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The Role of Trust in Natural Resource Management Conflicts: A Forestry Case Study from Germany

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Managing forest use conflicts between different stakeholders is an important part of participatory forest management at the local level. Trust is thought to be an important factor in conflict management. We examined how stakeholders at a local level perceive the role of trust in the development and management of natural resource conflicts. Aggregating data from 24 qualitative semistructured interviews conducted in the German state of Lower Saxony, a conceptual model is proposed that consists of 12 factors that are perceived by the study participants to interact with the relationship between trust and conflict. On the basis of this conceptual model, we provide practical insight for forest managers about how trust can be created and maintained by those involved in participatory forest management.

Keywords: conflict management, participation, sustainable forest management, stakeholder, trust model

Understanding preconditions for successful conflict management is of great relevance to forest managers and policy-makers interested in using participatory decisionmaking as a forest management method (Thompson et al. 2004, Sheppard 2005). Participatory forest management is a "process of involving, in decisionmaking and implementation, stakeholders who will be affected by the decisions made" (Idrissou et al. 2011, p. 526). Factors that play a role in creating, managing, and resolving forest conflicts are of particular interest (Leahy and Anderson 2008, 2010, Brown and Reed 2009, Lachapelle and McCool 2012). In participatory natural resource management, Carr (1998) argues that the importance of trust cannot be overstated. Senecah (2004) stresses this point by suggesting that all of the literature on effective participatory processes can be condensed to issues of trust whereas Newig et al. (2017), who review several causal mechanisms linking participation with environmental outcomes, identify trust as an important but not universally relevant conditioning variable. There is increased interest in and attention to participatory planning legitimacy (e.g., Newig 2012) and the role of trust in these processes (e.g., Tuler and Webler 1999, Leach and Sabatier 2005, Baskent et al. 2008, Laurian 2009, Menzel et al. 2013, Smith et al. 2013a, 2013b, Marcus 2016). Leach and Sabatier (2005) found a positive relationship between trust and the level of agreement, suggesting that trust is related to a group's ability to reach a durable decision.

Forestry is an ideal setting for trust research in participatory management because forest management decisions can be a source of intense conflict among stakeholder groups (Tuler and Webler 1999, Thompson et al. 2004, Evans et al. 2010). In the context of this study, stakeholders of forest management are defined "as actors who are affected by the issue, or who- because of their position- have or could have an active or passive influence on the decisionmaking and implementation processes" (Brugha and Varvasovsky 2000, p. 341). How stakeholders understand the relationship between trust and conflict based on their own experiences and observations is not well understood. Participatory forest management and effective conflict management strategies can be improved by understanding the development of sources of conflict.

Furthermore, there is a need for more qualitative work examining long-term stakeholder relationships to better understand the practical implications of trust and conflict in forest management. To address these issues, we examine the relationship between trust and conflict as understood by stakeholders involved in participatory forest management at a local level in Germany. Studies have

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primarily focused on the United States (e.g., Winter et al. 2004, Selin et al. 2007), and there are additional insights to be gained from studying trust in other forest management contexts.

We provide empirical insight into how forest managers and policymakers, involved in participatory forest management, can create and maintain trust. By asking participants to discuss their forest management experiences with trust and conflict, we create a model that elucidates the development of trust and its relation to conflict.

Theoretical Background

Participation in forest management allows those affected by a decision to influence the process through communication among participants (Newig and Kvarda 2012, Lynn 2013). Within participatory forest management, there are different levels of public involvement and influence on decisionmaking (Sheppard 2005), and trust plays an important role (e.g., Abbas et al. 2014). However, if stakeholders with adversarial or competing interests are asked to work together, conflicts may arise. Our research addresses a gap in the literature to understand the perceptions of stakeholders about the role of trust in managing conflict and the factors affecting the relationship of trust and conflict.

Conceptualizing Trust and Conflict

Abstract concepts such as trust are important to understand because they affect the everyday lives of those engaged in forest management. A definition proposed by Rousseau et al. (1998) posits that trust is "a psychological state comprising the intention to accept vulnerability based on the positive expectations of the intentions or behavior of another" (p. 395). In contrast, distrust describes "a lack of confidence in the other, a concern that the other may act so as to harm one, that he does not care about one's welfare or intends to act harmfully, or is hostile" (Kramer 1999, p. 587). Both trust and distrust are complex psychological states that have several different sources (Kramer 1999), and trust is a key issue in forest management (Marcus 2016).

