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25. Stakeholder-driven initiatives using sustainability indicators

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Abstract

Sustainability indicators have been extensively used to measure and communicate the state and progress of sustainability issues by covering robust and meaningful information for a variety of stakeholders. Sustainability indicators allow informal and, many times, sporadic actions of sustainability data collection and evaluation that can be conducted by stakeholders, covering different phases of the sustainability assessments. Stakeholder involvement in sustainability-related initiatives can increase the quality of environmental and sustainability decisions, since the information in these initiatives is then taken into consideration in more comprehensive ways. There have been new approaches to enhance the interaction and empowerment of stakeholders in environmental and sustainability indicator initiatives. Stakeholders can have an active role as part of the team that selects, develops, and evaluates sustainability indicators, as well as participating actively in data collection in the monitoring phase. This chapter aims to explore and describe voluntary and collaborative stakeholder initiatives that use sustainability indicators as evaluation and communication tools. The chapter analyses worldwide initiatives, including technology-based examples. The findings show that in a majority of cases, the examples focus on empowering stakeholder in the selection of sustainability indicators and monitoring data collection of sustainability-related initiatives. These examples appear to have been governmental entities and non-governmental organisations. The integration of stakeholders, as active actors, could: enhance social ties; improve the communication grid, including the vision on what was being implemented; and increase co-responsibility of the shared resources. Stakeholders, thus, can, and should, become part of the environmental and sustainability indicator initiatives, especially when they feel that their opinions are part of decision-making processes that have impacts in their daily lives or are important for their community. An increase of interaction between experts and non-experts of sustainability indicators could enhance transparency of sustainability-related initiatives and help the transition to more sustainable societies.

Keywords: *sustainability assessment; indicators; voluntary process; collaborative process; interactive participation; stakeholder empowerment*

Introduction

Sustainability indicators (SIs) have been extensively used, for instance by biologists, and have become a key tool to operationalise sustainability (Bell and Morse 2008). SI allows to measure and communicate the state and progress of sustainability aspects. Despite different methods and tools that exist to assess sustainability, indicators is one of the approaches most widely used (Ramos 2009). Indicators have been used over time as symbolic representations (Moldan and Dahl 2007). For instance, as a way of measuring and comparing sustainability performances of local-regional territories (Mascarenhas et al. 2010), and improve the dialogue with stakeholders (Ramos and Moreno Pires 2013) through the creation of new communication channels in sustainability debates. SI are also considered important tools in decision-making (Waas et al. 2014). Several guidelines and models that have appeared to ground the development of indicators can be found in other chapters of this book (e.g. Pintér et al., Chapter 2; Dahl, Chapter 3; Spangenberg, Chapter 9).

Three main clusters can describe the potential users of indicators types (adapted from Rickard et al. 2007): (1) voters, non-specialist media, decision-makers (who need very simple and structured information); (2) local government, policy implementers and checkers, non-governmental organisations (NGO), research funding bodies, and industry (who need intermediate level of detail and simplicity); and (3) academics and some NGO (who need technical information). Nevertheless, reality may be more complex, for example decision-makers need more technical information and policy-makers may want clearer and simpler information.

SI cover robust, less bureaucratic, and more meaningful information to a variety of stakeholders than other similar tools (such as life cycle assessment that is specific for experts). This characteristic has increased the use of SI. Stakeholders are any group or individual who influences or can be influenced by the achievement of a specific purpose (Freeman et al. 2010). According to Freeman (1984), because stakeholders have the capacity to influence decisions and other stakeholders, and thus assure the legitimacy of the process, they need to be involved in the decision-making processes so mutual interests can be accomplished.

Stakeholder engagement increases the quality of the environmental decisions because information inputs taken into account are more comprehensive, and the type of participation process influences the quality of stakeholder decisions (Reed 2008). The type of engagement depends on the goals of the initiative and availability of stakeholders. In some cases, any social actor could be a potential stakeholder to be integrated with the suitable training and education; in other situations only specific groups of stakeholders should be integrated. This depends on the aim, scope, and context of the initiative. Potentially any stakeholder could be integrated in sustainable development related processes, including vulnerable groups (WCED – World Comission on Environment and Development 1987).

