

1 **Title: Are there conservation benefits of strengthening land tenure security in developing regions?**

2 **Short title: Conservation and land tenure security**

3

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23

24 **Abstract**

25 Insecure land tenure plagues many developing and tropical regions, often where conservation
26 concerns are highest. Conservation organizations are now thinking about whether and how to better
27 incorporate land tenure strategies into their work, and how to more soundly ground that work based
28 on evidence of both conservation and human benefits. Through a review of the literature on land
29 tenure security as it relates to conservation practice, predominantly in the tropics, we aim to clarify
30 how conservation practitioners can go about incorporate land tenure security interventions into
31 conservation strategies. We present a framework that links tenure security, land management
32 decisions, and the resulting well-being benefits for people and potential outcomes for biodiversity and
33 natural resource conservation. We identify three common ways in which land tenure security impacts
34 conservation interventions. We review existing practical approaches to assessing and strengthening
35 land tenure security as they relate to conservation programs. We conclude with steps to assess
36 whether to integrate tenure security directly into a conservation initiative, and areas for future
37 research.

38

39

40 1 Introduction

41 Ecosystems and the services they provide to people are powerfully influenced by land use patterns
42 and land and resource tenure (Foley 2005). At the same time, securing local land tenure is linked to
43 social and human development, and investments in land tenure security have increased greatly in
44 recent years (The World Bank 2011). For conservation organizations, these investments can have
45 dramatic implications for ongoing conservation strategies, and land tenure security underpins the
46 success many multilateral policy initiatives including Reducing Emissions from Deforestation and Forest
47 Degradation (REDD+), the UN's Sustainable Development Goals, the Convention on Biological
48 Diversity's Aichi Biodiversity Targets, the International Platform for Biodiversity and Ecosystem Services
49 (IPBES), and "new conservation" broadly (Kareiva 2014). Yet the ways in which land and resource
50 tenure security ("tenure security") interact with conservation initiatives, large and small, remains
51 poorly understood and implemented. The aim of this paper is to review why and how the conservation
52 community needs to incorporate land tenure security in their planning and activities.

53 Insecure land tenure plagues many developing and tropical regions, often where conservation
54 concerns are highest (Bruce et al. 2010). Many of these countries are dealing with the history of
55 colonial imposition property rights and land tenure systems for taxation, extraction, and governance
56 purposes, often persist and differentially affect development outcomes to this day (Banerjee & Iyer
57 2005). Modern day tenure regularization programs and land acquisitions inevitably privilege and
58 provide tenure security for some while marginalizing others (Wily 2011). Further, land use pressures
59 have increased dramatically in recent years owing to the emergence of capitalism, the formation of a
60 consumer class, urbanization, and tremendous increases on the demands of natural systems
61 (Meyfroidt et al. 2013). Establishing secure land tenure has been particularly challenging for many rural
62 dwellers who must contend with these post-colonial legacies and manifestations of globalization.

63 Within this context, a broad body of work shows that securing local land tenure has generally
64 positive impacts on human well-being. The literature is vast, but securing land tenure is linked to
65 improvements in land values, investment, credit, rural-urban migration, and productivity (Feder &
66 Nishio 1998; Deininger & Feder 2009; Mullan et al. 2011; Holden et al. 2013). Of course land use
67 decisions are influenced by a number of factors, as we discuss below, but there is broad consensus that
68 securing land rights helps reduce uncertainty for landholders, support economic development, and
69 generally improve well-being (Lawry et al. 2016).

70 But does securing land tenure preserve forests, slow biodiversity loss, or otherwise improve
71 environmental conditions? Land use decisions under secure property rights differ significantly from
72 complete tenure insecurity, i.e., open access. In the open access case, households compete for the
73 same resources and have little incentive to plan their use with the future in mind, often resulting in
74 over-exploitation (Hardin 1968). Securing tenure allows landholders to absorb some (usually short-
75 term) costs to maximize total benefits over time, which can mean that current decisions are made to
76 sustain the resource into the future. Empirical research documents positive relationships between
77 tenure security and land investments that provide co-benefits to people and nature, for example soil
78 conservation (Deininger & Jin 2006a) and investments in agriculture (Holden et al. 2009; Otsuka &
79 Place 2015). Yet in other cases land investments seem to have little effect on conservation outcomes
80 (Gavian & Fafchamps 1996; Buntaine et al. 2015). And sometimes the causality is reversed:

81 investments such as tree planting are made to denote property borders and thus secure land tenure
82 itself (Besley 1995; Deininger & Jin 2006b; Fenske 2011).

