted discourses. Third, competitive elections would increase elite pluralism, making it easier for disempowered actors to find supporters within the state.

Despite relying on manager perceptions on learning and knowledge sharing in BRs, the data provides consistent evidence of similarities and differences across democratic and nondemocratic states. Similarities in the amount of knowledge sharers and learners and the relevance of state actors across regimes present an interesting puzzle that further research should address. Other identified similarities also deserve more exploration. For instance, broad involvement of stakeholders in BRs has a generalized positive impact on knowledge sharing and learning, suggesting that to promote multidirectional learning, stakeholder participation in other activities of the BR should be increased. Moreover, facilitating knowledge sharing among stakeholders helps create a more even distribution of learning, although this seems to affect more state actors in nondemocracies.

Yet differences exist. Expectations for multidirectional learning in nondemocracies should be held with caution, as the potential for diffused learning is limited. Although the state is receptive of locals' knowledge, non-state actors play a smaller role in learning processes in nondemocracies than in democracies. If truly multidirectional learning is desired, de-briefing exercises that balance the relevance of all actors as knowledge providers across all types of participants may be helpful. In any case, scholars and practitioners should be aware that although learning can occur in both regimes, benefits may be more limited in nondemocracies as they seem to take less advantage of the diversity of knowledge that including multiple stakeholders in participation can provide.

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