Stakeholders should be represented in a balanced manner, but many times some may be over-represented. This happens especially in some cultural and political contexts, including gender, age, culture, and experience gaps between stakeholders, which constitutes a characteristic of sustainability analysis processes, even if the sample of participants is representative of a society (Bell and Morse 2008). Different groups should be represented in a proportional way to avoid some parts to hijack the process. An example on how stakeholder groups could be selected can be found in Dahl, Chapter 23. One (or more) facilitator(s) will have a key role (Bell and Morse, Chapter 12) namely in managing the flow of ideas, achievement of consensus, and clarification of conflicts using additional tools such as the nominal group technique.

Despite the aforementioned arguments, involving stakeholders may not be an easy task. A group of people that is motivated for a common goal is needed to achieve such goal (Ramos et

al. 2014). Specific issues need to be decided for each environmental and sustainability indicator initiative: (1) which groups of stakeholders to be engaged (among employees, suppliers, customers, financiers, communities); (2) what type of inputs from stakeholders are relevant; and (3) what are the thematic areas and indicators relevant for the stakeholders' empowerment process. Some suggestions include creating a positive dialogue with stakeholders (Forrest 1998) and establishing a degree of engagement of stakeholder groups taking into account their specific characteristics (Luyet et al. 2012).

Participation can be described by the following typologies based on: (1) different degrees of participation from passive dissemination of information to active engagement; (2) the nature of participation according to the direction of communication flows (communication, consultation, or participation); (3) theoretical basis (normative and/or pragmatic participation); and (4) objectives for which participation is used (e.g. empowering stakeholders, building consensus) (Reed 2008). An overview on how participation takes place in sustainable development contexts can be seen in the work of Bell et al. (2012) and Bell and Morse (Chapter 12), including the type of participation (from passive to self-mobilisation), the subject, stakeholder groups, type of activities and methods employed (e.g. citizens' jury, consensus conference, deliberative polling, Delphi surveys, focus group).

New approaches have appeared to enhance the interactive role of stakeholders in environmental and sustainability indicator initiatives, beyond a one-way dialogue or passive "consultation" role. The aim of this chapter is to provide insights on voluntary and collaborative stakeholders' initiatives using SI as an evaluation and communication tool. A literature review considering scientific and grey literature was conducted, using Scopus and Google. Qualitative content analysis was conducted to review the selected documents. Some examples of initiatives where stakeholders have an active role are explored, mainly (1) selecting, developing, and evaluating SI; (2) participating actively in the collection of data in the monitoring phase of sustainability-related initiatives; and (3) using technology.

Stakeholder-driven initiatives can be defined as any event where stakeholders (as volunteers) have (Reed 2008) (1) an active engagement (degree of participation); (2) active participation (nature of the communication flow); (3) normative (based on the benefits for a democratic society, citizenship, and equity) and pragmatic theoretical basis (higher quality and durable decisions are assumed to be made); and (4) empowerment (as the objective). The term "stakeholder-driven" is used since the examples described represent proactive individuals and communities. Although these are interactive initiatives where facilitators have a key role, without an active role of the society, "stakeholder-driven initiatives" would not be possible. Thus, the key to these initiatives are stakeholders. Empowerment of stakeholders for sustainable development include inclusiveness, transparency, and accountability (Singh and Titi 2001). The strategy for empowerment is multi-faceted and multi-dimensional and involves the mobilisation of resources and stakeholder's capacities towards change.