83 These mixed findings highlight how land rights empower landholders with choice, which may not
84 necessarily benefit conservation outcomes. But given tenure's role, it can be a major factor in the
85 success or failure of conservation interventions (Larson et al. 2013; Sunderlin et al. 2014). A firmer

86 grasp on the context and channels through which tenure security impacts the coupled human-natural
87 system is needed. While there is a large academic literature on tenure security, the links to
88 implementation are often obscured by jargon and abstract models. With the goal of improving
89 conservation practice on the ground, we propose a simplified framework to showcase how land tenure
90 security interacts with conservation initiatives to affect human well-being and the environment.

91 Drawing from literature on property rights, expected utility theory, institutions, political
92 ecology, environmental externalities, and land use/land cover change, we hope to help realize
93 international policy goals that seek to secure human well-being while (or sometimes through)
94 preserving natural habitat. The multi-lateral programs mentioned above (REDD+, SDGs, etc.) must
95 address land tenure security issues to succeed. A better articulation of how tenure security interacts
96 with conservation activities to affect both human well-being and natural environments can provide an
97 important step toward developing, testing, and scaling up effective conservation strategies.

98

99 2 Land tenure form, land tenure security, and conservation

100 The literature defines and categorizes land tenure in various ways, perhaps because distinct
101 constructs are useful in different situations (Otsuka & Place 2001). We start by distinguishing between
102 the *form* of land tenure and the *security* of land tenure. A commonly-referenced FAO (2002) definition
103 states that form, which they refer to as *land tenure systems*, “determine who can use what resources
104 for how long, and under what conditions.” Land tenure *security*, in contrast, can be thought of as the
105 assurance a landholder feels that those rights will be upheld by society (Sjaastad & Bromley 2000).

106 The land tenure forms discussed in the literature are often conveyed in simplified categories
107 (Robinson et al. 2014): private, communal, public, state protected land, and customary/traditional.

108 These generalizations, however, can mask significant heterogeneity in the depth, breadth, and quality
109 of the bundle of rights that can be held within what might be called the same category (RRI 2012).
110 Further, these categories are also often used to reference a specific set of “right bundles”, and what
111 parties hold right or duties to a piece of land. Rights that are commonly referenced include access,
112 withdrawal, management, exclusion, alienation, transferability (Schlager & Ostrom 1992), and due
113 process and compensation in the event of expropriation (RRI 2012).

114 Table 1 summarizes broad associations between these bundles of rights and a tenure form. The
115 shading denotes how likely a tenure category implies a set of rights is “almost always included”, “may
116 or may not be included”, or “rarely included” following the categorization used by Schlager and Ostrom
117 (1992) for common property. Private property implies a so-called “well-defined” bundle of rights as the
118 complete set of rights, so in Table 1 all right bundles are noted as “almost always included”. We use
119 Schlager and Ostrom’s (1992) characterizations for shading community-based tenure. Land under
120 government control, such as protected areas and generally-defined “public lands”, can take many
121 forms (Mascia & Claus 2009; Nolte et al. 2013b), so most right categories are labeled “may or may not
122 be included”. Finally, as public land is often the default category for undocumented land in many
123 developing regions, we designate *exclusion*, *alienation*, and *due process* as being “rarely included”.

124
125 [Table 1 around here]

126
127 While Table 1 summarize common associations, there can be significant heterogeneity within
128 this table in practice, and there are certainly counter-examples to this categorization. Thus, the table is
129 likely most usefully applied in specific decision contexts where practitioners can map how rights are
130 associated with tenure categories in a specific location and with interventions in mind. For example, in

131 some locations protected areas overlap with indigenous lands (e.g., Holland et al. 2014). In Table 1 this
132 could be documented by “turning on” more than one tenure form, highlighting where rights overlap
133 and help point the way toward resolving uncertainty or conflict. In a different context, Table 1 may
134 highlight places where conservation goals may be best met not by intervening at all in cases where
135 communities have longstanding local rules and norms that implicitly lead to conservation outcomes.

