Stakeholder diversity and the comprehensiveness of sustainability decisions: the role of collaboration and conflict

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We review the literature (2007–2016) on the quality of sustainability decisions and we introduce an integrative conceptual framework that distinguishes between a beneficial and a detrimental path that explain the influence of stakeholder diversity on the comprehensiveness of sustainability decisions. We argue that decision quality increases when stakeholder interest diversity is expressed through task conflict (extensive information sharing and exploration). Decision quality is compromised if stakeholder diversity is suppressed and false consensus occurs, that is, when task conflict is not tolerated or when decision makers fail to acknowledge and work with their differences. We conclude by discussing three generic recommendations that focus on inclusive stakeholder selection, norms for engagement and process consultation as ways of developing constructive collaboration in multiparty systems.

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Introduction

Sustainability decisions have important consequences for large scale sustainable development in the domain of natural resources, urban development, renewable energy production and efficient energy use. It is of critical importance to make high quality decisions with positive economic, environmental and social outcomes [1].

Decision comprehensiveness reflects the richness of the knowledge pool scrutinized and integrated during the decision-making process and it is a key antecedent of decision quality. In participatory approaches stakeholders from social, economic and environmental domains may participate or give input in sustainability decision-making [1,2,3]. In such participatory approaches stakeholders explore their interdependencies and use their knowledge and expertise in order to integrate and develop their different perspectives and interests [4–6]. Our review explores the factors that influence the comprehensiveness of sustainability decisions in which diverse stakeholders are engaged in a collaborative decision-making process [7]. We will refer to systems that implement such participatory approaches as multiparty collaborative systems. In these systems, the diverse perspectives that are brought to the table by various stakeholders are expected to increase decision comprehensiveness (referring to exhaustive and inclusive strategic choices) [8] and ultimately decision quality. Although stakeholder diversity is a requisite component of multiparty collaborative systems, it also induces conflict [9,10,11,12]. Collaboration and conflict are intertwined processes that shape the dynamics of multiparty collaborative systems [4]. In this paper we review the recent literature on sustainability decision-making (2007–2016) and explore the mechanisms that link stakeholder diversity with decision comprehensiveness. We first present an integrative framework that describes the interplay between collaboration and conflict in decision-making groups, building on recent theoretical and empirical insights from the group dynamics and multiparty collaboration literature. We then describe the literature review process and map the findings of the most relevant studies addressing sustainability decision-making on the framework we presented. We conclude by presenting three ways in which sustainability decision comprehensiveness can be improved.

A model of diversity and sustainability decision comprehensiveness

Decision comprehensiveness is a measure of rationality [13]. It reflects the efforts to be exhaustive, inclusive and integrative in the decision-making process [8]. Comprehensive sustainability decisions will ultimately lead to positive outcomes in the social (e.g. stakeholder satisfaction), economic (e.g. increased profits) and environmental (e.g. low energy consumption and emission rates)

domains [3]. It is therefore of critical importance to better understand the mechanisms through which stakeholder diversity influences the comprehensiveness and thus the quality of sustainability decisions.

Recent reviews on diversity [14] stress the dual impact of diversity on the quality of group decisions. On the one hand diverse groups benefit from knowledge elaboration by pooling the expertise, preferences and skills of diverse group members, while on the other hand, diversity triggers relationship frictions and threatens the social harmony within groups. These two opposing mechanisms explain the beneficial as well as the detrimental effects of diversity in decision-making groups [14]. Diversity is an intrinsic property of multiparty collaborative systems. It is a requirement for making sustainability decisions [5,11•,15•,16]. Parties need to work with their differences in terms of interests, power, perspectives and identities, etc. and generate comprehensive views on the decision space by engaging in task conflict. However, working with different parties also triggers negative stereotyping, distrust, scapegoating; it generates relationship conflict and it threatens the social harmony of such collaborative systems [4–6]. Task conflict and relationship conflict often occur together, as task related disagreements can develop in relational frictions [17]. We argue that successful multiparty collaboration requires parties to engage in task conflict and at the same time prevent or successfully manage relationship conflict [4].

