Gender silence in social-ecological resilience[1]

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ABSTRACT. *The concept of social-ecological resilience offers a comprehensive framework for understanding the dynamics of human-environment interaction. The literature on resilience indicates that diversity is key to enable the system to cope with and adapt to change. However, more attention has been given to the influence of ecological diversity than to social diversity. Social diversity arises, among other, from the different roles of men and women in society. Yet, despite its importance in generating social diversity, gender is conspicuously absent in the literature on social-ecological resilience. We identify two processes that justify taking into account gender. Firstly, harnessing the diversity of knowledge held by various groups can enhance social learning and thus increase adaptability. Secondly, strengthening inclusiveness in decision-making platforms can reinforce their legitimacy. Both processes highlight issues linked to politics and power, which need to be accounted for if we take the 'social' in social-ecological resilience seriously.*

Keywords: Natural resource management, social structure, social equity, alternative pathways, distribution, politics of knowledge

INTRODUCTION

It is well acknowledged that people play a major role in shaping their environment (O'Brien et al. 2009; Warner 2010). The concept of social-ecological resilience provides an inclusive framework to understand the dynamics of interactions between humans and their natural environment, and allows insights for increasing society's capacity to adapt and cope with changes (Holling 1973, 2004). While recognizing that resilience is dependent on both ecological and social dynamics, the emphasis in much of the literature is on understanding ecological dynamics, and how these are influenced by human activities. These scientific results have much to contribute to our understanding of ecosystem dynamics. However, these insights, in themselves, have only limited impact on human behavior, which is primarily dependent on social processes (Röling 1997). Indeed, human behavior is not primarily driven by objective information, scientific insights or technical rationality (Kaplan 2000). Authors have pointed out the importance of understanding cognitive processes, such as filtering mechanisms, and the interpretation of information (Beratan 2007; Jones et al. 2011). Furthermore, human behavior is substantially shaped by institutions, policies, power, path dependency, and social interaction (Biggs 1995).

There is thus an increased recognition of need to better understand social dynamics, especially the processes which underlie the definition of rules guiding the use of natural resources (Eriksen and Brown 2011; Taylor 2012). In this context, authors have highlighted processes such as social learning, especially in the framework of adaptive management (Westley 2002; Pahl-Wostl et al. 2008; Kofinas 2009). Social learning is a longitudinal process, which frames the understanding of interrelationships between ecological variables and management practices as being dependent on negotiations between social actors.

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To allow exploration and debate, there has been an emphasis on participatory approaches, which allow integrating diverse sources of knowledge as well as contested claims influencing the management of natural resources (Walker et al. 2002; Adger 2003). This integration usually involves debates over which information is relevant and the meaning of this information. Not least because such debates are almost invariably shaped by power relationships, brokering a consensus can be challenging (Bodin et al. 2006; Cleaver and Toner 2006; von Korff et al. 2012). It has also been advanced that for participatory approaches to be successful – i.e. further social learning and enable collective action – a variety of stakeholders need to be involved (Barreteau et al. 2010; Rodima-Taylor 2012). However, the emphasis in 'variety' is often on ensuring participation of a range of social groups, defined by their functions in society, such as policy makers, scientists, administration and users.

In the literature on resilience, only limited attention has been paid to the social structure within the 'users'. Indeed, often there seems to be an implicit assumption that communities are homogeneous and norm-bound. This fails to takes into account the fact that not all users have the same status, and thus not the same ability to participate in debates and influence choices (Leach et al. 1999; Scoones 1999). This status is linked to the social structure, which is often tied to criteria such as gender, age, wealth or ethnicity. Each subgroup within the users is characterized by specific responsibilities, norms and roles. In communities that directly depend on natural resources for their livelihood, these roles also define their interactions with natural resources and thus the knowledge they have about them. The social structure within a community of users is thus a factor that may have substantial influence on social dynamics, i.e. on whether and how management practices are adapted over time, thus affecting the resilience of social-ecological systems.

In this paper we focus on the social diversity arising from gendered roles. To illustrate how gender-based social dynamics can affect the management of natural resources, we focus on communities whose livelihoods are based primarily on the use of local natural resources. We base our synthesis on evidence published in the literature on gender and the management of natural resources, such as forests and water. We also use evidence from a case study on the management of a communal grazing land in Ethiopia (see Aregu 2014).

We argue that gender-based differences can influence the resilience of the social-ecological system in at least two ways. Firstly, as a result of the on-going interaction with the natural resources they depend upon, men and women tend to have different knowledge. Yet, the value of this diversity is rarely recognized and thus not harnessed. Secondly, the exclusion of one social group from active participation in institutions that govern the natural resources may lead to their needs being neglected. This may lead to a loss of legitimacy of the institutions and to rules being subverted. Both processes can reduce the effectiveness and adaptive capacity of a management system and thus the resilience of the social-ecological system.