136 Table 1 summarizes rights associated with certain tenure forms, but this does not relate to land
137 tenure *security* per se. A common but faulty assumption is that private land tenure is more *secure* than
138 customary/traditional tenure based on its more complete bundle of rights. However, this overlooks
139 rules, rights, or norms, legally or locally enforced, that may exist within a customary framework that
140 can provide an internally coherent and enforced in practice (Baland & Platteau 1996). Moreover,
141 private rights may also be insecure, undermining whatever “completeness” of rights is presumed to
142 exist.

143 The form of land tenure bounds what land use decisions are possible, but land tenure *security*,
144 irrespective of a specific form, is a major vehicle through which land management activities are
145 realized. For example, a private land holder may have the right to cut down her forest, but whether she
146 does (and how she cuts it down, whether she replants it, etc.) is in large part a function of how secure
147 she feels she will receive benefits from that forest in the future (Barbier & Tesfaw 2013). Similarly, a
148 well monitored and enforced (secure) protected area is less prone to deforestation than if it is weakly
149 monitored and enforced (insecure), especially when land use pressure is high (Nolte et al. 2013b; le
150 Polain de Waroux et al. 2016). Ambiguity in tenure, where there are overlapping claims to rights, can
151 also create confusion or conflict over who has access and rights to a resource and be a form of
152 insecurity. Security, as mentioned above, can be thought of a measure of the assurance of the rights
153 implicit in any form of tenure (Sjaastad & Bromley 2000), reflecting a landholder’s confidence or belief

154 (real or perceived) that agreed-upon rights, i.e. the form of tenure, will be upheld by society. Security
155 does not necessarily imply formal statutory tenure upheld by the state; informal “locally-defined”
156 tenure conditions that are internally enforced may also be secure (Knight 2010; Stickler & Huntington
157 2015; Lawry et al. 2016).

158 In this paper we focus primarily on land tenure security and not form. While tenure form is an
159 essential element to understanding land value (Kaimowitz & Angelsen 1998), and thus something all
160 conservation strategies must consider, this is only meaningful if we also fully take into account tenure
161 security. Without taking security into account, most forms of tenure show mixed impacts on
162 conservation outcomes (Robinson et al. 2014; Seymour et al. 2014). Thus, a better grasp on the
163 conditions that underpin secure tenure is necessary to understand a conservation intervention’s
164 probability of achieving its goals.

165

166 3 Conservation interventions and land tenure security

167 Conservation interventions can affect, and be affected by, land tenure security. Figure 1 shows a
168 conceptualization of the relationship between land tenure security, conservation interventions, and
169 outcomes. Section 3 first describes the major components of Figure 1; later subsections detail the
170 interactions between a conservation intervention and tenure security (blue components).

171 The perception of land tenure security is affected by a variety of factors including prevailing
172 prices, social norms, economic development, household socio-economic status, expectations, and
173 other factors (Arnot et al. 2011). In Figure 1 we cast these as three categories: political economy,
174 formal, and informal institutions. These categories can overlap and interact, reinforce or contradict
175 each other, and the relative importance of each will vary by location. But all affect land tenure security

176 and, therefore, the expected returns to possible land uses. These impact land management decisions,
177 which have implications for outcomes that relate to conservation interests and human well-being.

178
179 [Figure 1 around here]

180
181 The political economy box represents the macro-level forces that manifest themselves locally
182 such governance struggles, macro-economic conditions, or political objectives. These conditions can
183 influence micro-level conditions (e.g., returns to land use, local preferences, local population growth
184 and density, within-community power dynamics, etc.) and local tenure security. Although these larger
185 political economy issues often rest outside the control of conservation practitioners, an awareness of
186 how they might support or undermine a project's feasibility is necessary (Vaccaro et al. 2013).

187 The degree of security is also influenced by locally-manifest formal and informal
188 institutions. Formal institutions are legal and statutory systems, policies, and rules which ultimately
189 legitimize a *de jure* tenure system, and are related to and reinforced through the political economy.
190 Formal institutions determine how land rights are administered, enforced, and applied (Simbizi et al.
191 2014). For the conservation community, two related ways in which tenure insecurity manifests through
192 formal institutions are of primary concern. First, how the enforcement and implementation of existing
193 laws on tenure might favor conservation outcomes. Second, how deficiencies in laws and/or their
194 implementation requires reform that might ultimately benefit conservation.