Stakeholder-driven initiatives: enhancing the interactive process

An interactive participation (see Bell and Morse, Chapter 12, for details on types of participation) can help to achieve more comprehensive results since stakeholders are incorporated into the decision-making process in order to be taken into account by policy-makers and other stakeholders (Fraser et al. 2006). These authors suggest that the lack of empowerment of stakeholders has led to solutions that do not fit the specific characteristics of the environment (specifically in the context of evaluation of environmental impacts of plans). This happens due to lack of specific knowledge and support from the community for policy changes. Hunsberger, Gibson, and Wismer (2005) highlighted that an environmental assessment follow-up monitoring process is improved by the engagement of the community

because it allows the integration of local needs. The engagement allows the inclusion of local knowledge, better assessment of cumulative impacts, and response to specific concerns. In the context of sustainable development initiatives, this suggests that the engagement of stakeholders in the selection, development, and evaluation of SI could have a significant value to create more meaningful indicators.

Mascarenhas et al. (2014) highlighted that participatory SI can be used to evaluate the strengths and weaknesses of formal assessments and draw conclusions about its overall utility and societal value. A feedback effect of increasing public awareness can have benefits to the overall sustainability assessment, such as enhancing to cope with changes. Information could be better understood since stakeholders are integrated in the process. Information flows easier and it is more transparent since the community is closer to the decision-making. In their study for assessments based on SI, Marques et al. (2013) acknowledged a shortage of efforts to integrate stakeholders' knowledge, perceptions, feelings, or their own evaluations in more technical assessments. They found that volunteer programmes can provide high-quality, reliable data to supplement government agencies' own monitoring programmes. Stakeholders involved in participatory initiatives should see how their contributions have affected the strategic or operational actions (Marques et al. 2013). In addition, the voluntary content of the initiative can potentially decrease costs associated to the monitoring phase. Voluntary programmes empower stakeholders to become more active and familiar with functions and values of resources (EPA 2000). This process increases stakeholder knowledge on the drivers, pressures, state, impact, and responses of resources towards a more acknowledgeable society.

The following sections explore selected examples of stakeholder-driven initiatives that use SI as the main tool to empower the participation of stakeholders in integrated processes (i.e. where stakeholders have an active role) specifically: (1) in the selection, development, and evaluation of SI; (2) collecting data in the monitoring phase of sustainability-related initiatives; and (3) in technology-based initiatives. In the literature, different terms used for this purpose were collected by Estrella and Gaventa (1998): "participatory evaluation", "participatory monitoring", "participatory assessment, monitoring and evaluation", "participatory impact monitoring", "process monitoring", "self-evaluation", "auto-evaluation", "stakeholder-based evaluation", and "community monitoring". The terms "evaluation" and "assessment" are often used as synonymous despite their different meaning. Thus, terms such as "self-evaluation" can be also found in the literature as "self-assessment" (e.g. Mascarenhas et al. 2014; Ramos and Caeiro 2010). All these terms were used to find literature for this research.

Selecting, developing, and evaluating indicators

The selection of SI suitable to the goals of each initiative is one of the most complex phases of the process of stakeholder groups' empowerment. The selection of SI from guidelines such as the Global Reporting Initiative (GRI) has been one of the barriers in the sustainability-reporting processes (Domingues et al. 2017), leading to a cherry-picking of indicators (Guthrie and Farneti 2008), and a tendency to compartmentalise sustainability issues (Lozano and Huisingh 2011). Stakeholders should be integrated as part of the team that conducts the selection, development, and evaluation (one may consider also validation) of SI to be used in different phases of the sustainability-related assessments. This could include not only triple-bottom-line indicators as presented in most sustainability-reporting guidelines, but also inter-linked issues and dimensions as suggested by Lozano and Huisingh (2011). The importance of the integration of stakeholders in the selection, development, and evaluation of SI by stakeholders as been highlighted by Mascarenhas, Nunes, and Ramos (2014) and Marques et al. (2013).

In a preliminary phase, the selection of SI should be flexible since only in practice one can be sure which indicators are most adequate for different groups of stakeholders (Abbot and Guijt 1998). Indicators should be submitted to a preliminary evaluation by the stakeholders that will use them (Mascarenhas et al. 2014, 2015). Some guidelines on the active role of stakeholders in the evaluation and selection process can be found in the White Paper of Sanz et al. (2014).