Sometimes parties with diverse interests seem to engage in harmonious interactions with relationship conflict virtually absent while avoiding task conflict. Such dynamics might be due to false consensus generated by the suppression of diversity in order to avoid the threats associated with conflicts and maintain an illusion of social harmony [4,18]. Parties do not engage in fruitful information exchange and constructive task conflict, therefore true collaboration is obstructed and decision comprehensiveness reduced. Once such dynamics are unveiled and reality is confronted, the tensions that engaging in task conflict induce, may surface. As a consequence, relationship conflict is likely to emerge. Alternatively, if these tensions are handled adequately, parties may learn to overcome them and reap the cognitive benefits of task conflict. Figure 1 depicts the integrative conceptual model of the arguments presented above. The key paths presented in Figure 1 will further be explained as we review the relevant literature on sustainability decisions.

Literature search and integration procedure
Research on sustainability decision-making is broad in scope, extremely prolific and dynamic, with hundreds of papers published each year on various topics ranging from water governance [19] to urban planning [20,21] and

supply chain management [22]. Given this wealth of literature we have used a stepwise procedure with the aim of identifying papers that explore the collective decision-making process. We initially searched documents published between 2007 and 2016 and recorded in the Scientific Citation Index (SCI) of the Web of Science (WoS) databases using the terms: 'sustainability decision* & conflict' (initially yielded 371 hits), 'sustainability decision* & diversity' (240 hits), 'sustainability decision* & participation' (523 hits) and 'sustainability decision* & collaboration' (206 hits).

We first selected the review papers from this initial pool. Out of seventy review papers only ten addressed participatory approaches in sustainability decision-making. These ten review papers (marked with * in the reference list) were the starting point for our review and we have used these to cross-validate the analytical framework presented in Figure 1. A notable aspect is that none of these review papers directly addressed the beneficial role of conflict in collaboration. The dominant view was that conflict hampers collaboration and as such is detrimental to the comprehensiveness of sustainability decisions. Our integrative framework presented in Figure 1 complements these reviews by differentiating between task and relationship conflict and by taking into account false consensus as a disruptive process in collaborative systems.

Further on, from the original pool of papers yielded by the initial WoS search, we have excluded papers with a normative or prescriptive approach to sustainability decision-making as well as the papers that focused on decision content rather than process. Our focus was on papers (especially published in 2015 and 2016) that explored the collective decision-making process. We have selected all papers reporting case studies or other empirical analyses of participatory practices in sustainability decision-making. Our review integrates the insights of this stepwise analysis along the conceptual relations depicted in Figure 1.

Diversity expressed — the cognitive synergy path
Situations in which stakeholders are interdependent while their interests differ in substantive ways, often call for collaboration [18]. In the sustainability literature, collaboration is often conceptualized as a process that leads to superior outcomes in terms of decision quality and acceptance [9•,23•]; its outcomes furthermore, are often portrayed as consensual and nonconflictual. Fadeeva challenges this view by arguing that striving for consensus may lead to a superficial discussion of relevant issues and may disregard the interests of particular stakeholders [24,p. 173]. We subscribe to this view and argue that task conflict is a necessary condition for successful collaboration in which decision-making groups

