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Understanding and Addressing Governance Dysfunction and Unsustainable Development in the Illegal Gold Mining Region of Madre de Dios, Peru

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ABSTRACT

Understanding and Addressing Governance Dysfunction and Unsustainable Development in the Illegal Gold Mining Region of Madre de Dios, Peru.

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This paper endeavors to explore the link between dysfunction in governance systems and persistent challenges to sustainable development in the illegal gold mining region of Madre de Dios, Peru. Through the use of stakeholder narratives, field observations and literature review, four questions were examined: 1) What are the existing social and environmental conditions in the case study area? 2) What are the existing relationships amongst stakeholders, and how do these illustrate dysfunction of the existing system of governance? 3) What gaps and/or deficiencies in the existing system are revealed by stakeholder narratives, and what are their visions for an alternative system? 4) What kind of integrative, multi stakeholder, sustainable development planning is called for in this context, and what capacities need to be built to accomplish this? Using stakeholder engagement processes, transition management and co-production of knowledge, recommendations and capacities are provided for each major stakeholder. The work is a first step toward a new integrative sustainable development approach, and will add to the knowledge base not only on this case study region, but to broader sustainable development practices elsewhere as well.

ACADEMIC HISTORY

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DEDICATION

This paper is dedicated to Raymond and Patricia Duff, my parents, whose unconditional love, bravery, pride, and support made this research possible.

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Keywords: gold mining, sustainable development, Peru, governance dysfunction, integrative approach

Acronyms

SD – Sustainable Development

ASGM – Artisanal and Small Scale Gold Mining

1 Introduction

The paradigm of sustainable development (SD) has become a major contemporary topic of interest to decision makers and has been embraced by a variety of institutions around the world (Kemp, et al. 2005). In January 2016, the United Nations Development Program (UNDP) published its seventeen sustainable development goals (SDGs) which aim to protect the planet and promote prosperity and peace amongst all people. SD involves making the right choices now to improve life for future generations (UNDP, 2016; World Commission on Environment and Development, 1987). Although the SD concept provides an inter-generational vision with much appeal and cache there remain many practical challenges that can be illuminated right now using critical case studies of existing development practices.

As defined by Kemp et al. (2005), SD is a socially instituted process of adaptive change that necessitates innovation and integrated approaches (GEF, 2017). Furthermore, SD requires radical changes in both functional systems and governance, with more adaptive and experimental forms of governance replacing the old (Kemp, et al., 2007). The term 'good governance' is a prerequisite to SD and has gained attention from a variety of institutions (Dale et al., 2013; Graham et al., 2003; Weiss, 2000). Archetypal attributes of good governance include structures and practices that foster positive work between a variety of stakeholders on complex issues, across multiple scales, horizontally and vertically, as well as maintaining a level of empathy and sensitivity regarding uncertainties, while continuously building trust and developing covenantal relationships amongst all stakeholders (Lemos et al., 2012; Dilling, et al., 2011; Caldwell, et al., 2005; Kemp et al., 2005; Cameron, et al., 2003). If SD theory has for some time been coupled with the notion of good governance, and SD has become the stated goal of many powerful local and global political entities, the question remains: *What is preventing a SD transition*?

Dysfunction in governance systems may exasperate the vicious cycle of pushing for SD, devising policies, but not seeing any 'on the ground' results, undermining momentum as a negative feedback. Broad indicators of existing dysfunction and this feedback include: inability to make and implement policy; weak financial management; employing public resources in pursuit of private interests; inability to separate public from private; arbitrary application of laws and rules; closed or non-transparent decision making systems; resources allocated in an inconsistent manner; increasing mistrust from stakeholders; and ongoing unsustainable practices (Broman et al., 2017; Edelman, 2017; Blunt, 1995). Blunt (1995) goes on to suggest that once some of these faulty systems have materialized, a new negative feedback appears in the form of reduced government control, less compliance with rules and regulations, and government crack downs, e.g. increased military personnel in region, ban on specific imports or sales. Combining governance dysfunction with existing economic instability can motivate irresponsible resource extraction, precipitating environmental degradation and mistrustful stakeholder relationships.

To explore the impacts of dysfunctional governance undercutting SD, this paper focuses on a pointed case study: the interwoven social, political, and environmental issues surrounding illegal gold mining in Madre de Dios, Peru. This case study region was chosen to view SD issues because current illegal artisanal and small scale gold mining (ASGM) provides a sharply focused lens to view complex challenges more clearly, with major policy and practice implications. Illegal ASGM starkly illustrates to the current challenges facing SD, such as stakeholder engagement, mismanagement of social and environmental assets, and the enabling of corruption that corrodes social fabric and exploits many who simply try to subsist. Current literature on SD calls for bottom-up approaches meeting top-down policy making (Downs et al., 2017; UN/DESA, 2016).

This paper answers the following four questions:

1. What are the existing social and environmental conditions in Madre de Dios?
2. What are the existing relationships amongst stakeholders, and how do these illustrate dysfunction of the existing system of governance?
3. What gaps and/or deficiencies in the existing system are revealed by stakeholder narratives, and what are their visions for an alternative system?
4. What kind of integrative, multi stakeholder, sustainable development process is called for in this context, and what capacities need to be built to accomplish this?

2 Background

The national government of Peru is responsible for appointing national laws and overseeing the national ministries. In 2008, Peru developed a *Ministry of the Environment* and granted them the right to promote environmental and social sustainability while still allowing the *Ministry of Energy and Mines* to be in control of managing environmental and social impact assessments (Bebbington & Bury, 2009). Although the national government oversees the allocation of resources and the maintaining of relationships with regional governments, regional governments act in autonomy while still carrying out national laws.