The engagement of stakeholders in the selection and development of indicators is crucial to include their opinions, values, concerns, and common goals (Beratan et al. 2004; Valentin and Spangenberg 2000). In accordance with the model proposed by Cloquell-Ballester et al. (2006), key stakeholders need to be informed during the process about: (1) the objective of the initiative; (2) the method of validating the final set of indicators; (3) the typology of participants in the validation process and the criteria used for their selection; (4) the number of proposals and the estimated time to perform the task; and (5) the potential use of the information obtained.

The selection and development of indicators need to consider the methods of collection and interpretation of data that will be used. The collection of data depends on what is being measured, the field, the frequency of measurement, and the cost (Danielsen et al. 2005). Each indicator can be evaluated according to a qualitative stakeholder's assessment, using a scoring procedure that can cover different criteria such as comprehensibility, relevancy, and feasibility (Donnelly et al. 2007; Ramos et al. 2004, 2007). Comprehensibility refers to the ability of the indicator to communicate the information to an appropriate level for decision-making and the general public; relevancy is related to the technical significance to assess the indicator as well as to support decision-making (for more details see Janoušková et al., Chapter 30); feasibility addresses the ability to implement and maintain the indicator operated.

Some examples of inclusion of stakeholders in the preliminary phases to select and develop indicators include: (1) identification and selection of SI for strategic monitoring of regional spatial plans in Algarve (Portugal) (Mascarenhas, Nunes, and Ramos 2015); (2) Kalahari rangeland condition and degradation in Botswana (Reed and Dougill 2002); (3) well-being in the coastal British Columbia (Canada), Kalahari rangeland early degradation in Botswana and Guernsey's sustainable development (UK) monitoring (Fraser et al. 2006); (4) assessment, management, and reporting in Marine Protected Areas (Marques et al. 2013); and (5) Local Agenda 21 in Iserlohn (Germany) (Valentin and Spangenberg 2000). Similar processes of indicators' selection can be guided by criteria defined by Niemeijer and Groot (2008); Cloquell-Ballester et al. (2006); Donnelly et al. (2007); Reed et al. (2006), among others.

Indicators should then be evaluated, and validated by stakeholders. Performance indicators can be evaluated based on three essential issues (Cloquell-Ballester et al. 2006): (1) conceptual coherence: correct relationship between the measuring instrument (indicator) and the measurement object (e.g. environmental and social quality); (2) operational coherence: correct definition of the international operations of the measuring instrument; and (3) utility: applicability of the indicator in the assessment. Please see Ramos and Caeiro (Chapter 32) for more details on this.

In order to make a transition to more sustainable societies, a scientific based information and an individual approach is not enough. Indicators need to represent also "non-traditional" angles of sustainability, including non-material values, cultural, and ethical aspects related to sustainability (Dahl 2012; Ramos 2009); and collaboration needs to be one of the elements of the initiative, including communication and engagement of the actors (Lozano 2007). When sustainability-oriented stakeholders are part of the staff that select and develop indicators, the process could boost the development of value-based indicators since their values will be represented in the indicators (Mascarenhas et al. 2014). A collaborative approach can reduce conflicts (Lozano 2008) and criticism when combined with an improvement on sustainability performance (Hörisch, Schaltegger, and Windolph 2015).

Stakeholder engagement has closer ties to stakeholders interested in corporate sustainability performance (Hörisch, Schaltegger, and Windolph 2015). These authors suggest that stakeholder engagement in the sustainability performance could be a complement to sustainability reporting as communication of information is not enough. Some authors have suggested an increase on the interaction and dialogue between stakeholders and organisations (Hörisch et al. 2015; Higgins and Coffey 2016), beyond communication of results. Sustainability reporting has been one of the main drivers of stakeholder dialogues (Lozano, Nummert, and Ceulemans 2016). This is in line with the suggestions of enhancement of a more active role of stakeholders in sustainability-reporting processes (e.g. Domingues et al. 2017; Higgins and Coffey 2016).