Figure 1
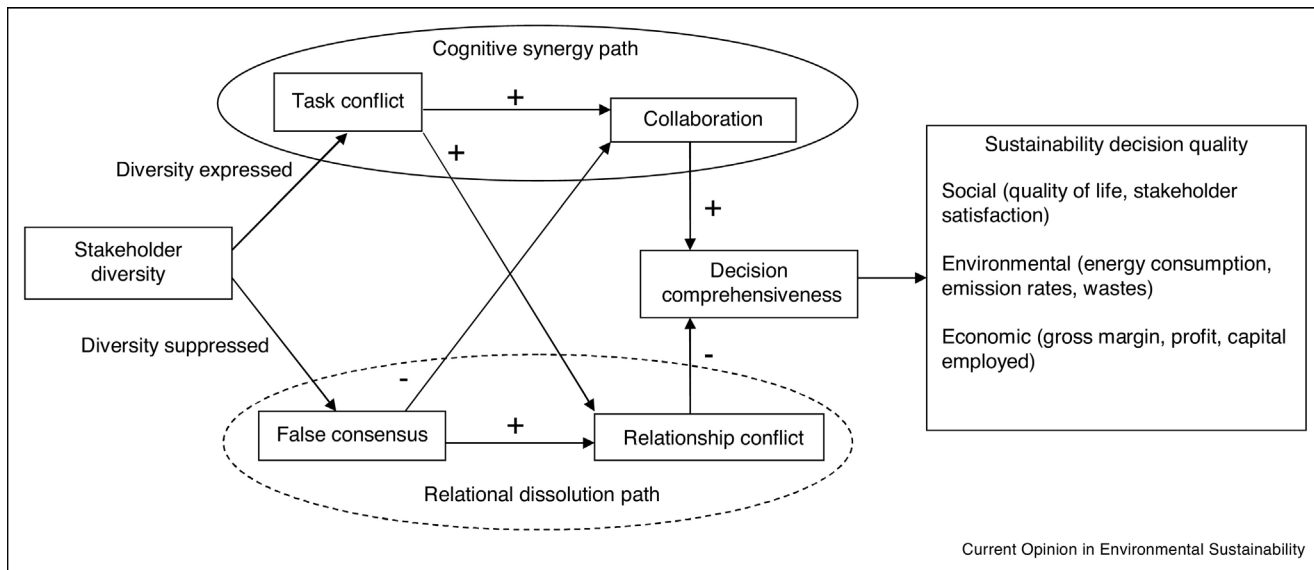
An integrative model of sustainability decision comprehensiveness in multi-party collaborative systems.

generate superior decision outcomes [9•,25•], engage in social learning and new knowledge generation [15•,19,26] and create a potential for better decision acceptance [19]. These superior collective outcomes are underpinned by a cognitive synergy process of which task conflict is an essential component [15•,27]. Through synergetic processes such decision-making groups manage to achieve more than any of the individuals deciding alone.

The distinction between task and relationship conflict is well established in Management and Organizational Psychology research. Task conflict reflects the disagreements on issues that pertain to the task at hand, including task definition and task accomplishment, while relationship conflict refers to disagreements and frictions that are based on personal or interpersonal issues [17]. The distinction between functional and dysfunctional forms of conflict is also acknowledged in environmental research [15•]. Díaz and colleagues for example, label task conflict as 'hot spots' and they see cognitive dissent as having integrative win-win potential. They also refer to the need to reduce social conflict (cf. relationship conflict) [28].

Often, however, these two forms of conflict go hand in hand [17]. Initial disagreements related to the task can become personal and evolve in relationship frictions. We see such dynamics in for example the lack of success of attempts to stimulate collaborative processes in fisheries management as task conflicts are embedded in a historical context of relational tensions related to the right over the use of waters and fishing practices [29]. Collaboration can be successful though if decision groups have well defined conflict resolution mechanisms [30•,31,32••,33]. Conflict

management interventions (e.g. collaborative conflict management strategies) are effective ways of disentangling task and relationship conflict [17]. Therefore they allow decision-making groups to reap the cognitive benefits of diversity and prevent its relational costs. The results reported in the study on the Biomass Dialogue in the Netherlands [15•] indeed shows that the generation of task conflict and the prevention of relationship conflict increases decision comprehensiveness.

Diversity suppressed — the relational dissolution path

Working together with different parties in order to make important decisions is challenging. In line with the similarity-attraction hypothesis [34] people establish and maintain social ties with others that are similar rather than dissimilar to one selves. Interpersonal similarity and familiarity generate positive affective states, while diversity often generates negative emotionality (based on a fear of being rejected for being/thinking different). When people fear that their views/ideas may be rejected by others, they tend to overestimate the extent to which others share the same views [35]. Participants in collaborative systems may therefore be motivated to suppress diversity (in for example their real or imagined interests or perspectives) and ultimately reach a false consensus ('we all speak with the same voice', 'we all have the same interest', etc.). When decision-making groups engage in false consensus, they fail to explore the complexity of the decision space, and fail to recognize and work with their differences. Ultimately, decision comprehensiveness is compromised.