195 Informal institutions can include customary land rights or rights enforced through recognition by
196 community norms and values, and may constitute a *de facto* tenure regime in which rights are upheld
197 by community of resource users themselves without formal statutory recognition (Simbizi et al. 2014).
198 This may remain secure and coherent as long as parties outside the system do not lay claim to

199 resources within that system (Lawry et al. 2016). However, with increasing land pressures, population
200 growth, and migration, outside claimants on resources under traditional or customary management
201 can be common (Curry & Koczberski 2009; Jayne et al. 2014). Incoherence and, in many instances,
202 tenure insecurity arise when there is a 'gap' between *de facto* and *de jure* tenure, and has been one
203 rationale underpinning efforts to formalize community land rights in much of the developing world
204 (Naughton-Treves & Day 2012). In some cases, efforts have been made to close this 'gap' by legally
205 recognizing traditional customary rights (e.g., see Knight 2010; Quizon 2015).

206 For the conservation community, understanding current land and resource use likely requires a
207 focus on whether *de facto* and *de jure* tenure align, as *de facto* rights are the current operating rules.
208 But to affect land use changes into the future, working to ensure *de jure* recognition of tenure and
209 there is transparent interaction between the formal and informal systems can be just as crucial. A
210 conservation intervention in land management aims to change the rights over who benefits from a
211 particular land use and implies new rights and duties. Conservation organizations must do the hard
212 work to ensure these changes are congruent with local formal and informal institutions.

213 Taken together, the first half of Figure 1 shows how land tenure security underpins land
214 management decisions, which affect the value of different land use options. Tenure security becomes a
215 filter through which land use decisions are made, and can affect the utility landowners derive from
216 expected returns on agricultural products (Alix-Garcia et al. 2012), social or cultural values (Rodgers &
217 Menon 2012), political economy issues (Broegaard 2005), among others. Tenure insecurity also comes
218 from overlapping tenure claims that are major issues some regions, such as indigenous forests within
219 protected areas in tropical Amazon (Nolte et al. 2013a; Holland et al. 2014) or overlapping claims
220 amongst land administration agencies in Indonesia (Samadhi 2013).

221 Land management decisions are typically made to improve a landholder’s own welfare, but also
222 entail externalities, positive or negative, which affect biodiversity and conservation. In this way tenure
223 security can have significant impacts on conservation outcomes. For example, increasing security for
224 smallholders might improve agricultural productivity (Arnot et al. 2011), but could come through
225 investments in synthetic fertilizer inputs that in turn negatively impact downstream water quality.
226 Alternatively, tenure security can produce positive externalities, such as increased investment in soil
227 conservation activities (Deininger & Jin 2006a).

228 Conservation organizations often hope to improve ecological outcomes by promoting or
229 discouraging certain land management strategies (solid blue arrow). To do this effectively, we must
230 understand how land use decisions are made. Land tenure security is an important and often
231 overlooked aspect of these land management decisions. Below we outline three broad considerations
232 for how land tenure security could interact with a conservation intervention. Issues A and B highlight
233 the importance of understanding local tenure conditions prior to implementation. Issue C focuses
234 more directly on how those tenure security conditions might affect a conservation intervention.

235

236 3.1 Issue A: How does tenure security impact the current provision of public goods?

237 Conservation practitioners must consider how tenure security affects land management
238 decisions (and, in turn, the organization’s target public goods – e.g., biodiversity, ecosystem services,
239 forest cover, etc.), prior to any conservation intervention (arrow A). This is necessary for understanding
240 how a conservation intervention might impact land management decisions. For example, in some cases
241 weak tenure security may play a role in a household’s decision to convert forest to agriculture.
242 Extremely insecure tenure could prevent households from engaging in agriculture for fear of not even
243 being able to reap a harvest, while moderately insecure tenure may prompt households to clear forest

244 for agriculture more rapidly. In another example, the process of formalizing tenure through titling can
245 also generate positive conservation spillovers, as demonstrated for forests in Ecuador (Holland et al.
246 2017). Additionally, a conservation intervention should consider the strength or legitimacy of
247 claimants, as some landholders may lack the ultimate power or authority to carry out a medium- to
248 long-term intervention strategy. These dynamics should be incorporated into conservation strategies
249 that aim to influence land management decisions.

250

251 3.2 Issue B: Can land management activities affect tenure security?