GENDERED KNOWLEDGE

Difference in knowledge about natural resources

Ecological knowledge, which is a key component linking the social and ecological system, is acquired through the process of on-going and close observation by specific groups of users (Berkes and Folke 2002; Folke 2004). Building on social roles, different social groups will

interact with specific natural resources. This interaction is shaped by the responsibilities and roles they have in the society, roles which tend to be defined by gender (Rocheleau 1997; Agarwal 2009). Thus men and women acquire ecological knowledge, e.g. on the relative abundance of certain species, their regrowth rates, the seasonal management measures needed to ensure sustainable use.

As a result, men and women have both shared and distinct knowledge about the use and management of the natural resources essential to their livelihoods. For example, given that women are in charge of collecting fuelwood for cooking, as well as branches and grasses for feeding cattle (Agarwal 1997), women in India have more knowledge than men about trees regarding their use for energy and fodder (Agarwal 2001). Another study in South Africa pointed out that middle-aged women tend to be highly knowledgeable about woody plant species for fuelwood and beverages, while men do have more knowledge on tree species for medicine, craft and fencing (Dovie et al. 2008). Evidence from Nepal indicates that women have more knowledge on water quality, reliability and acceptable storage methods (Upadhyay 2005).

This diversity in knowledge is a valuable resource, especially in times of change, when it can be used to learn, cope with and adapt to change. As such, this knowledge is not only relevant for current uses, but can inform monitoring activities (Dovie et al. 2008), allowing for early detection of change in pressures in the ecological system. Indeed, resilience is often associated with diversity of knowledge, as it contains the seeds that encourage both adaptation and learning when coping with changes (Folke et al. 2002; Holling 2004; Chapin et al. 2009). The differing knowledge held by different social groups will broaden the collective knowledge base, thus enhance social learning and increase the capacity of the system for innovation (Leach et al. 1999; Folke et al. 2005). For example, to cope with prolonged drought, communities in India have built on women's knowledge about the nutritional and medicinal properties of specific plants, roots and trees (Agarwal 1997).

Challenges in harnessing the diversity for adaptation

Ideally, to allow for social learning and adaptation, this knowledge would be pooled so that management choices can be made based on all relevant ecological knowledge. This implies that gender is recognized as a source of diversity, and that measures are taken to ensure that the knowledge is effectively shared within the community, not least by valuing women's and men's knowledge and management suggestions equally. Should such measures not be taken, the process is 'gender blind'. Then social norms often lead to women being excluded from discursive processes where observations are shared, and from decision-making processes, where management rules are set. In other words: gender blind processes, through not countering social norms, tend to miss an important source of variability. This reduces the generation of novelty and limits the adaptive capacity of the social-ecological system.

Indeed, gender-related barriers frequently impede the open participation of women in platforms that ensure an effective pooling of knowledge and allow for integrative social learning. In many societies, gender tends to shape the level of involvement in the public sphere, i.e. involvement in managing community affairs. This limits their participation, esp. in formal institutions where observed changes in natural resources are discussed, management options are weighted and rules decided upon. A well-documented example of this process is the management of community forests, where women are either barely represented, or if present tend not to be able to make their needs and priorities heard (Agarwal 2001; Cornwall 2003). This is linked to men questioning women's capabilities, the

absence of a critical mass of women in the management committees, and the lack of public speaking experience by women (Agarwal 1997; Giri and Darnhofer 2010; S1).

This indicates that gender-based social structures preempt the open exchange of knowledge, highlighting the issue of power, which determines whose reality counts, whose voices are heard, and whose knowledge is valued (Cornwall 2003; Cote and Nightingale 2012). Thus, unless institutional arrangements encourage inclusion, and ensure that all are empowered to voice their ideas, there may be delays in the awareness of changes in needs or in the ecosystem, less diversity in the potential solutions discussed, and thus an impoverished experimentation with adaptive measures. Indeed, participation affects the adaptive capacity through influencing selection, communication, and implementation of potential solutions in the management of natural resources (Chapin et al. 2009; Ebbesson 2010).