There are at least three possible sources of false consensus in decision-making groups: first, consensus is forced through power dynamics or the suppression of powerless parties by more powerful stakeholders [36]; second, group consensus is generated through the convergence of individual cognitive biases, resulting in a false consensus bias whereby each stakeholder overestimates the degree of similarity between ones own and others' views/interests while also overestimating the degree of public support for ones own opinions [37–40]; and third, consensus reflects an unconscious dynamic caused by group members fearing that if they are out of step with the rest they will be rejected by the group. This is a collusive and largely unconscious phenomenon and colors a relationship or a social system rather than being a property of an individual [41].

Motivated to maintain their power, some parties may frame the decision situation or try to influence the structure of the decision-making group in a such a way that relevant stakeholders are excluded. In their overview of policy-making strategies aimed at preventing and managing conflicts in agriculture in two Latin American countries, García-López and Arizpe discuss power dynamics and its limitations for top-down policy making. Government initiated participatory processes are prone to selective co-optation of stakeholders that will eventually reinforce the interests of the most powerful party. Farmers are often absent as stakeholders and their interests are not or mis-represented, leading to suboptimal sustainability decisions. Moreover, in this context, the lack of impartiality in stakeholder selection, brings to the table nongovernmental organizations (NGOs) that are often perceived by farmers to be nonrepresentative. The composition of such multiparty systems seems to create an illusion of 'like mindedness' among the different parties, that reduces decision comprehensiveness and generates relationship conflicts with other (marginalized) stakeholders [42]. Thus, false consensus expressed as an illusion of unanimity, suppression of dissent and exclusion of marginal stakeholders, in time, is likely to generate relationship tensions and a climate of distrust [43]. Similar multiparty systems, in which governments select unrepresentative stakeholders (NGOs), have generated major social, economic and ecologic crises in the Niger Delta [44]. A history of corruption and the exclusion and marginalization of relevant stakeholders has proven to be a hotbed for relationship frictions. Attempts to increase participation and involve relevant stakeholders in the problem definition surrounding the Niger Delta oil exploitation, given this historical context, often evolve into intractable relationship frictions [45].

Different stakeholders involved in making sustainability decisions are likely to hold competing interests. In addition they may also experience internal conflicts regarding their own, sometimes divergent, interests [25•].

Confronting others, and openly expressing their diverging interests, albeit internally or externally may be threatening. False consensus may then function as a defense mechanism [35,45] As a consequence, stakeholders can be tricked into agreeing quickly on (apparently) shared issues, or assuming that all parties around the table have similar views [37] rather than exploring their differences and actively seeking a comprehensive problem formulation [46]. However, not engaging with the task and its complexities may eventually lead to relationship frictions as the reality of interdependence and the concomitant tensions kick in [45]. That the suppression of diversity and the enforcement of fast and false consensus consequently can spur intractable relational tensions is clearly illustrated by the long lasting environmental conflicts in Nigeria [47] and agricultural conflicts in Latin America [42]. We therefore conclude that false consensus prevents multiparty systems from dealing adequately with the decision situation by relying on incomplete and overly simplified information. For this reason, we label this pathway that explains the association between stakeholder diversity and decision comprehensiveness, the 'relational dissolution path'.

General discussion and recommendations for effective multiparty collaboration

Few sustainability-related papers directly address the interplay between conflict and collaboration [9•,19,28] and most papers depict conflict as a disturbing force for collaboration. Our review contributes to the literature on sustainability decision-making by explaining the differential effect of task and relationship conflict on decision comprehensiveness. We argue that stakeholder diversity impacts sustainability decision comprehensiveness via two mechanisms: a cognitive synergy path and a relational dissolution path.

The cognitive synergy path explains the beneficial effect of stakeholder diversity on decision comprehensiveness through deliberative processes in which various interests are explored, new insights are generated and the collaborative system produces a joint understanding of the task. Principles of deliberative democracy have been recognized as effective ways of guiding participatory practices in sustainability decisions [26,48•]. These principles focus on extensive knowledge elaboration and cognitive synergy achieved as a consequence of debate, and the involvement of relevant stakeholders through participatory practices. The relational dissolution path explains the negative effect associated with the suppression of diversity through false consensus.