There are competing economic, social, and conservation interests that must be considered when making decisions about how to sustainably manage a forest. With such diverse interests, the potential for disagreements about forest management is high. If disagreements exist alongside distrust, then the result can often be an unwillingness to compromise, defensiveness, and a desire to "win" an argument (Lewicki and Wiethoff 2000). In this context, conflict between different interests becomes negative. This study followed the conflict definition provided by the Food and Agricultural Organization of the United Nations as, "disagreements and disputes over access to, and control and use of, natural resources" (Matiru 2000, p. 1). Environmental issues are particularly susceptible to conflict because opinions about natural resources are commonly value based (Brown and Reed 2009, Gritten and Saastamoinen 2010). Values are typically associated with identity, and having that value challenged can feel personal; thus, individuals can develop a conflict (Putnam and Wondolleck 2003). Differing values can act as a barrier for conflict resolution (Gritten and Saastamoinen 2010). Conversely, shared values and respect for differing values increases manageability of conflicts because those factors enable stakeholders to debate interests rather than individual values (Fisher and Ury 1999). Identification of shared values and acknowledgment of differing values provides a basis for relating to one another, increasing the likelihood that trust can be built (Davenport et al., 2007a, 2007b, Leahy and Anderson 2008).

Successful regulation of conflict can have a positive effect on levels of trust. Beierle and Konisky (2000) found that the process of constructive debate in participatory environmental planning increased feelings of goodwill and increased awareness and understanding of others' perspectives. Thus, we refer specifically to conflict management as a necessary ingredient to avoid escalation to an unproductive situation characterized by defensiveness and distrust.

The Role of Trust in Conflict Management

Davidson et al. (2004) examined the relationship between trust and conflict and found that, in high-trust situations, involved parties were more likely to use cooperative negotiation strategies and less likely to use uncooperative strategies such as avoiding and dominating. They found that trust mitigates risk perceptions of "losing face" or being taken advantage of in the interaction. Thus, fewer resources are spent trying to mitigate this risk, and these resources can then be spent on finding a solution to the issue at hand. Ayoko

Management and Policy Implications

The results of this study have several implications for forest managers who are interested in implementing participatory forest management. Contextual factors play an important role in creating an environment where stakeholders can establish trust. However, it is also important to point out that initial levels of trust merely reflect a starting point. Practically speaking, it is important to be aware of these factors for determining how stakeholders might feel about one another to design the process accordingly. Boundary-spanning agents are particularly useful because they are personally involved in more than one stakeholder group and can understand differing perspectives. Thus, the participation of stakeholders in participatory forest management who are boundary-spanning agents should be actively encouraged by forest managers. Forest managers can create opportunities for interaction (for example, through establishment of regular round-table meetings with a skilled facilitator). Through interaction, stakeholders are able to create a clearer picture of their peers through communication and trust can be built. Adequate time and opportunity can be given to relevant stakeholders to discuss problems with one another, and clear communication about how a decision will be reached can be provided by forest managers. Decisionmaking processes should be designed in a way that is perceived as legitimate. Stakeholders should be encouraged to be actively involved in forestry. For example, forest managers might schedule events related to education (e.g., a "work in the forest day" in the local forest with volunteers or a day in which local residents get the opportunity to harvest timber for their own domestic heating use). When stakeholders are educated about the forest and its uses, they are more likely to become actively involved; the more they become active, the more things they will learn about the forest. In addition, active involvement in forestry and forest-related education appear to be important for creating shared forest values, or at least in creating respect for differing forest values. Thus, forestry education for children and adults is recommended via forest workers or foresters. Shared values and respect for differing values increases manageability of conflicts because those factors enable stakeholders to debate interests rather than individual values. Mutual understanding and respect for differing interests and values can be increased if stakeholders participate in the activities of other stakeholders. Thus, we recommend collaborative involvement of stakeholders in as many different forest activities as possible.

Table 1. Interests represented in interviews.

Actors	Number of interviews
Governmental actors	
Politicians of environment committee	5
Ministry of forestry	1
State forest service	2
Local chamber of agriculture	1
County association	1
Town forestry office	1
Local nature conservation authority	1
Planning authority	1
Nongovernmental actors	
Environmental and nature conservation groups	4
Leader of a local hiking organization	1
Member of a local outdoor sporting group	1
Forestry owner association	1
Renewable energy business	1
Timber trade business	1
Private forest owner	2
Total	24

and Pekerti (2008) also found an inverse relationship between trust and conflict intensity, which suggests that the presence of trust has an attenuating impact on conflict intensity. In a meta-analysis examining the influence of trust in cooperative situations characterized by conflict, McEvily et al. (2006) found that when there are strong conflicting interests, trust becomes particularly important. In a supporting study, Carr (1988) proposed that the presence of trust increased one's willingness to take risks when using collaborative methods of public forest management, emphasizing that to collaborate successfully, one must look beyond their own desires and consider things from another perspective, which involves risk. When trust is present, there is opportunity to develop social bonds and shared commitments, and these bonds can encourage open and honest interactions (Lijeblad et al. 2009).