Stakeholders need to be informed and empowered in order to contribute to the construction of mutual interests in organisations (Hörisch, Schaltegger, and Windolph 2015). A framework has been suggested by Perrini and Tencati (2006) in order to engage stakeholders in the assessment and communication of corporate performance, including SI.

Other examples, like the Leadership Council of the Sustainable Development Solutions Network (SDSN), involve stakeholders both in the selection of indicators and in the monitoring phase. The SDSN has developed indicators and a monitoring framework for the Sustainable Development Goals (SDGs) (SDSN 2015). The framework is a result of a participatory process with the SDSN Thematic Groups. It represents a list of SI to monitor the progress on the achievement of the SDGs and respective targets at different levels, including local and regional contexts.

Monitoring phase

Arts and Nooteboom (1999) define the monitoring phase as being characterised by a longitudinal and repetitive observation, measurement, and recording of variables and operational parameters for a specific purpose. In environmental and sustainability-related processes, some research has been done to investigate how stakeholders could actively collaborate in the monitoring phase of initiatives through a community/locally based approach (e.g. Savan et al. (2003) on the Citizens' Environment Watch initiative; Gouveia et al. (2004) on data collection by citizens using Information and Communication Technology (ICT); Danielsen et al. (2005) on locally based monitoring approaches; Measham and Barnett (2007) on the motivations and modes of environmental volunteering; Conrad and Daoust (2008) and Conrad and Hilchey (2011) on community-based monitoring frameworks). These examples show that it is possible to conduct stakeholder-driven initiatives in sustainability-related fields using SI as the common language.

According to Danielsen et al. (2005), voluntary schemes conducted by stakeholders can be as reliable as those derived from professional evaluation and monitoring. Informal and sporadic actions of environmental and sustainability data collection and evaluation, conducted by stakeholders can cover different phases of environmental and sustainability processes (Ramos and Caeiro, Chapter 32; Ramos et al. 2014). Informal actions in the sense that they are conducted by volunteers, and not by someone that is directly related to the formal/conventional process, such as a technical team. Informal data can complement data gathered by the formal/conventional sustainability assessment processes (Mascarenhas et al. 2014; Fraser et al. 2006; Ramos and Caeiro, Chapter 32). A fair balance between data quantity and quality is essential to guarantee data accuracy (Hochachka et al. 2012). Data voluntarily collected and evaluated by stakeholders can complement spatial and temporal failures of conventional monitoring systems and promote training and education of specific issues among volunteers (Silvertown 2009). This could be an incentive to pursue stakeholder-driven initiatives. Coutinho et al. (2017) developed a stakeholder-driven sustainability assessment

framework that can be used to collect and evaluate performance data by employees in a public sector organisation, based on perceptions, individual practices, and voluntary monitoring indicators.

Some countries, such as Australia, Canada, the United States of America (USA), and the United Kingdom (UK) have been implementing volunteer monitoring systems in the last decades (at least since the '90s e.g. EPA 1991; EPA 1996). Such countries have used voluntary initiatives to monitor environmental-related issues at the local and regional level. The United States Environmental Protection Agency (EPA) is an example of entities that in the '90s developed a voluntary monitoring system to track nonpoint sources of pollution.[1] EPA developed guidelines for general water monitoring and specifically for lakes, estuaries, and wetlands (EPA 2006; EPA 1997a; EPA 2000; EPA 1997b; EPA 1991; EPA 1996). Such guidelines combine checklists and indicators with open- and close-ended questions to be filled by stakeholders. Some of the common monitoring activities are shoreline surveys (field observations like potential sources of pollutants), measurement of physical characteristics (e.g. stream flow, turbidity or sedimentation in streams, water clarity), and identification of exotic species (presence/absence or mapping or other quantitative methods). For instance, water characteristics are important indicators measured in terms of: (1) clearness, colourless or transparent, milky, foamy, turbid, dark brown among other colours; and, (2) odour, no smell or a natural odour, sewage, chlorine, fishy, rotten eggs. Other indicators can be the frame of the stream bank which may include vertical or undercut bank, steeply sloping, gradual sloping (EPA 1997b). These indicators are measured by trained citizens that can jointly work with or without experts, while the process is monitored by one or more supervisors that is/are responsible for the management of the monitoring activities (as suggested by Bell and Morse, Chapter 12). All these data collected collaboratively by volunteers and agencies is available online (Waterqualitydata.us. 2017). These data are reported and any monitoring results that are not according to the expected standards are managed in order to fulfil the necessary requirements in terms of e.g. environmental quality. These initiatives are conducted at local and regional levels (Epa.gov 2017a) and they are deeply related to political drivers. EPA is a federal governmental agency, its administration is appointed by the USA's president and approved by the Congress.