252 Some landholders make land management decisions with the explicit *intent* of improving land
253 rights (Besley 1995; Deininger & Jin 2006a; Fenske 2011). That is, the direction of the arrow between
254 land management and tenure security is opposite that in Issue A above; here land management
255 decisions are undertaken to directly improve the landholder's security. This can be the case when
256 policies encourage "productive use" of the land to stake claim to property, as is well-known in the
257 Amazon where frontier areas have been settled by clearing forest for pasture land and thus being
258 granted homesteading rights (e.g., Fearnside et al. 2005; Mena et al. 2006). Tree planting can also
259 demarcate and stake claim to land (Unruh 2008; Barbier & Tesfaw 2013). Knowing the activities
260 landholders can undertake to secure tenure can help an organization know whether to support or
261 discourage these actions.

262

263 3.3 Issue C: How do the above conditions affect a project or program?

264 Finally, a conservation intervention may have a direct and immediate relationship with tenure
265 security (link C). On the one hand, a conservation program may require some degree of tenure security
266 as a necessary or enabling condition for successful implementation. For example, payment for

267 ecosystem services (PES) programs may assume or require strong land tenure security. In PES
268 programs, ecosystem service beneficiaries compensate landholders for changing land management
269 activities to maintain the provision of that service (Wunder 2013; Naeem et al. 2015). Thus to reliably
270 enter into these contracts, landholders must have a requisite level of tenure security to meet the
271 obligations of the contract. Without this, the conservation practitioner has little assurance the
272 conditionality of the payment will be met (Duchelle et al. 2014). Additionally, a key mechanism of PES
273 programs is identifying who receives the reward for participation in the program. In areas where land
274 tenure is uncertain or in conflict, choosing a group with whom to work assumes that group has at least
275 the right to manage and exclude activities from the land. The level of tenure security of the landholders
276 impacts an organization's capacity to change land management decisions.

277 On the other hand, in some cases practitioners may be able to directly harness tenure reforms to
278 meet conservation goals. Generally, tenure reforms are not designed to catalyze conservation
279 behaviors actors. Yet the establishment of Namibian conservancies provide an example of using tenure
280 reforms to promote conservation outcomes. Here the World Wildlife Fund worked with the
281 government to help pass legislation in 1999 that grants ownership rights over local wildlife to legally
282 constituted "community conservancies", largely based on the argument that sustainable wildlife-based
283 industries would generate livelihoods benefits of higher value than cattle ranching (Jones 2010) . Some
284 conservancies have leveraged their wildlife ownership rights to broker local investments from
285 commercial tourism enterprises. The result has been abandonment of livestock production in favor of
286 conservation practices and increases in wildlife in the conservancy areas. These partnerships generate
287 considerable local employment and investments in local public services, although equitably managing
288 the distribution of newfound benefits can prove challenging (Novelli & Gebhardt 2007).

289

290 Which of the issues A, B, or C above are most salient? This will depend on local contextual
291 conditions, largely based on the interactions between the three boxes on the left side of Figure 1. How
292 do macro-level political economy factors manifest in local returns to land uses, do credit and economic
293 constraints limit land use options, is there a “tenure gap” between informal and formal institutions, are
294 there existing conflicts in land exchange? Of course tenure is not the only factor that affects
295 conservation outcomes, but when it is a bottleneck the framework above outlines a number of useful
296 insights. First, it demonstrates how secure land tenure can lay the groundwork for sustainable
297 conservation programs by decreasing uncertainty in investment for landholders and conservation
298 practitioners. Second, the framework outlines major ways through which tenure security may interact
299 with conservation interventions, allowing practitioners to more rapidly hone in on the theory and
300 evidence supporting a given intervention. Third, conservation practitioners must still be prepared to do
301 the hard work of clarifying which informal, formal, or political economy factors are critical levers for
302 improving tenure security. For example, in many areas formal institutions do not recognize local
303 customary rights. While this may seem like a clear place to help strengthen tenure, if the local
304 customary rights are relatively secure (in the absence of formal recognition), as is documented in at
305 least some African communities (Knight 2010; Stickler & Huntington 2015), advocating for formal rights
306 may have little impact on human well-being or conservation outcomes. In some special cases such as
307 this, organizations’ efforts and budgets may be better spent elsewhere.

308 The conservation community must also be aware of what *level* of security might be needed to
309 secure conservation and human well-being objectives. Formal institutional changes can be long,
310 contentious, and complex, and the payoff for conservation could be small relative to other options. For
311 example, a protected area or PES program may require tight integration with formal institutions, but
312 reinforcing informal institutions, like environmental stewardship, might be an effective conservation

313 intervention toward more sustainable industrial agricultural practices (e.g., Rudel et al. 2009). The
314 menu of conservation interventions is large, and whether and how important land tenure security is for
315 any given intervention must be investigated.