Different factors relate to levels of trust between stakeholders. Cheng and Daniels (2005) found that, at least initially, in-group membership can greatly affect others' perceptions. Robinson et al. (2011) showed that group organization relies heavily on individuals skilled at uniting people. Furthermore, the presence of a skilled facilitator may be useful for encouraging stakeholders who have previously felt marginalized (Evans et al. 2010). The behaviors and actions of stakeholders, and how these are perceived by other stakeholders, matter a great deal in producing successful outcomes from participatory management (Tuler and Webler 1999, Smith and McDonough 2001, Lachapelle and McCool 2012). Individuals with strong connections are pivotal in bringing people with different ideological backgrounds together, as demonstrated by Robinson (1996).

Communication has been identified as a central factor in the relationship between trust and conflict by many studies (e.g., Wagner and Fernandez-Gimenez 2008). Communication created opportunities to understand differing perspectives (Beierle and Konisky 2000), to identify shared values, and to gain a better understanding of the reasons behind differing values (Beierle and Konisky 2000). However, communication between conflicting participants can also develop into endless repetitions of positions instead of constructive work on conflict resolution (Fisher and Ury 1999).

Furthermore, Mannigel (2008) argues that having the opportunity for participation increases perceptions of transparency by increasing awareness and understanding and that participation also creates the opportunity for stakeholders to be educated on more technical aspects of natural resources (Evans et al. 2010). Smith and McDonough (2001) found that perceptions of fairness are important for trust-building. Ensuring that decisions are made fairly and transparently through consideration of the needs and wishes of all relevant stakeholders encourages participation because stakeholders see that their contributions are valued (Tuler and Webler 1999). The literature demonstrates a relationship between trust and conflict; however, the lack of a comprehensive model describing how stakeholders in forest management understand the relationship between trust and conflict hinders making trust a more practical and applicable concept in participatory forest management.

Method

We conducted a qualitative case study, based on a single-case design (Yin 2014), in the German state of Lower Saxony. The study focused on two neighboring districts that rely on forests as a part of their local economy. We selected these two districts because they represent mostly rural areas with high forest cover and offer conditions typically found in rural, forested regions of Germany. In the area, forest management goals are a balanced combination of timber production, recreational opportunities, and nature conservation. Former and existing disagreements about forest use and management at the time of conducting the interviews were largely based on conflicting priorities between recreational forest users and forestry. Other conflicts at that time existed between conservation groups and forestry related to harvest-level intensities and specific forest management issues, such as tree species choice, management of nature conservation areas, or wind turbine construction. In the 1990s, several forms of participatory forest management were established. Regular round-table meetings to foster communication among forestry authorities, local communities, and interest groups were implemented in the area. Furthermore, regular communication with local citizens takes place; for example, information about planned harvesting measures and applied forest management strategies are provided by forest authorities.

Twenty-four qualitative, semistructured interviews (Glesne 2006) were conducted with various forest-related stakeholders and decisionmakers (Table 1). Initially, important stakeholders for participatory forest management in the area such as local foresters, forest owners, representatives of local forestry or timber companies, and members of local nature conservation or forest-related recreational groups were contacted. Further interviewees were identified using a network sampling method (Bagheri and Saadati 2015) to identify further interviewees, in which we asked interviewees to identify other stakeholders in the region involved in forest use and management. We also interviewed state-level stakeholders to gain a broad perspective of the relationship between trust and forest conflicts within Lower Saxony. The sampling was considered complete when interviewees suggested no further additional organizations or key stakeholders. Data saturation was evaluated using two criteria: a lack of new participants recommended through the network sampling approach and a repetition of data, themes, and codes (Fusch and Ness 2015). This method of stakeholder identification ensured that in the sample selection we considered all relevant stakeholders engaged in forest use and management in the area. Most interviewees had been active in forest management in the area for many years. For example, the town forester had been in place for more

than 20 years, and a second-generation local timber company was operating in the area. Thus, the interviews illustrate the participants' experiences with the development of the relationship between trust and conflict in the area over a long period of time.