Some initiatives (in countries such as Portugal, Ireland, Spain, USA, and UK) have taken place to assess at local level and compare results from different places worldwide since they use the same indicators. Some examples include: the (1) Coastwatch to monitor coastal resources (Coastwatch.org 2017); (2) Florida Lakewatch to monitor lakes in the State of Florida (USA) (Lakewatch.ifas.ufl.edu 2017); (3) Earthwatch Institute with different initiatives from archaeology to wildlife (Eu.earthwatch.org 2017); (4) Citizens' Environmental Watch, similar to the previous one (Savan, Morgan, and Gore 2003); (5) Christmas Bird Count to monitor birds (Audubon 2017) (one of the oldest initiatives of citizen-based/citizen-led monitoring science); and (6) the British Trust for Ornithology that feeds the database of the National Biodiversity Network with data collected by volunteers about birds (Bto.org 2017).

Such initiatives assign responsibility to different parts of the civil society. Issues related to these initiatives are more understood (there's an increase of awareness (Fernandez-Gimenez, Ballard, and Sturtevant 2008)) and stakeholders feel more integrated. Internal trust and external credibility are created (Fernandez-Gimenez et al. 2008). According to Cook (1995), if stakeholders feel they are included as partners they will do their best to make the initiative work. The importance of the stakeholder's role is directly equivalent to the complexity of the study, specifically when conclusions are not achieved only with scientific facts but value-based judgement is also needed (Rickard et al. 2007).

Many initiatives in the monitoring phase can be found in scientific and grey literature. This shows how stakeholders have had an active role in the collection and evaluation of data associated to SI.

Technology-based initiatives

According to Gouveia et al. (2004), technology has emerged as a promoter of the use of data collected by volunteers and a facilitator of communication between them. ICT has gained an important role in supporting a collaborative system with tools and methods to collect, evaluate, and validate data. ICT promotes public engagement in initiatives such as environmental monitoring (Gouveia et al. 2004). These authors present different examples of initiatives using ICT-based tools for data collection such as multimedia data acquisition, user interface for data input and communication, and collaborative virtual environment.

Technology, such as GPS devices, cameras, and other sensors, can support the collection of high amounts of information and knowledge (Ramos et al. 2014; Painho et al. 2013). Another example is the use of Public Participation Geographic Information Systems (PPGIS) to empower social interactions on urban planning-related initiatives (Bugs et al. 2010). This bottom-up approach faces different challenges since it needs infrastructures able to store, analyse, display, and share data collected and monitored by citizens in order to be discussed by stakeholder groups.

An example of the spread on the use of ICT on collaborative initiatives is the increased number of apps available that any citizen can download in order to participate through mobile crowd-sensing. Some examples of apps available on online stores of mobile devices are (CaBA 2016): (1) "PlantTracker", to identify invasive non-native plant species (Planttracker.org.uk 2017); (2) "RiverObstacles", to identify natural or human barriers to fish migration (River-obstacles.org.uk 2017); (3) "AquaInvaders", to report and track invasive non-native aquatic species (Brc.ac.uk 2017); and (4) "FreshWaterWatch", to collect freshwater quality data for the global EarthWatch programme (Earthwatch FreshWater Watch 2017). Additionally, Coastwatch has been developing a "Micro-litter" app to identify the presence of micro-litter, including the shore position and type of material (Coastwatch Europe 2017). These initiatives encompass indicators that are user-friendly to most stakeholders, allowing any social actor to actively participate in the monitoring process after reading simple instructions available on the apps. This enables a collective collection of information by citizens.