The regional council of Madre de Dios, which is elected by direct suffrage, is comprised of ten members with officials from three provinces. This council oversees the functionality of the regional government. The current President is Otsuka Luis Salazar, who was elected in 2015 by local citizens. Figure 1 displays the location of Madre de Dios, with a larger focal point of the two study regions: Puerto Maldonado (region capital) and Centro de Investigación y

Capacitación Rio Los Amigos Biological Station (CICRA). The current mission of the regional government under his direction promotes SD as well as improving quality of life:

> *The Regional Government of Madre de Dios organizes and conducts regional governance according to their exclusive, shared and delegated powers, being promoter of integral and sustainable development of the region, ensuring the effectiveness of the principles and constitutional rights and improve the quality of life of its population. (GOREMAD – PEI, 2015-2017)*

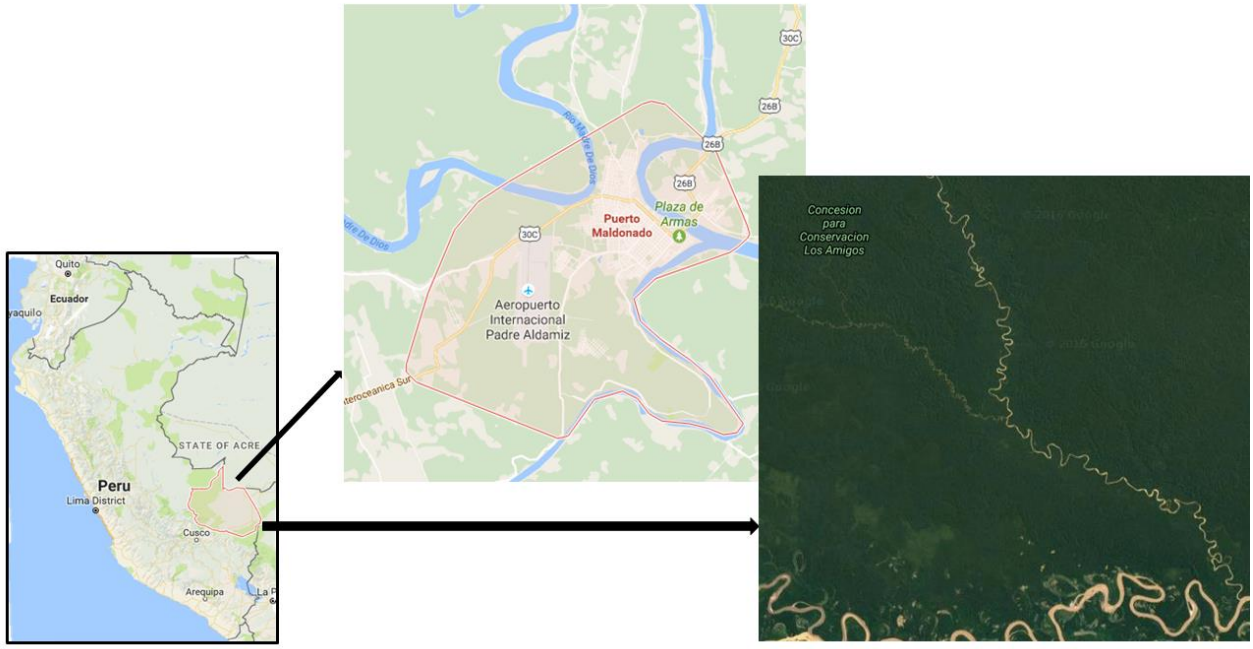

Figure 1: Madre de Dios Region of Peru where case study was performed; zoomed-in images where narratives were collected: Puerto Maldonado and CICRA (Adapted from Google Maps 2017)

Madre de Dios, Peru is a highly biodiverse area with approximately sixty distinct indigenous groups occupying the Peruvian Amazon (INDEPA, 2009; INEI, 2008). Located in the southeastern part of the country, it is divided into three main provinces: Tambopata (where

the capital Puerto Maldonado is located), Tahumanu, and Manu. This area is blanketed by thick rainforest and is also home to *Manu National Park*, a World Heritage Site and international protected area as classified by UNESCO (2017). In 2007, roughly 54% of the land in this region was located in regional protected areas, and another 4% was controlled by private conservation and ecotourism concessions (Vuohelainen et al. 2012).

The main economic activities in this region are gold mining, logging, Brazil nut harvesting, tourism, and small scale farming for local trade or subsistence (Vuohelainen et al. 2012). Recently, this region has been the victim of extreme environmental changes, including deforestation, mercury contamination, monoculture booms, and forest degradation. Population increase, as well as the main economic drivers and sources of 'livelihoods', have led to important studies on the health and well-being of these protected forests and the communities who live there. Their findings reveal: exposure to environmental pollution, elevated concentrations of mercury in hair samples, elevated mercury concentrations in carnivorous fish, and water pollution (Bendezu et al., 2016; Diringer et al., 2015; Gibb et al., 2014; Ashe, 2012; Swenson et al., 2011; Escobal et al., 2003).

Given the increasing rates of deforestation and mining activities in Madre de Dios (Swenson et al. 2011), as well as the current state of emergency the region has entered due to mercury pollution (which will be further discussed in the Findings section), this study is of pressing need. Understanding the response stakeholders have in regards to environmental and social concerns, and the solutions they deem necessary, will increase the likelihood of fixing dysfunctional forms of governance and promoting SD. If one is to understand the complex relationship between natural resource extractive operations, livelihood alternatives, best environmental practices, and SD, ethnography and narrative data provide valuable insights.