316 Finally, we should be aware of inequality outcomes that might result from interactions between
317 a conservation intervention and land tenure security. For example, engrained power dynamics and
318 embedded history can make addressing current tenure problems for some populations, e.g. female-
319 headed households, difficult (Banerjee & Iyer 2005). Marginalized or vulnerable subgroup populations
320 may also have distinct tenure security situations that should be factored into program planning (Carter
321 & Olinto 2003). Of course, conservation organizations cannot solve all these issues. A first step toward
322 safeguarding population well-being could be a commitment to a social “do no harm” ethic in relevant
323 conservation interventions.

324 The relationship between land tenure security, land management, and outcomes related to
325 human well-being and conservation is obviously complex. The devil is in the details, and those with
326 conservation goals must do their due diligence to understand local factors that determine
327 opportunities and constraints for an intervention. The approach presented in Figure 1 provides a
328 starting point for grappling with these issues.

329

330 4 Interventions to strengthen tenure security

331 Development agencies and researchers have generated a number of approaches to assess land
332 tenure security which may offer some guidance for conservation audiences. Existing tools range in
333 depth and scale, and the appropriate method will depend on the needs of the project. Some
334 approaches focus explicitly on land tenure security, others only tangentially as a component of larger

335 assessment. Appendix A presents several recently developed diagnostic tools as an entry point to
336 existing approaches.

337 The most common approaches to strengthening tenure security are through formal mechanisms
338 to legally recognize land rights. These might include documenting rights such as through land titling
339 programs (Deininger & Feder 2009; Knox et al. 2011; Larson et al. 2013), formalizing *de facto* rights,
340 incorporating customary systems into regulatory frameworks (Knight 2010), or gaining rights from the
341 state through a process of devolution of management (Knox et al. 2011; Bruyn & Veer 2014; Jagger et
342 al. 2014; Otsuka & Place 2015). In some countries such as Australia and Mongolia, the legal basis for
343 management rights is established, but requires a community demonstrate *a priori* the managerial
344 ability to adequately exercise these rights (Hill & Williams 2009).

345 Some tenure security interventions focus on governmental capacity to implement and uphold land
346 tenure reforms and make documentation systems affordable and accessible (Jagger et al. 2014;
347 Meinzen-Dick 2014; Otsuka & Place 2015). Efforts may include creating a transparent public
348 landholding registry, clarifying institutional responsibilities, simplifying overlapping and plural tenure
349 systems, resolving disputes, or improving monitoring and evaluation of tenure governance systems
350 (Deininger & Feder 2009; FAO 2012; Naughton-Treves & Day 2012; Larson et al. 2013; Bruyn & Veer
351 2014).

352 Finally, some interventions focus on informal institutions. These often begin with an evaluation of
353 the local tenure setting, including the policy and governance environment and local norms with the
354 goal of identifying sources of insecurity, conflict, and inequality (Katz 2010; van Gelder 2010; Larson et
355 al. 2013; Bruyn & Veer 2014). Complementary education and outreach programs can also bolster the
356 knowledge and skills needed to take advantage of formal institutions like land registration (Naughton-
357 Treves & Day 2012).

358 Across these types of intervention, marginalized populations are often a focus. To ensure tenure
359 systems recognize basic human rights and safeguards against intra-community discrimination against
360 women, pastoralists, indigenous groups, or other minorities, low-cost land registration and legal
361 assistance are often necessary (Katz 2010; Knight 2010). Additionally, spousal co-ownership is not the
362 norm in many locations, so divorce and inheritance laws may limit women’s rights separate from a
363 spouse (Mammen & Paxson 2000; Peterman 2011). Addressing such issues can ensure land passes to
364 widows and children.

365

366 5 Conclusions

367 Summarizing the discussion above, four main “action items” emerge for organizations investing in
368 place-based conservation programs.

369 First, assess the baseline social-economic-political situation and underlying tenure security issues.
370 Land tenure security is a function of local conditions (political economy, informal, and formal
371 institutions) and can hinder or help advance conservation goals.

372 Second, examine how degrees of tenure security might interact with conservation programs under
373 consideration. This includes assessing how the program would interact with the legal system and
374 informal institutions, and whether the intervention requires or assumes some level of tenure security
375 that may not necessarily be currently present.