We conducted the interviews in German following a common interview guide that probed interviewees' knowledge and experiences. Interviews focused on local conflicts related to forest area use and management, experiences with participatory forest management in the area, the role and meaning of trust in conflict management, and on sources of trust among different stakeholders interested in forest management. For example, we asked interviewees about previous conflicts in the area and, based on their own observations and perceptions, which factors and actions contributed to the mediation of conflicts. We recorded and later transcribed each interview. We conducted the analysis and constructed the model in German, and only example quotations were translated into English.

We used a grounded theory approach (Glaser and Strauss 1967, Charmaz 2014) and MAXQDA software (Verbi GmbH, Berlin, Germany) to analyze the data. To give the interview material its initial structure, we used an interview guide to create broad categories (e.g., experiences in previous conflicts, sources of trust, and experiences with participatory forest management). However, we did not use a theory-driven system with deductively derived categories to analyze the data. Instead, we inductively developed categories from the interviews through an iterative, bottom-up process of coding and data aggregation. We used memos to prestructure the interviewees' concepts and to develop additional categories (Glaser and Strauss 1967, Charmaz 2014). Finally, we identified factors that contributed to the development of trust and conflict as understood by interviewees. On the basis of these factors, we developed a conceptual model to demonstrate the relationships among identified factors, trust, and conflict.

We conducted a two-step approach to ensure intercoder reliability (Lavrakas 2008). The first step was an in-depth discussion related to the translation and meaning of quotes from German to English. Two authors, a native English speaker and a native German speaker, collaboratively translated the example quotes. The process included in-depth discussions between the two authors about colloquial text translations to ensure accuracy. The second step to ensure intercoder reliability was code-matching work by a US-based research laboratory group with the translated quotations. The laboratory members assigned the translated quotations to the codes of the coding scheme that had been developed at the end of the analysis.

Results

Conceptualized Trust

The interviews confirmed that trust is, indeed, a highly abstract construct. Although almost every interviewee agreed that trust matters, interviewees found it difficult to succinctly define trust. Trust and trust sources were not clearly distinguished by interviewees, which made it difficult to analytically evaluate the concept of trust.

Nevertheless, we identified two primary perceptions of interviewee trust. These perceptions best matched Sako (2000), who distinguished between "types" of trust including competence and goodwill trust. "Competence trust requires a shared understanding of professional conduct… Goodwill trust can only exist when there is consensus on the principle of fairness" (p. 89). The relationship between forest authorities and the local population was often described as being characterized by trust in the competence of local forest administrators: "The citizen trusts a forester in his uniform … they have the feeling he is somebody who is responsible and that he will do everything correctly" (owner of a timber company). A forester provided an example that related to the idea of goodwill trust:

> If we work in protected areas, we assure the local nature conservation authority that we will stick to existing rules. This requires trust because they cannot come around every day to control us. They let us do our work. And if they came after 14 days and we had not stuck to what we said, they couldn't do anything to change it. Trust is important; I think we justify their trust because we stick to agreements. This is the foundation of our cooperation—that they can trust in what we are saying (forester of small-scale privately owned forests).

Although some interviewees referred to both trust dimensions when asked to describe how they understand trust, most referred either to competence trust or to goodwill trust. Definitions related to goodwill trust dominated interviewee responses. Interviewees explained that trust is a precondition for all human interaction and thus also for participatory forest management. An employee of the Ministry of Forestry stated that without trust there would be no open discussion or exchange of information, and cooperation between stakeholders would be impossible.

Conceptualized Conflict

Interviewees provided many examples of forest management conflicts in the area to illustrate what they mean when talking about conflict. Most interviewees perceived disagreements about the priorities of forest management. The degree to which nature conservation and recreationalists' interests should be taken into account was the most important conflict. Interviewees described different levels of conflict, ranging from mere disagreements to violent escalations. Although participants considered disagreements about contradicting forest management interests to be normal, conflict escalation was considered negative and should be avoided. For example, an employee of a local forestry nongovernment organization explained his understanding of conflicts with the example of reduced natural regeneration of trees based on mountain biking off roads:

> … the demands on the forest are ever increasing. And when a boundary is crossed, it pops up, usually for economic reasons. For example, … if bikers are speeding cross-country, the [timber] productivity of the forest is reduced (employee of a regional forestry nongovernment organization).

The Relationship between Trust and Conflict

The interviewees perceived trust levels among stakeholders as an important factor in the outcome of participatory forest management. High trust levels could avoid an escalation of disagreements about forest management priorities into a situation characterized by an unconstructive desire to win an argument. Participants perceived that high trust levels increased the likelihood of finding compromises and innovative solutions that served different interests. For example, an interviewee argued, "… if I don't have trust …

Table 2. Contextual factors relevant for trust.