Given the major relevance of participatory practices in sustainability decision-making, several scholars have formulated design principles for multiparty systems [30•,49]. Cox *et al.* have reviewed the studies that used the eight principles introduced by Ostrom and concluded

that all design principles received substantial support in the literature, that is, using these principles improves (overall) the quality of participatory decision-making. On the basis of our review, and the paths depicted in Figure 1, we focus on three important recommendation (stakeholder selection, norms for collaboration and process facilitation) also aligned with some of Ostroms design principles.

First, it is important that in the selection process, all relevant stakeholders are invited to participate. Inclusive selection criteria will eventually create an ample representation and the attenuation of power disparity in the multiparty system [50]. Stakeholder self-nomination could for example solve some of the issues related to the biased selection of relevant stakeholders by (powerful) governmental representatives [51]. Representation alone will however, not remove power disparity and more peripheral stakeholders need to receive support in order to be able to voice their concerns. Modern tools (geographic information systems) may provide accurate information to peripheral stakeholders (for example, nonscientists involved in natural resource management) and facilitate their participation in sustainability decisions in an informed way [52•]. Moreover, citizens' juries can be used effectively to engage and empower citizens to participate in sustainability decision-making [26].

Second, collaboration does not emerge spontaneously. Multiparty systems benefit greatly from ground rules (normative systems) on how to work together with others and how to generate healthy task conflict and avoid false consensus. Previous research [53,54] showed that the rationality of collective decisions is positively influenced by simple ground rules for true consensus like: 'view initial agreement as suspect', 'view differences of opinion as natural and helpful', 'avoid arguing about initial opinions', 'avoid "win-lose" statements', 'avoid conforming to a majority just in order to reduce conflict' (see for more details [55]). Engaged debates will eventually help multiparty collaborative systems to generate a comprehensive problem formulation, essential for the quality of sustainability decisions [15•]. Moreover, sharing the diverse viewpoints will stimulate cross-understanding and prevent false consensus [16,56,57].

Third, we argue that process consultation can be very helpful in order to prevent or work with a relational dissolution of multiparty collaborative systems. A major critique of the design principles for collaborative multiparty systems is that they ignore the socio-affective states that go hand in hand with working across organizational boundaries (for example, distrust, a climate of psychological unsafety, collusive dynamics) [4,30•]. In order to stimulate the emergence of trust and psychological safety and prevent collusive dynamics, multiparty collaborative

systems may benefit from process consultation [58]. In addition, process consultation may help multiparty collaborative systems to focus on beneficial task conflict and avoid its transformation in detrimental relationship conflict.

Conclusion
We reviewed the literature on collective decision-making processes, in particular the role of stakeholder diversity, collaboration and conflict in sustainability decisions. On the basis of the literature on group dynamics and multiparty collaboration we have developed an integrative framework that explains the positive and negative consequences of stakeholder diversity on decision comprehensiveness. We then used the most important review papers on sustainability decisions to cross-validate this framework that distinguishes between a cognitive synergy path (focused on task conflict and collaboration, conducive for decision comprehensiveness) and a relational dissolution path (focused on false consensus and relationship conflict, detrimental for decision comprehensiveness). We conclude by making three practical recommendations focused on stakeholder selection (to stimulate inclusiveness and diversity), norms for collaboration (to foster the cognitive synergy mechanisms) and process interventions (aimed at preventing or working with and managing relational conflict).

Conflict of interest
None declared.

References and recommended reading
Papers of particular interest, published within the period of review, have been highlighted as:

- • of special interest
- •• of outstanding interest

1. Boyer RH, Peterson ND, Arora P, Caldwell K: **Five approaches to**
• **social sustainability and an integrated way forward**.
Sustainability 2016, **8**:878.
The paper provides a comprehensive overview on various conceptualizations of social sustainability and emphasizes the differences between social, economic and environmental sustainability.

2. Coenen FH, Huitema D, O'Toole LJ: **Participation and environmental decision quality: an assessment**. *Participation and the Quality of Environmental Decision Making*. Netherlands: Springer; 1998, 307-324.

3. Seok H, Nof SY, Filip FG: **Sustainability decision support system based on collaborative control theory**. *Annu Rev Control* 2012, **36**:85-100.

4. Schruijer S: **The psychology of interorganizational relations**. In *The Oxford Handbook of Interorganizational Relations.* Edited by Cropper S, Ebers M, Huxham C, Smith Ring P. New York, Oxford: Oxford University Press; 2008:417-440.