3 Methods

Research was conducted in situ, Madre de Dios, Peru, specifically CICRA and Puerto Maldonado during June and July 2016. Interviews, site visits, and field observations were the primary methods used to complete this research. Site visits were completed in small mining communities and consisted of participant observation as well as discussion with the supervisor who led the visit. Multiple field observations were conducted at CICRA, which consisted of viewing current active mining along the banks of the Madre de Dios River, and visiting old, inactive mining areas on the CICRA conservation land concession (Figures 2, 3, and 4).

Figure 2: Active ASGM, Madre de Dios River (traveling to CICRA from Port of Laberinto)

Figure 3: Active ASGM, Madre de Dios River (traveling from CICRA to Port of Laberinto)

Figure 4: Inactive, ASGM plot, primary forest completely deforested, filled in with water during wet season

3.1 Interviews

Eight interviews were conducted at the CICRA biological field station, and thirteen were conducted in Puerto Maldonado. All interviews were tape recorded with consent prior to

initiating the interview. No names will be provided, and interview subjects will be identified as their respective 'stakeholder' title. See Table 3 in Appendix I for a complete list of stakeholders who were interviewed. Clark IRB approved the human subjects method.

Interview questions were framed to understand: 1) the major environmental problems in the area, 2) how local people value economic practices which can be considered environmentally harmful, 3) local peoples' values and perceptions about conservation of Madre de Dios, 4) how non-governmental organizations (NGOs) affect and address political concerns in the area, 5) the relationship between NGOs, local and/or indigenous communities, and government, and finally 6) local people's attitudes towards their government in relation to environmental policy.

As necessary, a Peruvian translator was present during all interviews. Interviews were completed in locations chosen by the interviewee. Interviewees were selected to represent a wide spectrum of perceptions and ideas. They range from participants currently engaged in the major economic livelihood sectors, government agencies, NGOs, academia, and local residents. Upon completion of the field work, all interviews were uploaded and transcribed.

3.2 Coding Analysis

All transcribed interviews were uploaded into NVivo Pro 11 software (QSR International, Doncaster, Australia) and nodes (groupings) were established based on reoccurring themes brought up by each stakeholder. Nodes were used to classify current governance dysfunctions, sort explicit narratives, and collect suggested resources and alternatives for SD in Madre de Dios, Peru. The software was used as an organizational tool for qualitative data.

3.3 Limitations

Field work time was limited to June-July 2016, and most networking and interview organization was done while in the field. Interviewing more stakeholders could have contributed to this research. Some participants that were contacted were unavailable and/or scheduling could not be set up in situ. Other areas of the region were not visited due to time constraints as well as lack of relationships and networks. Engaging more stakeholders outside of the regional capital would be beneficial to future qualitative research in this field.

3 Findings and Discussion

This section is broken down by research question.

4.1 What are the existing social and environmental conditions in the case study area?

Madre de Dios has had a history of economic 'booms', where each driving activity was coupled with environmental consequences, e.g.: rubber boom, logging boom. The most recent boom in this region has been ASGM, and there is speculation that the next boom will be an agricultural boom. As expressed by local participants:

"Another factor that modified all the policies here… our history is based on booms, the first one was the rubber boom, then the forestry, logging boom, finally the present one is the gold boom, regionally speaking…." (Interview 9, Local Conservationist, 2016)

"Agriculture. I think the next boom after mining is going to be agricultural boom… Sort of seeing that already here, the papaya production is becoming monoculture papaya…" (Interview 11, NGO, 2016)

Currently, ASGM activities in Madre de Dios are classified as illegal due to the enactment of a recent national law which requires ASGM miners to obtain a permit to work prior to entering the field (Ashe, 2012). Researchers have targeted this area to quantify the environmental impacts associated with this activity including: mercury contamination and health impacts; deforestation; and social unrest. For example, recent studies in Puerto Maldonado have found elevated levels of mercury in human hair (Ashe, 2012), as well as in carnivorous fish in the Madre de Dios River, a major food staple for populations in this region (Diringer et al., 2015). ASGM activities are also appearing in National Protected Reserves. Joshi (2016) specified that from 2013-2015 the buffer zone known as La Pampa (located on the outskirts of the Tambopata National Reserve) lost approximately 2,500 hectares of forest. Illegal mining and uncontrolled agriculture expansion by migrants was the largest driver of deforestation in this reserve (Vuohelainen 2012).

Long term studies conducted by the Carnegie Institution for Science at Stanford University found that levels of mercury had reached record high levels (Fraser, 2016; CAMEP, 2008). In response to these findings, Ollantay Humala, former president of Peru declared a 60-day state of emergency in Madre de Dios (Bendezu-Quispe et al., 2016). Methyl mercury, a highly toxic form of mercury, can have serious detrimental effects on exposed humans, including kidney dysfunction, decreases in cognitive functioning, lung damage, and central nervous system damage (Bendezu-Quispe et al., 2016; Diringer et al., 2015; Gibb et al., 2014). It has been cited that due to the illegal mining activity in Madre de Dios, 41% of the current population has been exposed to mercury contamination (Jamasmie, 2016).

Other environmental concerns in this area are agriculture ‘booms’ that entail deforestation, illegal logging, illegal hunting, and the conversion of primary rainforest to

secondary. Research conducted by Vuohelainen et al. (2012) found that between 1991-2008 4% of total regional protected areas had been deforested. In over half of the protected areas studied, uncontrolled or illegal expansion of agriculture was the main driver of deforestation. The existing social conditions in this region further exacerbate these problems.