Factors	Definition	Example from interviews
1. In-group membership	Refers to the familiarity that the stakeholders have with one another (e.g., a person who has lived in the village for many years).	"My predecessor worked for almost 40 yr in this forestry office and I have worked in this position for more than 20 yr, continuity is really important in my opinion" (town forestry office).
2. Presence of an actor who acts as a facilitator	Presence of actors who are good at facilitating and mediating between different interests.	"There is a woman in the state forest service [. . .]. It works very well there. [. . .] She found a very good method of cooperation, also with the nature conservation authority; they have a lot of unity" (member of a local outdoor sporting group).
3. Past experiences	Positive and negative experience that might affect an actor's perceptions and judgments of the current situation.	"The politicians planned a road construction through the forest, a big, connected forest ecosystem, and our district is in debt anyway. Thus, we are trying to stop that and we will be successful. We succeeded already 6 yr ago with the same issue. Then, we all worked together and pulled together, hunters, conservationists, forestry, and the endeavor was stopped" (member of a nature conservation group).

Table 3. Stakeholder interaction factors relevant for trust.

Factors	Definition	Example from interviews
4. Presence of boundary-spanning agents	Actor involved in two or more different stakeholder groups who can link different interests.	"Our method of forest management does not conflict with environmental or nature conservation NGOs. On the contrary, the former town forester was member of Friends of the Earth; I am a member of Birdlife. We are totally connected to the environmental NGOs. We work together very openly. Meanwhile in other forestry districts they have a lot of criticism about forest management, we have no conflicts at all with conservationists for 40 yr" (town forestry office).
5. Communication	Dialogue, exchange of ideas, and information flow with other stakeholders about how to best manage a forest.	"Our forest management is nature oriented, but also really open and honest. We harvest old oak trees close to downtown, and we communicate what we are planning to do—that is really important. We invite local citizens to watch harvesting activities, we communicate via the local newspaper, and I give public presentations and guided tours in our town forest. I think all these things contribute to the lack of conflict over forest management in our town" (town forestry office).

Note: NGO, nongovernmental organization.

then a conflict will be characterized by reservations … trust is a basic condition to get anything done … but I think both sides have to work hard to earn this trust" (member of the forest owner association). However, interviewees suggested several factors that are necessary for this relationship to effectively function. These factors strengthened trust when they were successfully used.

Contextual Factors

Contextual factors refer to the general situational environment present before the participatory forest management process begins. The interviews suggested that these factors are typically formed based on experiences and expectations of those involved (Table 2).

Interviewees believed that when participatory forest management is implemented with stakeholders that identifywith each other in some way (in-group membership), they are likely to hold a more trusting attitude. Being an in-group member creates a sense of community that does not exist for stakeholders that have not previously participated in participatory forest management.

When there is a stakeholder present who is a talented facilitator (either formally or informally appointed), the presence of this well-connected individual can be useful in creating a trusting environment. When past experience with other stakeholders has been generally good, the stakeholder is likely to hold a more trusting attitude. Conversely, if the contextual factors include unfamiliar members, a stakeholder who is difficult to work with, or negative past experiences, then it is likely that they will more distrustfully approach the process. Past experience plays an important role in estimating the trustworthiness of others. When stakeholders have had positive experiences with others, they are more inclined to feel that they can trust them in the future. However, negative past experiences may increase perceptions of risk, which decreases willingness to trust. Although these findings suggest that contextual factors play an important role in creating an environment where stakeholders can establish trust, it is also important to point out that initial levels of trust merely reflect a starting point. Practically speaking, it is important to be aware of these factors that influence stakeholders' trust and the potential for conflict and design a participatory process accordingly.

Stakeholder Interaction Factors

When stakeholders have the opportunity to interact with one another, their initial level of trust will increase or decrease based on conclusions they draw from these interactions (Table 3). In participatory forest management, stakeholder interactions are necessary. The interviewees suggested that there are two factors that determine the nature of these interactions: the presence of boundary-spanning agents and communication.

Table 4. Decisionmaking process factors relevant for trust.

Factors	Definition	Example from interviews
6. Procedural justice	Perception that the procedures used to make decisions allow all interests to be equally considered.	"And if you agree to inform the locals, to take them on board, to take their concerns seriously, it usually turns out so that people are ok with the overall concepts. Maybe doing a participatory process for the locals and so on" (employee of a renewable energy business).
7. Participation in decisionmaking	Ability of interested stakeholders to be involved in decisionmaking (e.g., at round tables).	"For the designation of nature reserves we established round-table working groups where interested organizations could participate. That was really a positive experience for us as authorities, because we had time to deal with all the different interests and demands and search for compromises. In the formal designation process you don't have the time to deal, in so much detail, with all the different interests and then you do not get the acceptance. It takes time and energy, but it's worth it for all participants" (local nature conservation authority).
8. Transparency	Refers to the degree of clarity with which decisions are made and how they came to be made.	"We speak openly about the requirements of forest management we have to fulfill. For example, we had our last FSC audit last week, and we also present all these things on information charts. The local residents can also watch when we are harvesting; the people can really share what is going on in the town forest" (town forestry office).