5. Vansina L, Taillieu T: **Diversity in collaborative task-systems**. *Eur J Work Organ Psychol* 1997, **6**:183-199 http://dx.doi.org/10.1080/135943297399178.

6. Vansina L, Taillieu TCB, Schruijer SGL: **Managing multiparty issues: learning from experience**. In *Research in Organizational Change and Development*, vol 11. Edited by Pasmore W, Woodman R . 1998:159-183.

7. Huitema D, Mostert E, Egas W *et al.*: **Adaptive water governance: assessing the institutional prescriptions of adaptive (co-) management from a governance perspective and defining a research agenda**. *Ecol Soc* 2009, **14**:26.

8. Fredrickson JW, Mitchell TR: **Strategic decision processes: comprehensiveness and performance in an industry with an unstable environment**. *Acad Manag J* 1984, **27**:399-423.

9. Celino A, Concilio G: **Explorative nature of negotiation in**
• **participatory decision making for sustainability**. *Group Decis Negot* 2011, **20**:255-270.
The paper makes the case for using diverse stakeholders during participatory decision processes, in order to increase knowledge elaboration and decision comprehensiveness.

10. Quilliam RS, Kinzelman J, Brunner J, Oliver DM: **Resolving conflicts in public health protection and ecosystem service provision at designated bathing waters**. *J Environ Manag* 2015, **161**:237-242.

11. Le Gentil E, Mongruel R: **A systematic review of socio-economic**
• **assessments in support of coastal zone management (1992–2011)**. *J Environ Manag* 2015, **149**:85-96.
The paper reviews an impressive body of literature on coastal zone management and building on an integrated assessment framework provides an overview of the methods used to combine socio-economic assessment methods and tools.

12. Montaña E, Pastor G, Torres L: **Socioeconomic issues in**
• **irrigation literature: approaches, concepts, and meanings**. *Chil J Agric Res* 2009, **6**.
The paper bridges two research fields, namely social and agricultural sciences and reviews the social science concepts and models used in dealing with sustainability issues in irrigation.

13. Fredrickson JW: **The comprehensiveness of strategic decision processes: extension, observations, future directions**. *Acad Manag J* 1984, **27**:445-466.

14. van Knippenberg D, Mell JN: **Past, present, and potential future of team diversity research: from compositional diversity to emergent diversity**. *Organ Behav Hum Decis Process* 2016, **136**:135-145.

15. Cuppen E: **Diversity and constructive conflict in stakeholder**
• **dialogue: considerations for design and methods**. *Policy Sci* 2012, **45**:23-46.
The paper makes the case that constructive conflict is the driving force of collaboration in participatory sustainability decisions and offers a case study to exemplify ways of fostering and using constructive conflict in decision-making.

16. McGreavy B, Lindenfeld L, Bieluch KH, Silka L, Leahy J, Zoellick B: **Communication and sustainability science teams as complex systems**. *Ecol Soc* 2015, **20**:2.

17. De Wit FR, Greer LL, Jehn KA: **The paradox of intragroup conflict: a meta-analysis**. *J Appl Psychol* 2012, **97**:360-390.

18. Gray B, Schruijer S: **Integrating multiple voices: working with collusion**. In *Relational Practices, Participative Organizing*. Edited by Steyaert C, van Looy B. Bingley: Emerald; 2010:121-135.

19. Von Korff Y, Daniell K, Moellenkamp S, Bots P, Bijlsma R: **Implementing participatory water management: recent advances in theory, practice, and evaluation**. *Ecol Soc* 2012, **17**.

20. Broto VC, Boyd E, Ensor J: **Participatory urban planning for climate change adaptation in coastal cities: lessons from a pilot experience in Maputo, Mozambique**. *Curr Opin Environ Sustain* 2015, **13**:11-18.

21. Späth P, Rohracher H: **Conflicting strategies towards sustainable heating at an urban junction of heat infrastructure and building standards**. *Energy Policy* 2015, **78**:273-280.

22. Simangunsong E, Simangunsong E, Hendry LC, Hendry LC, Stevenson M, Stevenson M: **Managing supply chain uncertainty with emerging ethical issues**. *Int J Oper Prod Manag* 2016, **36**:1272-1307.