In 2007, the total population of this region was 109,555. Interestingly, only 13% were considered 'legally employed' in a sector, but roughly 57% of the population was considered 'economically active' (INEI (b), 2016; Knoema, 2016). The gap between the 'legally employed' and 'economically active' population might be associated with illegal activities that are prevalent in this region. As described by one of the participants:

"…so many people instead of accomplish the laws, the regulations, they go outside the law. Because it is easier, and fast, and there is a complete structure of corruption in the governmental institutions that allow to be informal or illegal is the easy and the best way to work here." (Interview 17, International NGO, 2016)

According to Knoema (2016) (INEI (b), 2016) approximately 31% of the 'legally employed population' in this region were working either in agriculture, fishing, or mining fields. This implies that much of the economic opportunity (both legal and illegal) for the population, with limited alternatives, is working in the sectors that are associated with both adverse environmental consequences and economic gain. In 2015, it was estimated that extractive operations alone would contribute roughly one million thousands of new soles (roughly $295 million U.S. dollars using a conversion rate 1 Peruvian sol equals 0.3 US dollars) to the regional GDP (INEI (b), 2016). Figure 5 displays the percentage of the 'employed population' by occupational category and the trends from 2006-2012 respectively.

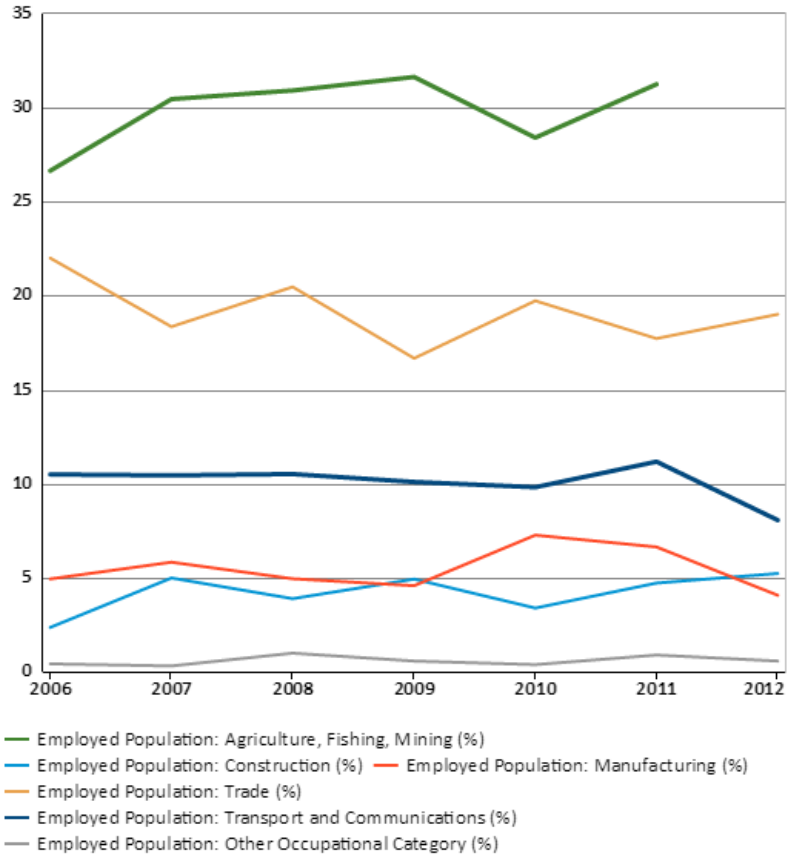

Figure 5: The percentage of the legally employed population over time (year) per occupational sector

Source: Knoema, 2016; INEI (b), 2016

Research has been conducted in this region regarding the social conditions underlying natural resource extraction, agriculture, and wealth distribution. Escobal and Aldana (2003) concluded: 1) various income generating activities considered 'sustainable' can harm the rainforest such as Brazil nut harvesting and agriculture; 2) agriculture activity rises with increasing poverty; 3) there is a negative association between income level and the probability of engaging in agriculture; and 4) deforestation and agriculture invasions could be reduced if property rights were more clearly defined because it would encourage sustainable forest management practices. These findings were reiterated by participants in this study who stated that the major social concerns include: 1) government not recognizing territory; 2) NGOs and

government systems not reviewing social and environmental conditions in parallel; 3) no application of social or environmental justice rights (due to lack of human resources and capacity); 4) extreme private gain and social loss (i.e. properly enforced mining policies could benefit the region by adequate tax collection); 5) over exploitation in work forces leading to the inability to provide an exit from current unequitable system; and 6) creation of social 'winners' and 'losers', which can lead to violent social explosions (Interviews 7; 9; 11; 13; 20, 2016)

Juxtaposing stakeholder narratives with observed environmental problems and social conditions allows us to understand and address governance dysfunction and unsustainable development in this region. For example, current mistrustful relationships amongst stakeholders reflect dysfunctions in the existing systems of governance, which trigger the propagation of social and environmental problems in positive feedback.

4.2 What are the existing relationships amongst stakeholders, and how do these illustrate dysfunction of the existing system of governance?