Note: FSC, forest stewardship council.

Table 5. Value-formation factors relevant for trust.

Factors	Definition	Example from interviews
9. Active involvement in forestry	Includes any active use of the forest (e.g., use of self-harvested timber, etc.).	"The citizens take their firewood out of the forest by themselves. They enjoy it, and instead of just giving them the prepared wood, I get the people in the forest so they experience the forest and work there, which helps the people appreciate forests. They bring their kids, who help to get the wood into the car. This has positive effects" (town forestry office).
10. Forest-related education	Refers to the process of learning about forests, forestry, ecosystems, and forest functions.	"The [district] forestry office, they have three forest workers who go into schools, do projects in the schools to create awareness and understanding. This should be supported. I would appreciate it if they could do more of these things" (forestry owner association).
11. Shared forest values	Recognition of a shared understanding about priorities of forest use and management or human-forest ecosystem relation (e.g., the extent of conservation in relation to use intensity).	"Here in our district, we still have a relatively idyllic world, our district is shaped by agricultural production and even the representatives of the nature conservation organizations are reasonable. In a constructive dialogue, we can agree on management guidelines, also together with the forest authorities. In other districts with a more urban population nearby, it's different" (forestry owner association).
12. Respect for differing forest values	Respect for perspectives on forests that are different than one's own understanding about priorities of forest use and human-forest ecosystem relation.	"Geocaching, if you think about that, what kind of hobby is that? On the other hand, if you have 40,000 caches online in Lower Saxony, I cannot say that these people are all mad as a hatter. I do not share the same enjoyment in what they are doing, but I came to the conclusion that the forestry administration has to do something about that. My colleagues said I am crazy to meet with these geocachers, but I reached out to them, and together we developed a paper with recommendations for ecologically sound geocaching in forests" (state forest service employee).

When boundary-spanning agents are present, this encourages communication among groups and stakeholders. Boundary-spanning stakeholders are particularly useful because they are personally involved in more than one stakeholder group and can understand differing perspectives.

Communication is fundamental for creating trust; it is only through communication that stakeholders can get to know the ideas and motives of their peers. Interviewees understood communication as a central factor for successfully managing conflict. One interviewee described his experiences with round-table meetings after they were established in the area by pointing out the importance of learning about the differing perspectives:

> You can learn quite a lot from the perspective of the other participants. We are talking in plain language and say clearly what we don't like, but the way we interact with each other has changed; we talk to each other now. Previously, we had mocked each other in the local media for decades, and had achieved basically nothing. Nowadays we achieve significantly more for the environment (nature conservation organization volunteer).

Interviewees considered communication a central factor in the relationship between trust and conflict. However, we found that constructive communication tended to be supported by a skilled