376 Third, in light of these underlying tenure security issues, organizations should reassess the
377 likelihood of an intervention achieving the desired outcomes. In some cases the current situation, left
378 alone, may have the best chance of achieving the best conservation outcomes. In other cases tenure
379 security issues may be so engrained or intractable that they severely limit likelihood of positive

380 conservation outcomes. Conservation organizations have limited staff, budgets, and capacity. It is
381 critical that they consider how tenure-related strategies complement or detract from other sectoral
382 based work.

383 Finally, if an intervention is deemed worth pursuing, organization should consider the implications
384 for marginalized or vulnerable groups. The stakeholders for whom tenure security is being assessed
385 clearly matters: women, indigenous groups, and other marginalized subpopulations may face
386 additional hurdles to securing land tenure compared to other groups. Securing tenure can sometimes
387 be a zero-sum game in that one group's gains in tenure security comes at the expense of another.
388 Organizations realize when such tradeoffs are present as they may create additional conflict or
389 undermine overall social cohesion often necessary for achieving conservation objectives.

390 In general, more work is needed that recognizes the dynamic nature and complex feedbacks
391 inherent in these issues. Experimental research through randomized controlled trials, taking advantage
392 of natural experiments, or re-analyzing existing metadata on tenure interventions can all help identify
393 the benefits of tenure security on conservation outcomes. Observational research is mixed, and
394 identifying the causal implications of tenure security on the environment, and how local conditions
395 might mediate these causal effects, is critical (Baylis et al. 2016; Persha & Meshack 2016).

396 We see two more immediate research areas that deserve more attention. First is the detailing the
397 gap between legally- and socially-defined tenure, which occurs when there is incongruence between
398 on-the-ground, *de facto* rules and rights used to manage land on one hand, and the land rights as seen
399 in the eyes of the state, on the other. This "tenure gap" between *de jure* and *de facto* land
400 management has implications for conservation outcomes since it highlights whether investments
401 should be made in formal or informal institutions.

402 Second is determining the marginal benefit of engaging in a land tenure security intervention
403 relative to other types of conservation investment, which we refer to as the “tenure dividend”. The
404 conservation community, like any other, has finite resources to allocate to policies and programs.
405 Understanding the additional benefit of engaging in a tenure security intervention will help assess the
406 tradeoffs between alternative interventions to meet conservation and development goals. Until we
407 develop this understanding, however, as a conservation community we must face land tenure and
408 tenure security issues head-on, explicitly taking these into account in strategic plans and
409 implementation.

410

411

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595 **Table**

596 Table 1. Common associations in the literature between land tenure form and bundles of *de jure* rights

\ Tenure category Right bundle \	<i>Individual or firm</i>	<i>Community</i>		<i>Government</i>	
	Private	Communal	Customary / Traditional	Protected	Public
<i>Right holder</i>	Individual(s)/firm	Community	Self-identified community	Society	Citizenry
<i>Duty holder</i>	Individual(s)/firm	Community	Self-identified community	Governing body	Governing body
Access					
Withdrawal (subsistence)					
Withdrawal (commercial)					
Management					
Exclusion					
Alienation					
Due Process					

Notes:

1. Color coding: almost always included; “may or may not” be included; rarely included (no shading)
2. Definition of rights (Schlager & Ostrom 1992; RRI 2012): *Access* allows entry into an area. *Withdrawal* is the right to benefit from land, for subsistence or commercial purposes. *Management* can be defined by the legal limits of other rights, and it can also be used to empower a community to articulate its rights to alienation or the exclusion of particular resources. *Exclusion* is the ability to refuse others access to and use of a resource. *Alienation* is the right to subdivide or sell one’s property. *Due process and compensation* allows for adjudication of grievances and fair (usually monetary) compensation in cases of eminent domain.
3. In a given location there may be overlap between columns signaling overlapping (and thus contested or unclarified) rights.
4. Generally, local conditions dictate which of these bundles are relevant for conservation and biodiversity for a given location, but most often associated with environmental outcomes are: *Access*, *Withdrawal for commercial use*, and *Management* rights.