GENDERED NEEDS

Gendered roles lead to gendered needs

To fulfill their roles men and women tend to have different needs regarding natural resources (Reeves and Baden 2000). As a result, they are likely to prioritize different species, have different temporal preferences, and favor different management rules. For example, in the use and management of forest resources women are interested in and collect forest products such as fuelwood for cooking or branches and grasses for feeding cattle, while men are interested in timber to raise cash for the household (Agarwal 1997). Similarly, the case study of communal grazing land in Ethiopia men are in charge of plowing fields using oxen and thus prioritize them, while women are in charge of ensuring the daily food supply for the family, which is partly composed of milk and dairy products, and thus prioritize the adequate feeding of lactating cows. Also, women are responsible to craft household items made from specific grasses that grow in the communal grazing land, yet are not allowed to harvest them there. Thus in both cases, women's needs are not taken into account, which can lead to resentment. For example a key informant pointed out that she feels the current arrangement is one-sided: "Even though oxen are important for our family, especially for crop cultivation and what we are going to eat, still cows should not be neglected in grazing: cows are also important so we have milk for our children, income from butter for us [women] and the future oxen for the whole family."

Social differences thus tend to be linked to power, i.e. the ability to make one's needs known and to influence management choices. Women tend to have limited power in the decision making process through which rules guiding the use of resources, their monitoring and benefit distribution are decided (Agarwal 2000, 2001). Indeed, since women are either not members of management committees, or social norms prevent them from voicing their concerns and their proposals for rules against the preferences of men, women's needs are often not taken into account (Cornwall 2003). The lack of participation also means that there are no open discussions and thus no transparency in the trade-offs in costs and benefits underling the management rules. Yet alternative options involve different interests and values, and imply significantly different winners and losers, opportunities and risks.

Not taking women's needs and perspective into consideration, may lead to benefits and costs related to the use of the natural resource to be unevenly distributed by gender. For example in a community forest regeneration program, the forest was closed to enable regeneration. As a result, women had to travel over longer distances for firewood, yet were excluded from

sharing the benefits (Agarwal 2001). Such unequal distribution of costs and benefits was also noted by Barnett and O'Neill (2010): although adaptation interventions are benefiting the interest of some users, they may well adversely distress vulnerable groups and thus create or reinforce social inequity.

Exclusion may undermine legitimacy

Community institutions may thus well reproduce existing inequalities of wealth and power, as some people are better placed to negotiate rules, and their status may give them more authority (Cleaver and Toner 2006). As such people are differently placed to participate in institutional arrangements and to benefit from the outcomes of community management. Yet, if rules lead to a distribution of cost and benefit distributions among users that is perceived as unfair, the legitimacy of institutions is likely to be undermined (Agarwal 1997; Leach et al. 1999). Unfair cost and benefit sharing will especially discourage the marginalized group of users to comply with the management rules and obligations. Andersson and Agrawal (2011) confirmed that inequality between groups of users generates social resentment and disincentives, leading to breaking the legitimacy of the rules-in-use and unsustainable use of natural resources.

Ample empirical evidence shows that as women are not involved in the process of framing rules, their needs are not adequately taken into account, which may leave them little choice but to break rules to fulfill their social roles. For example, case studies show that even after the regenerated forests were opened, poor women could not get access to grass and fuelwood, due to lack of cash to cover the cost of access rights, and lack of entitlement. Consequently women who illegally collected fuelwood and grasses from the protected community forest accounted for 70-80% of the rule violations (Agarwal 2000, 2001). If left with no choice to cover their subsistence needs, marginalized groups will subvert rules-in-use and may thus undermine the resilience of the social-ecological system by perpetuating unsustainable resource use.

These examples show that the degree and quality of involvement of marginalized groups such as women in decision-making is a key criteria for the efficiency of natural resource management (Agarwal 2009; Chapin et al. 2009). Pahl-Wostl et al. (2008) stated that social learning in the context of social-ecological systems requires the development of new relational capacities between social agents, i.e. learning how to collaborate and understand others' roles and capacities. Indeed, the quality of the social learning process are dependent on the inclusiveness and meaningful participation of all users groups. Unless all user groups are equally involved in defining the rules guiding the management of natural resources, it is likely that the needs and preferences of some powerful users will be served, at the expense of marginalized users (Maryudi 2012). Such bias based on social structure and power is likely to lead to ineffective natural resources management due to non-compliance and resistance, thus reducing the resilience of social-ecological system.

DISCUSSION: WHY GENDER BLINDNESS MAY REDUCE RESILIENCE

Especially in communities that are directly dependent on a natural resource, gendered roles in society lead to gendered knowledge through familiarity with specific species and specific properties and uses of those species. Changes that negatively impact e.g. the relative abundance of these species, or monitoring of indicator species, are thus likely to have a gender component.