Relationships among diverse stakeholders are complex. SD involves incorporating the ideas and goals of many people from different institutions and across many fields. A major challenge in SD is ensuring that governance authorities have the capacity to facilitate and operate constructively within such multi-stakeholder systems. Allowing diverse stakeholders to participate in major policy, projects, or goal designing legitimizes the operation, reduces risk of conflicts, and produces a learning environment for all participants (Kemp, et al. 2005). However, one practical challenge to development is deciding which stakeholders should be incorporated into the discussion, planning, and implementation of new projects and policies, and by what means. To explore how this multi-collaborative stakeholder system could work, an account from

one of the interviewees displays how multiple sectors and institutions collaborated and began designing a policy that would formalize the ASGM miners in the area:

"…when I was assessing the ordering of the mining activity, the relationship was very close… I was helping the government… to establish with the miners, the producers, the mechanisms to formalize the mining activity, working with certain NGOs to do the technical support. There you have at that moment regional government, local producers…and NGOs working together towards…defining the formalization process, how it should be…and made a chain of actions they want to develop to improve these economic activities..." (Interview 19, Local lawyer, 2016)

Although each sector was working together to devise a policy that would control environmental pollution, promote legalized ASGM, and account for and manage all the active mines, their completed work was negated when the national government enacted Law 27651 (as stated previously), commonly known as the Act Formalizing the Promotion and Protection of ASGM. The Peruvian government is aware that small-scale mining contributes to environmental damage while also sustaining many local livelihoods. Regulating this sector bridges economic interests and the need for environmental protection. The lack of communication and stakeholder engagement between the national, regional, and local governments has led to controversy and many adverse social impacts. The region of Madre de Dios has the highest number of unapproved mining permits from ASGM operations even with this formalization process in place (Ashe, 2012).

To further explore how stakeholder relationships reveal dysfunction in governance and to elaborate more on the attempted formalization process, an account from one of the interviewees reveals how this law lacks practicality for where it is supposed to be enforced. This law, as previously stated, aimed to regulate the ASGM activity as well as enhance its social and

economic productivity. The following narrative displays the ways in which the stakeholders who are directly impacted by this law interpret and manipulate it:

"…the other reason are the policies, because for example, the laws they say you cannot use the floating device…technically the balsas are mechanized metals, lesser impacts in comparison with the caterpillars… and also another devices that destroy forests…the balsas were just very easy to control…they don't have destruction on the side, we don't know why the law forbidden this… Also the current laws, they say for example, even if you get a permit to be a… legal miner, you…clear the forest…make the hole, get water, creates lagoon…the state will say, it's a lagoon you cannot work…So you have to close…The miner would say, that's my lagoon…law has no difference between artificial and natural lake, so it's a lake…you cannot do mining… the lagoon, how that work, I need to float, floating devices are prohibited. It is tricky, and the miners know this. I'll do illegally, I work at night, I do… more fast, destroy a lot, before you come with your police and army to kick me out. The state promoted the boom, fast change use of the forest…" (Interview 13, Local Academic, 2016)

These narratives describe the relationship between local communities and the national and regional governments. An equally important relationship is the relationship between NGOs and government, as well as NGOs and local communities. NGOs can work as a liaison for the government by dismantling resources to local communities, or helping to carry out certain tasks. NGOs are also very capable of using limited amounts of resources to achieve maximum results, and in most cases, can network at much larger/international scales. Donor-funded NGOs can provide a no-cost resource to both the government and the communities in which they intend to serve, and can bridge chronic wide gaps between these two major stakeholder groups. NGOs

were perceived by interviewees to be better in management of capital, disseminating information, and informing communities of social and environmental conditions.

Several accounts have explained how NGOs have exerted a 'paternal' relationship with local communities when developing projects. The attitude of the NGOs is perceived by local communities as being one of salvation and the promotion of conservation practices (Interview 11, NGO, 2016). This orientation has tended to turn local communities away from NGOs and conservation because it was considered an insult to their way of life. The promotion of conservation by NGOs projected the idea that using any resource from the forest was destructive, and that communities should be engaging in other economic activities (Interview 17, International NGO, 2016). Due to these past relationships between NGOs and local communities, regional government now uses NGOs as what has been described as a 'political football', to gain voter support. Another key aspect to consider is the lack of trust between communities and NGOs. The following two excerpts reveal the current opinion about NGOs from the perspective of local communities:

"There is still the paternal relationship where NGOs go in thinking they are bringing salvation for a particular problem, where actually what needs to be understood, a very slow process of relationship building, so that you get trust, then you can experiment, as long as you explain what experiment is… But unless you have done all the previous historical background work then...both communities and NGOs need to understand that it may not work… but communities are sold the line that it is going to work, and then problems occur." (Interview 11, NGO, 2016)

"…No, something that happened at the end is that…even when the NGO that invested the most…whenever the project finished, they left. But before that they told [the community], every

single hour you are working for the benefit of this project, please write it because we are going to pay for these hours…engineers are being paid for working, workers for NGO being paid, so the people working in the field is being paid too. But instead of being paid, they never paid nobody, now there is this sensation of uncomfort- with that organization…" (Interview 12, Miner, 2016)

When considering what alternatives are necessary for SD and overcoming dysfunctional governance, repairing stakeholder relationships is fundamental. The lack of transparency, trust, and collaboration that exists between these stakeholders is evident from the narratives. Moving forward, alternative relationships must be established, with key characteristics that include: transverse partnerships, accountability, accessibility, visualization, goal-setting, and impartiality (Interview 4, 2016; Kemp et al., 2007; Kemp et al., 2005). Envisioning what an alternate stakeholder relationship looks like in practice is described below by a participant:

"…government…can do great things on certain levels, but maybe they don't have the resources…to understand the areas, the people in those areas, they treat everyone the same. Where NGOs have the ability to actually focus in, these are the solutions that we are working with the communities to solve. Assist [NGOs] by funding these…solutions. Therefore, the government should see NGOs as more of a way of solving socio economic problems, an extension of their own mechanisms, benefitting as many people as possible with as much as value added to the resources, without long term intergenerational issues…" (Interview 11, NGO, 2016)

4.3 What gaps and/or deficiencies in the existing system are revealed by stakeholder narratives, and what are their visions for an alternative system?