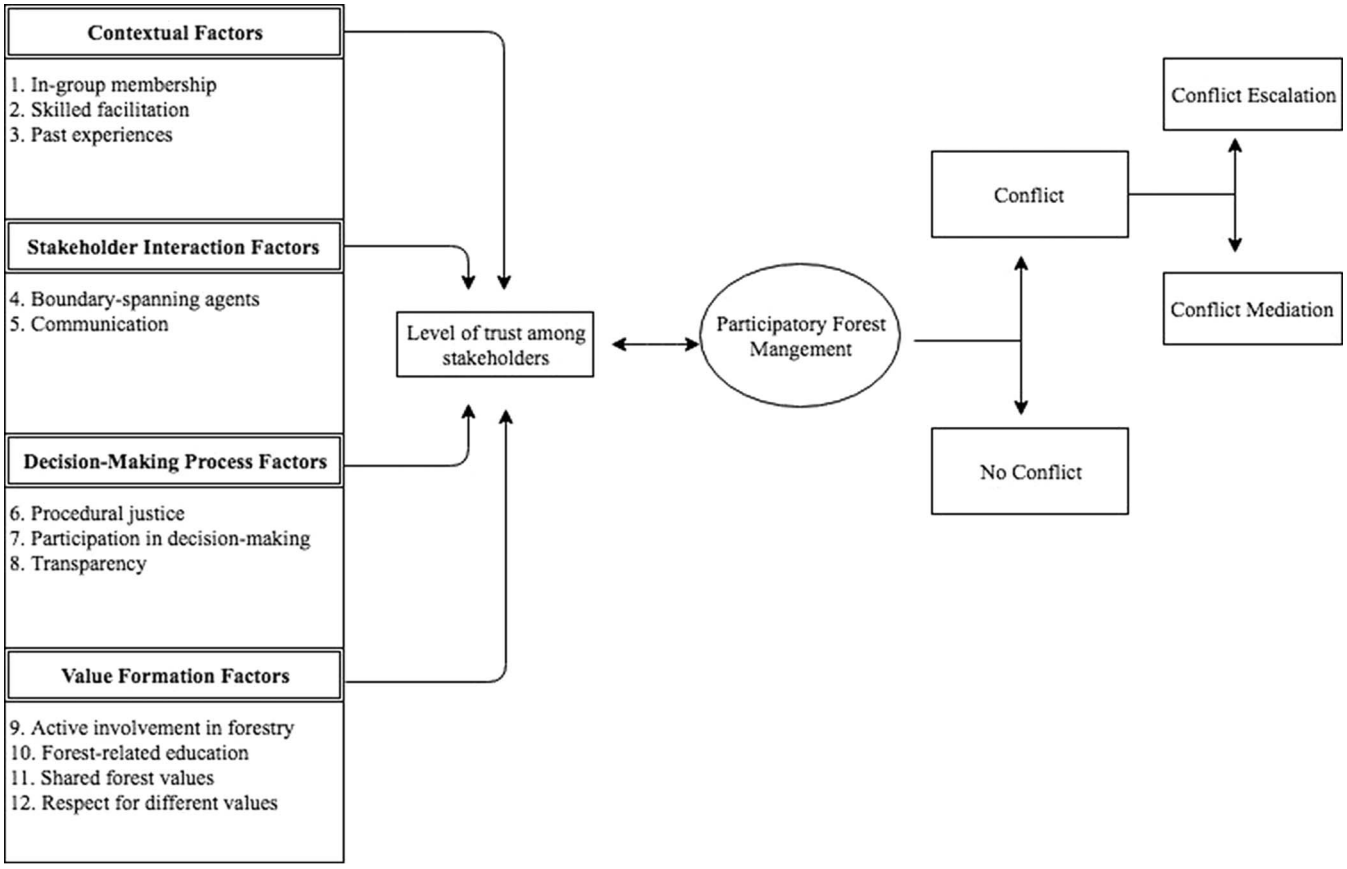

Figure 1. Model on stakeholder understanding of the relationship between trust and conflict.

facilitator or an adequate communication structure to foster trust-building processes.

Decisionmaking Process Factors

Decisionmaking process factors relate to the design and perceptions of stakeholders during the actual decisionmaking process (Table 4). Process structure directly affects the ability of stakeholders to interact with each other, which affects the likelihood of trust building.

Perceptions of procedural justice and the opportunity to participate in decisionmaking were both important factors for creation of trust and feelings of goodwill. Perceptions of transparency played an important role in helping stakeholders understand how a decision was reached and how input was used. Thus, it appears that when adequate opportunity to participate is ensured, perceptions of transparency can increase. However, perceptions and observations of interviewees also indicated that the quality of participatory processes and the kind of communication matters more than the quantity of those factors.

Value-Formation Factors

Value-formation factors relate to perceptions of respect, presence of shared values, and levels of involvement in forestry (Table 5). As stakeholders increase their levels of interaction, they discover shared values. When stakeholders have shared values, they have more reason to trust. Likewise, distrust decreases when they understand differing values.

The interviewees suggested that being actively involved in forestry is important for creating shared values and gaining respect for differing values. This was accomplished through a reciprocal relationship between involvement and education. Active involvement in forestry topics creates opportunities for learning, which creates opportunities for understanding.

A two-way relationship exists between active involvement in forestry and forest-related education. When stakeholders are educated about the forest and its uses, they are more likely to become actively involved; the more they become active, the more things they will learn about the forest. In addition, active involvement in forestry and forest-related education appear to be important for creating shared forest values, or at least in creating respect for differing forest values, even if they do not necessarily agree. In general, mutual understanding and respect for differing interests and values can be increased if stakeholders participate in the actions of stakeholders with other interests in forests.