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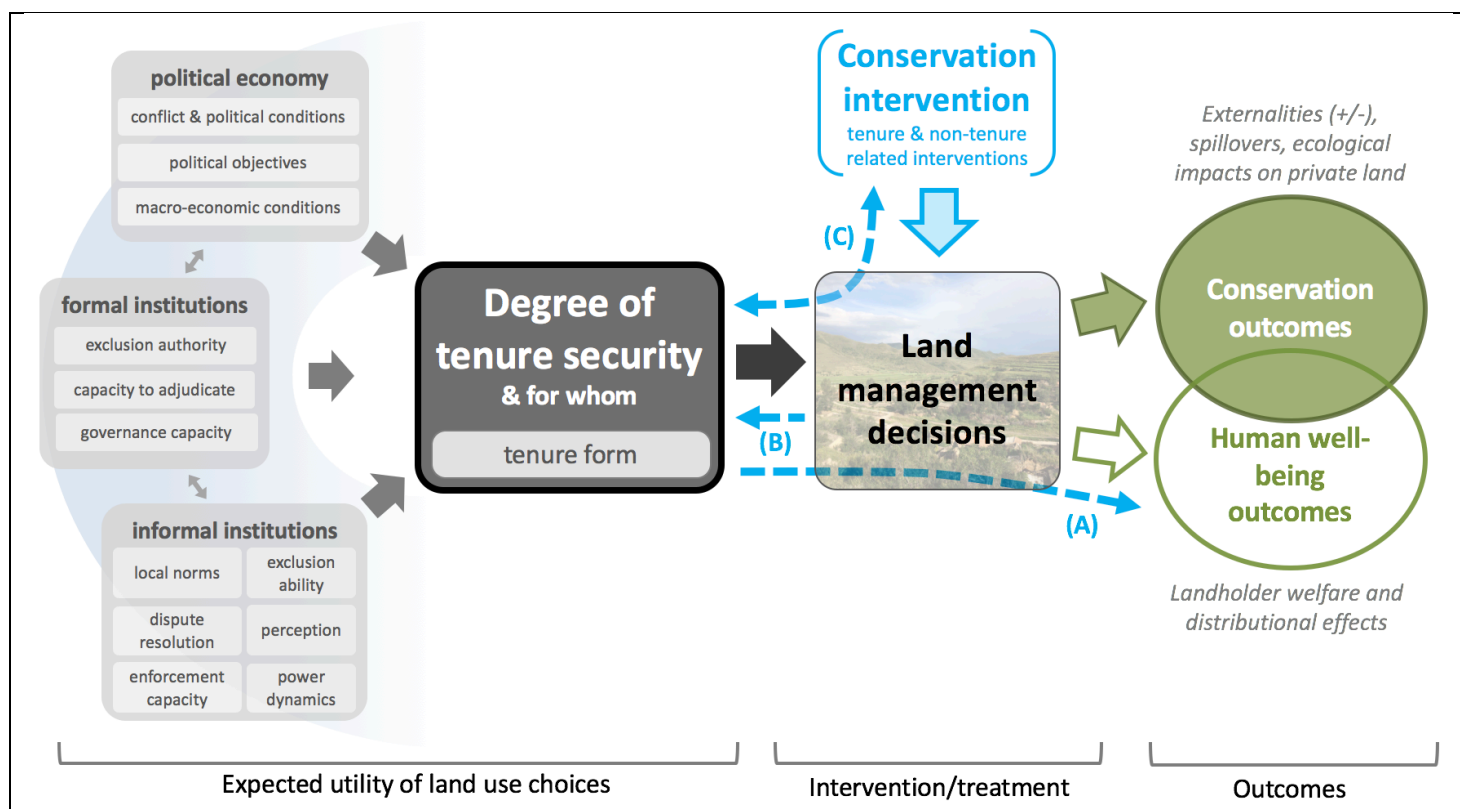
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601 **Figure**

602 **Figure 1. Land tenure security and conservation**



Notes:

1. Solid arrows indicate dominant direction of impact. Dashed blue arrows indicate issues of conservation concern.
2. *Land management decisions* include various land use activities or actions that conservation organizations hope to affect.
3. *Conservation interventions* are activities an organization undertakes to promote conservation. For examples, see the International Union for Conservation of Nature's classification of conservation actions (Salafsky et al. 2008), which include policies such as payments for ecosystem services (PES), conservation based management (CBM), invasive species control, site or area protection, etc. These can also include "getting out of the way" in cases where local communities already possess effective management techniques that implicitly or explicitly support conservation goals.

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