In the previous section, it is evident from the narratives that the existing relationships amongst stakeholders is plagued by mistrust and dysfunction. Understanding the context of those relationships directly from the stakeholder's perspectives is crucial to identifying the gaps and deficiencies that exist in the current system. Identifying these gaps, or what Downs, et al. (2017) refer to as 'conundrums', is a major building block of successful SD transformation. The following narrative shows how the *social-ecological complexity conundrum* and the *stakeholder diversity conundrum* (ibid) confound SD in spite of the fact that the regional and national governments continue to promote them in political rhetoric and propaganda:

"…I just paid…dollars for my concession, most of what I pay is a punishment for not working. Not physically working. But if I would be working, the government would bomb me. How can you explain that? One ministry…not the ones who bomb me, ask you to pay... you have to pay also to work mining, the right to work. You pay to have the right to do mining, and you also pay punishment for not working…If you don't pay that, your concession is finished. When your concession is finished, then its nobodies land…so what the government is promoting is the invasion of that area, by many other miners…the problem is not fixed by finishing the concessions, the problem is even worse." (Interview 16, Miner, 2016)

Mining is a major economic driver in this region and is responsible for many livelihoods, but it also has significant environmental consequences. The socio-ecological context this activity inhabits is complex, and the stakeholders involved in this particular narrative are disengaged from one another, each experiencing different impacts, cultivating social tension between 'winners and losers' (Voinov et al., 2010).

This example also identifies a stakeholder gap between the two scales of governance that politicize this activity: regional and national. The gap between these two scales results from a lack of collaboration, transparency, stakeholder engagement, and inefficient resource allocation. The deficiencies that arise from this gap between regional and national governance systems were noted by several interviewees, including: 1) capital allocated to persons in 'office jobs' versus to 'the field'; 2) government funding monopolized by select NGOs and/or persons, 3) no consultation between either governance system, 4) government projects cannot be contracted out leading to either inexperience or incompetent management, 5) blanket solutions for various problems 6) discrepancies between the perception of these problems from each governance system.

Collectively these deficiencies, as stated by one participant, are: *"…creating a social crisis for the local people, instead of an opportunity*." (Interview 9, Local conservationist, 2016) The imbalance of power and perception between these two groups, who are vital stakeholders and drivers for SD, reflects some of the challenges that lie ahead in this region. For example: *"The issue is, the regional government was…discussing, planning with the local actors, what are the needs, how do you fix the situation, they have to make a plan, consensus with all the sectors… The central government should respect those plans…as solutions for those sectors."* (Interview 19, Local lawyer, 2016)

"The other big issue because most of the laws…coming from [central government], in this case, the rules, how to develop certain activities, for example mining, allows foreign people to be the ones to have the rights to do mining in their territories. Nobody consult them…before giving the rule…the rules have been given from outside, and they have to face all of the problems…that now [they] fight for they own rights." (Interview 20, Indigenous Federation, 2016)

Not only do these narratives reveal deficiencies, they also illustrate a classic top-down approach to developing and implementing policy. Recently, SD literature has focused on integrating both top-down approaches and bottom-up approaches, and generating participatory multi-stakeholder processes (Downs et al., 2017, Voinov et al., 2010). Under this framework, the recognition of stakeholder interests, relationships, and capacities drives the transition towards SD and away from typical top-down approaches (Downs et al., 2017). The call for a new integrative SD design will be discussed in the final section of this paper.

This research aimed to collect the suggested alternatives to the current governance system with regards to SD from each participant. To be able to capture their variety, Table 1 generalizes the major governance problems cited by the interviewees, as well as the corresponding responses that would either alleviate some of these existing problems or are necessary for the transition towards a more sustainable region.

Governance Problems	**Suggested Responses**
Lack of Long & Short Term Goals	- Development of stakeholder visions, creation of common goals and objectives - Development of national and regional department for indigenous communities - Regionally defining sustainable use of the forest - Regionally defining sustainable ASGM activity - Development of dynamic policies that allow for market changes and 'booms'
Lack of Collaboration Between Stakeholders	- Collection of experiences of stakeholders involved - Incorporating the local actors into regional solutions - Improving the existing relationship between NGOs and regional government - Allow NGOs to act as facilitators for local people and sectors to accomplish regulations from government - Capacity building amongst all stakeholder relationships
Lack of Enforcement Mechanisms	- Development of an environmental police force - Improving the monitoring and policing of river ways in the region

	- Appointing local people to jobs - Expanding capital to persons/sectors in regulated fields - Eliminating blanket solutions and developing beneficial regional policy
Lack of Monitoring and Technological Resources	- Expansion of satellite technology - Promotion of cleaner mining technologies and allowing access to these technologies - Increase education resources - Monitoring of market demands and supply in the region
Internal Government Barriers	- Development and implementation of a new regional 'zonification' process - Development of more competitive government funding opportunities, removing the existing monopolies - Promotion of legal mining through formalization process and economic incentives - Provide access to environmental justice - Promotion and providing alternatives to livelihoods

Table 1: Current governance problems as expressed by participants and their suggested responses for sustainable development

Although problematic relationships among stakeholders are prevalent, there was overwhelming agreement amongst the participants that these relationships are worthwhile repairing to achieve SD; trust may have eroded, but honoring shared interests could restore it. This narrative describes a vision of what an alternative system is, showing that restoration of stakeholder relationships drives functional governance:

"…The lack of people with the capacity to make the laws be…enforced. The other thing…each institution is working isolated from the other one, there is no one north to work together towards the same direction…combining these two things is a great weakness…we need to start by [making ourselves sincere], institutionally talking, regionally talking, with the NGOs, central government, regional government. Then to write a regional…policy till 2021, so five year planning, but if we are not able to integrate the different institutions we are not going to succeed…Another important thing…share the jobs, one can be doing the teaching, the skills, capacity, the other one can be in companionship in the field, the other one can be a tester and bring in indicators, the results…maybe Madre de Dios can show change, and by doing that we

are increasing the agricultural, forestry income for the local people, so they are not going to deforest…each institution taking part of the problem, to close the circle, closing the productive chain, if we can close the productive chain then it is going to work." (Interview 10, Regional government, 2016)

4.4 What kind of integrative, multi stakeholder sustainable development planning is called for in this context, and what capacities need building to do this?

Focusing on the pivotal nature of the *stakeholder diversity conundrum*, we apply aspects/domains of an *integrative framework* for SD practice to vision an alternative approach for Madre de Dios (Downs et al. 2017), specifically Domains 3, 4, 5, and 6 of that frame. Domain 3 emphasizes stakeholder interests, relationships and capacities, while Domain 4 and 5 emphasize knowledge types and temporal and spatial scales (ibid). Domain 6 addresses the need to collectively strengthen socio-technical capacity as a social enterprise to progress sustainable human development (ibid; Downs, 2001). Populating these domains with implementation and management practices such as participatory modeling, transition management, and co-production of knowledge may allow stakeholders in this region to overcome existing barriers to SD.

Key questions can be asked to ensure whether a project or policy is in route to success or failure. Using Domain 3-6's guiding questions in Table 2, and pairing these with the collected stakeholder narratives, it is evident that the current policy and projects geared towards SD in the region have had adverse effects or failed. Many narratives have expressed the need to engage with a diverse array of stakeholders, incorporate various types of knowledge, develop long, short, and medium term goals, understand the geographical and spatial scale of policies and projects, increase socio-technical capacity, and attend to outside influences (Interviews 4; 7; 10; 11; 13; 16; 17; 19; 20; 21, 2016). These stakeholder desires are reflected in Table 2 below:

Domains	Guiding Questions	Desires to achieve SD
3. Stakeholder integration	• Are there serious efforts to engage diverse stakeholders – using appropriate levels, methods and resources – at all stages: design, assessment, planning, implementation, and monitoring? • Is the project likely to garner a strong sense of shared ownership amongst stakeholders?	- Engage a variety of stakeholders - Co-produce during all stages of SD - Decrease the social tension between 'winners and losers'
4. Knowledge integration	• Are academic, indigenous, local and professional knowledge types brought to bear to understand, then craft responses to problems? • Are natural science, engineering, health science and social science disciplines and methods leveraged and sufficiently integrated at different project stages?	- Incorporate a variety of knowledge types, especially local and indigenous, into SD - Allow multiple researchers and academics from a variety of fields collaborate and create innovative ways to achieve SD
5. Temporal, spatial integration	• Are short term (1-3 years), medium-term (10) and long-term (20+) planning horizons considered in parallel? • Is the spatial/geographical scale of the project appropriate? • Does the project include attention to 'external' influences that operate at a larger-than-project scale?	- Design short term and long term goals for all SD policies and projects and make them transparent - Include flexibility into design policy to account for external forces
6. S X T Capacities integration	• Is the strengthening of existing social-technical capacity, and the building new capacities to enable the projects adaptive success over time an integral part of the proposed effort? • Is S X T capacity articulated in a sufficiently comprehensive, integrated way?	- Strengthen social-technical capacity between stakeholders and institutions - Integrate multi-level governance structures and institutions

Table 2: Guiding questions to identify common gaps in practice and necessities articulated by interviewees for SD; Domains 3-6; Adapted from Downs et al. (2017)

Although SD in this region has been stymied, the potential for change and the desire to change seems encouragingly strong among those most affected:

"…people do conservation, using their forest, hunting, logging, doing agriculture, they are doing conservation too…mining, actually. You can do mining in a sustainable way…So I think that the conservation and sustainability of Madre de Dios is in the hands of the people..." *(Interview 17, International NGO, 2016)*

This statement re-affirms and re-emphasizes the importance of incorporating all stakeholders, especially those working in sectors that are directly impacted by SD projects and policies, in the design, implementation, and monitoring of said projects and policies. Co-production of knowledge is one way in which transdisciplinary and multi-institutional forces can collaborate to generate strong goals and efficiently integrate policy with science and vice versa, while allowing all forces to have a sense of ownership (Lemos et al., 2012; Dilling, et al., 2011; Robinson et al., 2006; Carbone et al., 2005). There are various approaches to collaboration described by Meadow et al. (2015) as well as collaborative interactions described by Lynam et al. (2007), framed as collective capacity building enterprises by Downs et al. (2017). They involve the engagement between scientists and stakeholders, and address different modes of stakeholders: contractual, consultative, collaborative, collegial, with corresponding interactions – via extractive, co-learning, co-management practices.

Transition management is a model used for governance to help bridge gaps between top down policy approaches and bottom up social changes (Kemp, et al. 2007). Per Kemp et al. (2007), key problems challenging the sustainable management of societal and environmental change are dissent, distributed control, short term steps, lock in, and political myopia. The current conditions in Madre de Dios exemplify these problems: people's perspectives and solutions differ; different visions for the region are expressed by different stakeholders; there are few short terms goals to achieve long term sustainability; the formalization policy for mining has

created an unsustainable use of resources; short political periods for government officials detracts from innovative and radical changes. To overcome such barriers, transition management calls for restructuring policies into three niches: science, innovative, and sector, as well as organizing multi-level governance systems: strategic, tactical, and operational (Kemp, et al. 2007).