23. Jones FC: **Cumulative effects assessment: theoretical**
• **underpinnings and big problems**. *Environ Rev* 2016, **24**:187-204.
The paper provides a comprehensive overview of the literature on the joint environmental effects of human activities and natural processes and concludes with practical recommendations on the use of cumulative effects assessment.

24. Fadeeva Z: **Promise of sustainability collaboration — potential fulfilled?** *J Clean Prod* 2004, **13**:165-174.

25. Bernard F, van Noordwijk M, Luedeling E, Villamor GB, Sileshi GW,
• Namirembe S: **Social actors and unsustainability of agriculture**. *Curr Opin Environ Sustain* 2014, **6**:155-161.
The paper provides an overview of stakeholder involvement in decisions involving the sustainability of agricultural processes and concludes that the bottom-up, integrative participatory approaches are the ideal way of making such complex decisions.

26. Huitema D, Cornelisse C, Ottow B: **Is the jury still out? Toward greater insight in policy learning in participatory decision processes — the case of Dutch citizens' juries on water management in the Rhine Basin**. *Ecol Soc* 2010, **15**.

27. Curşeu PL, Meslec N, Pluut H, Lucas GJ: **Cognitive synergy in groups and group-to-individual transfer of decision-making competencies**. *Front Psychol* 2015, **6**:1375 http://dx.doi.org/10.3389/fpsyg.2015.01375.

28. Díaz S, Quétier F, Cáceres DM, Trainor SF, Pérez-Harguindeguy N, Bret-Harte MS, . . . , Poorter L: **Linking functional diversity and social actor strategies in a framework for interdisciplinary analysis of natures benefits to society**. *Proc Natl Acad Sci U S A* 2011, **108**:895-902.

29. Pomeroy R, Parks J, Pollnac R, Campson T, Genio E, Marlessy C, . . . , Hue NT: **Fish wars: conflict and collaboration in fisheries management in Southeast Asia**. *Mar Policy* 2007, **31**:645-656.

30. Cox M, Arnold G, Villamayor Tomás S: **A review of design**
• **principles for community-based natural resource management**. *Ecol Soc* 2010, **15**:38.
This paper provides an excellent overview of the effectiveness of using the design principles presented in Ostrom [49] and shows that most design principles received substantial empirical support.

31. Hicks CC, Stoeckl N, Cinner JE, Robinson J: **Fishery benefits and stakeholder priorities associated with a coral reef fishery and their implications for management**. *Environ Sci Policy* 2014, **44**:258-270.

32. Ostrom E: **A general framework for analyzing sustainability of**
•• **social–ecological systems**. *Science* 2009, **325**:419-422.
The paper uses insights from ecological and social sciences to present an integrated framework of core subsystems essential for analyzing sustainability problems.

33. Watanabe M, Madruga LRDRG, Yamaguchi CK, Vieira ACP, Jenoveva-Neto R: **Decision making and social learning: the case of watershed committee of the State of Rio Grande do Sul, Brazil**. *Water Resour Manag* 2014, **28**:3815-3828.

34. Byrne D: **Interpersonal attraction and attitude similarity**. *J Abnorm Soc Psychol* 1961, **62**:713.

35. Mannarini T, Roccato M, Russo S: **The false consensus effect: a trigger of radicalization in locally unwanted land uses conflicts?** *J Environ Psychol* 2015, **42**:76-81.

36. Watson ER, Foster-Fishman PG: **The exchange boundary framework: understanding the evolution of power within collaborative decision-making settings**. *Am J Community Psychol* 2013, **51**:151-163.

37. Flynn FJ, Wiltermuth SS: **Whos with me? False consensus, brokerage, and ethical decision making in organizations**. *Acad Manag J* 2010, **53**:1074-1089.

38. Jones PE, Roelofsma PH: **The potential for social contextual and group biases in team decision-making: biases, conditions and psychological mechanisms**. *Ergonomics* 2000, **43**:1129-1152.

39. Wojcieszak M: **False consensus goes online impact of ideologically homogeneous groups on false consensus**. *Public Opin Q* 2008, **72**:781-791.