From an ecological view-point the argument can be made, that including women's is only relevant if women systematically have 'better' knowledge than men about how their social-ecological system functions. While there is ample empirical evidence to show that women tend to have different knowledge than men, this does not imply that women systematically – i.e. in every context, for all resources – have 'better' knowledge. It is more likely that in most contexts, their knowledge will be complementary. Thus excluding women, or not giving them voice on platforms in which knowledge is shared and decisions taken, implies that potentially relevant information will not be heard and cannot be taken into account. Cutting out certain groups deprives the community not only of their knowledge, but also of their ideas and creativity. This means that some interdependencies or impacts will not be considered, some management approaches not considered. Yet an impoverished knowledge base can reduce the capacity for innovation and renewal (Folke et al. 2005). Indeed, diversity is an important element to strengthen the capacity of the system to cope with and adapt to changes through renewal and reorganization after disturbances (Holling 2004; Chapin et al. 2009). However, despite its importance in shaping users' knowledge, experiences and perceptions in the management of natural resources, the gender dimension is noticeably absent in the literature on social-ecological resilience.

It can be argued that having better information does not necessarily lead to better decisions, i.e. decisions that enhance the resilience of the social-ecological system. Indeed, including more stakeholders and more viewpoints tends to make it more difficult to reach a consensus. Yet, this argument applies equally to all participative processes and to deliberative governance approaches and does not justify ignoring women's knowledge. Furthermore, how rules are defined and adapted affects resilience, as it affects the degree of social trust, the distributive justice, and the legitimacy of rules and institutions (Ebbesson 2010). We thus argue that including women and other marginalized groups in the process of defining and adapting management and use rules is necessary to achieve resilience, even if they are not sufficient in themselves. Rather, they serve to enhance the likelihood that choices that foster resilience are made.

Furthermore, we do not intend to imply that women necessarily manage natural resources in a more sustainable way, as this outcome is dependent on a range of contextual factors that women may not be in a position to influence (Agarwal 2009; Mwangi et al. 2011). Rather, shedding light on gender, sheds light on a range of issues linked to power; especially the power to define whose knowledge counts. Indeed, an ecosystem or a natural resource cannot speak for itself, somebody needs to argue in its place. This discourse necessarily favours one viewpoint over other potential viewpoints, promoting one course of action over other potential courses of action. Any discussion about the best course of action is thus necessarily mired in the politics of knowledge. There is always a debate about whose reality counts, thus the question of power linked to whose voices are heard, and whose knowledge is valued (Cornwall 2003; Cote and Nightingale 2012). Turning a blind eye on gender issues is linked to ignoring tensions and conflicts in a community, and to underestimating the impact of

discursive and exclusionary power. These processes are not only gendered, but also gendering, thus perpetuating roles and values (Davidson and Stratford 2007). Thus, structuring adaptive management processes without sensitivity for social structure may well contribute to perpetuating the exclusion of some of the ecological knowledge present in the community, thereby reducing the resilience of the social-ecological system.

A strength of the social-ecological resilience framework is that it has allowed to highlight the feedbacks, close interactions and interdependencies between social and ecological systems. Thus, emphasizing either social or ecological processes at the cost of the other is short-sighted and creates a fruitless dichotomy. As with inclusive and sustainable development pathways, it can be argued that when managing for resilience choices should take into account both ecological and social boundaries.

Excluding the knowledge of women not only limits the number of management options perceived and discussed, it also risks undermining the legitimacy of the selected options. Integrating marginalized women in a meaningful way would allow the community to take into account their needs, to benefit from their ideas. The resulting discussion regarding different possible options would acknowledge that each has a differential impact on different groups in society, making it important to clarify who is likely to benefit from a particular option and who is likely to be negatively affected (Stirling 2009).

Promoting open and inclusive governance processes will also fuel adaptive management by adjusting management measures not only to changes in the ecosystem, but also to those occurring in the social system. Indeed, in a context driven by rapid and often unpredictable change, it is no longer sufficient to identify a suitable management system, this management system needs to be able to adapt and transform. These change processes are often linked to the perceived fairness in the distribution of costs and benefits among groups of users. Taking into account social justice issues is thus a key aspect of sustainability and resilient management of natural resources (Eriksen and Brown 2011; Wuelser et al. 2012).

While focusing our argument on gender, we do not mean to imply that other sources of social diversity, e.g. age, wealth, ethnicity, are of lesser relevance, since they too affect the locus of experiential knowledge, and whether it is available to the broader community and integrated in management choices. Similarly, while we have emphasized instrumental reasons to promote women's meaningful inclusion, we do not mean this to indicate that ethical reasons are of lesser importance.

The primary aim of this paper is thus to highlight the need to increase the awareness of social structure as a rich source of diversity in ideas and knowledge, but also of tension and power struggles. We acknowledge the complexities and challenges involved in balancing diverse needs and in negotiating trade-offs, so that all members of the community perceive management choices as appropriate and legitimate. We highlight the need to better understand the complexity of the social processes that underlie social learning and that fuel change in how natural resources are managed. In other words: while a better understanding of ecological dynamics is clearly important to ensure the resilience of social-ecological systems, so is a better understanding of social dynamics.

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