Considerable attention should be paid to reducing the vulnerability of those stakeholders directly impacted by the current social and environmental conditions - by building and strengthening community capacity and expanding their ability to address current socio-enviro-economic problems (Downs et al., 2017; Downs, 2001; 2000). To achieve multi-level governance systems increasing socio-technical and knowledge integration capacity is necessary. Expanding, Downs (2001) six-level capacity building framework to enable SD includes: 1) strengthening financial and political seed capital; 2) education, training and public awareness-raising; 3) information resources; 4) policy and decision making; 5) basic infrastructure and appropriate technologies; and 6) strengthening the local and regional markets for products and services that support SD. Gaps in these six levels have been expressed by the stakeholders involved in this research, with ideas on how to fill them that come from them. The pursuit of SD in Madre de Dios will be challenging as the goal, defined by Folke et al. (2002), is to create and maintain prosperous social, economic, and ecological systems. Bridging the gaps between conflicting stakeholder relationships is a necessary component towards achieving multi-level institutions and SD (Bebbington & Bury, 2009).

5 Conclusion and Recommendations

The path of *un*sustainable development in the illegal gold mining area of Madre de Dios -

from both an environmental and social perspective - is given substance, meaning and nuance by stakeholder narratives garnered in the field. Above all, they emphasize the need for greater collaboration among stakeholders at all stages and scales of decision-making processes about development – from needs and design through assessment, planning, implementation and monitoring. Stakeholder engagement processes, such as co-production of knowledge and transitional management offer some practical tools in this regard. The work is a first step toward a new integrative sustainable development approach, and will add to the knowledge base not only on this case study region, but to broader sustainable development practices elsewhere.

Below are recommendations by stakeholder on further engagement practices and capacity building efforts:

Government:

- Distribute resources to develop multi-level systems of governance that deal with necessary components of SD, including: stakeholder engagement, technology innovation, capacity building, and networking.
- Invite NGOs and local communities to become working partners, by enabling them to collect necessary data in the field and generate reports. Partner to generate maps and assess baseline social and ecological conditions.
- Fund sustainable projects that serve local and regional social, economic and ecological goals, that recognize the interactions among sectors like health, energy, industry, water, food, and education.
- Capacity building**:** Implement multi-level governance systems to co-produce knowledge and make decisions. Transparently and collaboratively pursue sustainable mining options,

e.g. mining wastewater treatment facilities, and ‘clean mining’ technologies.

NGOs:

- Provide longer funding periods to allow for social relationship- and trust-building with local communities. Network with other NGOs with shared goals and projects for the region.
- Re-frame conservation and sustainability to include rather than exclude human sectors. For example: Develop innovative ways in which people work in harmony with their environment, e.g. holistic and cosmetic products from the forest, eco-tourism, and agro-forestry.
- Provide seed funds and capacity building assistance to empower local communities to apply for government funding that support local and regional projects.
- Capacity building: Become an integrator for capacity building efforts among diverse stakeholders in the multiple domains articulated above.

Local communities:

- Develop civil society groups to reform existing governance systems and partner with NGOs and others.
- Provide local expertise and knowledge on social and ecological needs, priorities and conditions to NGOs and government agencies. Co-produce data and narratives with academic researchers, and disseminate widely via social media.
- Capacity: Be a forceful and willing partner in the capacity building enterprise, as outlined above, in order to muster positive, creative energies that promote shared interests. Partner with universities and educators to garner enabling capacities.

Academic researchers and universities:

- Be proactive as enablers and advocates for social change through collaborative capacity building enterprises at local, regional and national scales.
- Provide technical support and independent oversight of all stages of SD work: From needs and design through assessment, planning, implementation and monitoring.
- Partner with community groups and NGOs to garner independent sources of funding to diversify funding support.
- Be a champion of integrative, inclusive processes that empirical evidence suggests have a greater likelihood of yielding SD outcomes; remain as unbiased and objective as possible.

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Appendix I

Table 3 – List of stakeholders who were interviewed

Interview #	Interviewee	Where
1	Researcher, 5+ years, non-resident	CICRA
2	Researcher, 5+ years, non-resident	CICRA
3	Researcher, 5+ years, resident	CICRA
4	Coordinator NGO, local, resident	CICRA
5	Researcher, 5+ years, non-resident	CICRA
6	Employee NGO, local, resident, past miner worker	CICRA
7	Coordinator NGO, local, resident	CICRA
8	Local, resident, informal conversation	Puerto Maldonado
9	Conservationist, Local, Resident	Puerto Maldonado
10	Regional government, local, resident	Puerto Maldonado
11	President NGO, non-local, resident	Puerto Maldonado
12	Representative mining association, local, resident	Puerto Maldonado
13	Local, resident, Wake Forest University Center	Puerto Maldonado
14	Local environmental municipality, local, resident	Puerto Maldonado
15	NGO, local, resident	Puerto Maldonado
16	Miner, local, resident	Puerto Maldonado
17	International NGO, local, resident	Puerto Maldonado
18	Eco tourism sector, non-local, resident	Puerto Maldonado
19	Lawyer, regional government, local, resident	Puerto Maldonado
20	Indigenous federation, local, resident	Puerto Maldonado
21	National government, local, resident	Puerto Maldonado