40. Wojcieszak M, Price V: **What underlies the false consensus effect? How personal opinion and disagreement affect perception of public opinion**. *Int J Public Opin Res* 2009, **21**:25-46.

41. Schruijer S: **Venalism in higher education: a systems-psychodynamic perspective**. *Organ Soc Dyn* 2013, **13**:115-126.

42. García-López GA, Arizpe N: **Participatory processes in the soy conflicts in Paraguay and Argentina**. *Ecol Econ* 2010, **70**:196-206.

43. Vaidya A, Mayer AL: **Use of the participatory approach to develop sustainability assessments for natural resource management**. *Int J Sustain Dev World Ecol* 2014, **21**:369-379.

44. Acey C: **Managing wickedness in the Niger Delta: can a new approach to multi-stakeholder governance increase voice and sustainability?** *Landsc Urban Plan* 2016, **154**:102-114.

45. Mannarini T, Roccato M: **The dark side of pursuing self-esteem and identity: socio-cognitive biases in conflicts over locally unwanted land uses**. *Paradoxes of Conflicts*. Springer International Publishing; 2016:71-83.

46. Arunachalam M, Arunachalam M, Singh-Ladhar J, Singh-Ladhar J, McLachlan A, McLachlan A: **Advancing environmental sustainability via deliberative democracy: analysis of planning and policy processes for the protection of Lake Taupo**. *Sustain Account Manag Policy J* 2016, **7**:402-427.

47. Nzeadibe TC, Ajaero CK, Okonkwo EE, Okpoko PU, Akukwe TI, Njoku-Tony RF: **Integrating community perceptions and cultural diversity in social impact assessment in Nigeria**. *Environ Impact Assess Rev* 2015, **55**:74-83.

48. Salter J, Robinson J, Wiek A: **Participatory methods of**
● **integrated assessment — a review**. *Wiley Interdiscip Rev: Clim Change* 2010, **1**:697-717.
The paper reviews the main components of a participatory integrated assessment (PIA) and provides an overview of the methods used and policy-related as well as process outcomes of the PIA. The paper concludes with an overview of cross-cutting themes in PIA and explores different tensions that influence the co-creation of knowledge that ultimately impacts on the quality of sustainability decisions.

49. Ostrom E: *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge, UK: Cambridge University Press; 1990.

50. Datta D, Chattopadhyay RN, Guha P: **Community based mangrove management: a review on status and sustainability**. *J Environ Manag* 2012, **107**:84-95.

51. Pieraccini M, Cardwell M: **Towards deliberative and pragmatic co-management: a comparison between inshore fisheries authorities in England and Scotland**. *Environ Polit* 2016, **25**:729-748.

52. Wright DJ, Duncan SL, Lach D: **Social power and GIS**
● **technology: a review and assessment of approaches for natural resource management**. *Ann Assoc Am Geogr* 2009, **99**:254-272.
The paper makes a case for empowering more peripheral stakeholders during participatory approaches in sustainability.

53. Curşeu PL, Jansen RJ, Chappin MM: **Decision rules and group rationality: cognitive gain or standstill?** *PLOS ONE* 2013, **8**: e56454.

54. Curşeu PL, Schruijer SGL, Fodor OC: **Decision rules, escalation of commitment and sensitivity to framing in group decision-making: an experimental investigation**. *Manag Decis* 2016, **54**:1649-1668 http://dx.doi.org/10.1108/MD-06-2015-0253.

55. Hall J, Watson WH: **The effects of a normative intervention on group decision-making performance**. *Hum Relat* 1970, **23**:299-317.

56. Huber GP, Lewis K: **Cross-understanding: implications for group cognition and performance**. *Acad Manag Rev* 2010, **35**:6-26.

57. Wolfe SE: **A social innovation framework for water demand management policy: practitioners' capabilities, capacity, collaboration, and commitment**. *Soc Nat Resour* 2009, **22**:474-483.

58. Schruijer S, Vansina L: **Working across organizational boundaries: understanding and working with the psychological dynamics**. In *Psychodynamics for Consultants and Managers: From Understanding to Leading Meaningful Change*. Edited by Vansina L, Vansina-Cobbaert M-JJ.. London: Wiley; 2008:390-410.