The Conceptual Model

Stakeholders identified 12 factors that affect the relationship between trust and conflict in participatory forest management (Figure 1). Not only did these factors work together with trust to reduce conflict escalation, they also aided in creating or undermining trust from the perspectives of the interviewees. These factors were categorized into contextual factors, stakeholder interaction factors, decisionmaking process factors, and value-formation factors. Communication played an important role in facilitating not only trust building but also many of the identified factors, such as transparency. The model begins with contextual factors, which stakeholders use to establish base levels of trust or distrust. Trust

then increased, decreased, or remained at the initial level based on interactions with fellow stakeholders, process factors related to decisionmaking, and value-formation factors. The trust level between stakeholders was viewed as a two-way relationship with conflict by the interviewees. A lack of conflict or successfully mediated conflict can increase trust between stakeholders; however, the escalation of conflict can destroy existing pretrust and make conflict-management more difficult. The levels of trust then affect the ability of the group to manage conflict.

Discussion and Conclusions

The aim of this study was to examine how stakeholders involved in participatory forest management understand the relationship between trust and conflict within participatory forest management. The resulting model is based on 12 factors that influence this relationship. Ultimately, the findings make clear that, to reduce conflict escalation between stakeholders in participatory forest management, emphasis should be placed on trust-building measures.

The results of this study have several implications for forest managers who are interested in implementing participatory forest management. Contextual factors play an important role in creating an environment where stakeholders can establish trust. However, it is also important to point out that initial levels of trust merely reflect a starting point. Practically speaking, it is important to be aware of the factors that influence stakeholders' trust and potential for conflict and design a participatory process accordingly. Boundary-spanning agents are particularly useful because they are personally involved in more than one stakeholder group and can understand differing perspectives. Thus, forest managers should actively include boundary-spanning stakeholders in participatory forest management. Forest managers can create opportunities for interaction, such as the establishment of regular round-table meetings with a skilled facilitator. Through interaction and communication, stakeholders are able to create a clearer picture of their peers, which builds trust. Forest managers can provide adequate time and opportunity for relevant stakeholders to discuss problems with one another and provide clear communication about how a decision will be reached.

Stakeholders should be encouraged to be actively involved in forestry, and decisionmaking processes should be designed in a way that stakeholders perceive as legitimate. For example, forest managers might schedule events related to education (e.g., a "work in the forest day" in the local forest with volunteers or a day in which local residents get the opportunity to harvest timber for their own domestic heating use). When stakeholders are educated about the forest and its uses, they are more likely to become actively involved; the more they become active, the more things they will learn about the forest. In addition, active involvement in forestry and forest-related education appear to be important for creating shared forest values, or at least in creating respect for differing forest values. Thus, forestry education for children and adults is recommended (for example, via forest workers or foresters). Shared values and respect for differing values increases manageability of conflicts because those factors enable stakeholders to debate interests rather than the individual values. Mutual understanding and respect for differing interests and values can be increased if stakeholders participate in the activities of stakeholders with other interests in forests. Thus, we recommend collaborative involvement of different stakeholder activities as much as possible.

The results of this study have several implications for researchers interested in understanding factors affecting participatory forest management. This study focused on understanding the perceptions about the relationship of trust and conflict of stakeholders involved in participatory forest management. Various stakeholders agreed on factors relevant for the interaction of trust and conflict. The literature has also identified these factors as important in the development of trust (e.g., Beierle and Konisky 2000, Cheng and Daniels 2005, Lijeblad et al. 2009). This study shows that the perceptions of stakeholders in participatory forest management align with the scientific perspective on the relationship between trust and conflict. Furthermore, this study showed that development of trust in participatory forest management is a long-term and permanently ongoing process. Therefore, future research on trust should take past developments between research participants into account and be aware that measured trust levels are only a snapshot of a reality that can quickly change.

This study focused on the impact of several factors on stakeholder perceptions of the relationship between trust and conflict in participatory forest management. Although we believe this study offers valuable implications for both theory and practice, it is not without limitations. One researcher worked on the development of the model, and we did not formally test intercoder reliability to estimate the impact of subjective perceptions of this analyzing researcher. The single factors could not be examined in depth, and further research is needed to understand each factor in isolation. Future research should also aim to develop methods to quantitatively measure the identified factors. The generalizability may be limited by the cultural context of the study and the specific case characteristics. It may not generalize well to cultures with different attitudes, factors, and definitions that inform trust and conflict. In addition, generally high levels of trust and low levels of conflict characterize the case described in this study. However, the findings show parallels to the literature on trust and participatory forest management based on research in other geographical contexts. Therefore, it would be valuable to compare our model of trust and conflict in different cultural settings, in different economic and biogeophysical conditions, and in contexts characterized by differing levels of trust and conflict.

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