ICT can boost stakeholder-driven initiatives since it can increase the number of potential participants and simplify the process. A unique system adopted worldwide allows to compare results; however, technical and governance challenges need to be overcome, namely through an increase or improvement of platforms available for knowledge sharing and improvement of the SI available on these platforms. After all, people have busy lives and being integrated in a proactive process like the ones described involves time and responsibility as discussed by Bell and Morse (Chapter 12). In addition, decision-makers also argue that they do not have time to consider other "opinions". Apps could be one of the options that could facilitate engagement, but the representative of the groups may be narrow.

These cases show that the empowerment of stakeholders has been mainly at the monitoring phase of environmental and sustainability assessment initiatives but there are also some examples of their empowerment to select and develop indicators. Despite these initiatives being mainly at the community/local level, they can be used as examples and be adapted to other contexts, namely through the use of technology. Technology acts as an important key to increase and reach a larger number of stakeholders involved in environmental and sustainability-related initiatives.

Conclusions

This chapter shows a variety of stakeholder-driven initiatives established and that have taken place. These allow the integration of stakeholders as part of the team that selects, develops, and

evaluates indicators and as part of the team that collects data in the monitoring phase of assessment initiatives. These approaches involve an active participation of stakeholders in one or more phases of environmental and sustainability indicator initiatives. The cases described have a common ground of inclusiveness, transparency, and accountability. These are mostly at local and regional level, including some whose results can be compared between countries. They have been mainly managed by governmental entities and NGO (except for the technology-based initiatives).

Stakeholder-driven initiatives are a voluntary opportunity that can run in parallel but interactively with formal sustainability evaluation and monitoring processes. Formal/conventional, and voluntary processes can use similar SI in order to evaluate the same issues but in different ways, taking into account the different background of the social actors and including the use of checklists or similar approaches; this can then be used to triangulate and complement data. SI can be a useful evaluation and communication tool in this context, being used as the common language. An increase of interaction between experts and non-experts could enhance transparency of sustainability-related initiatives.

Despite the aforementioned, such initiatives are still a complex process involving different individuals and groups who are integrated to achieve a common goal. Decision-makers and practitioners often claim that they do not have resources, such as time to consider stakeholders' contributions. At the same time, some stakeholders may claim that they are not available to participate. Consequently, it is possible that some stakeholders are over-represented. It is crucial to guarantee the representativeness of different groups, especially vulnerable groups, in order to have a well-represented diversity, including gender, age, cultural, and political aspects. Technology can play an important role to boost the representativeness of distinct stakeholder groups, the diversity of the people represented within the groups, and to enhance participation among them.

It is important to empower different stakeholders that are suitable to participate and be involved in data collection, evaluation, and other decisions to improve the quality and use of SI. This is part of the essential work towards a more integrated and inclusive decision-making process, especially because environmental and sustainability-related initiatives are many times combined with political decisions. Integrating stakeholders in the end, where decisions are mostly already made, allows decisions to be made based on unclear criteria and jeopardising environmental and social long-term goals.

Many stakeholders desire to be part of the environmental and sustainability-related initiatives since they have become more aware and educated about these aspects. Stakeholders should then be represented and have a significant impact. Stakeholder-driven initiatives increase, for instance, the knowledge of different stakeholder groups, legitimacy, and co-responsibility of the decisions. The interactive nature of these initiatives can also increase social ties, communication between different stakeholder groups, and enhance the feedback mechanism due to the proximity between the formal, conventional, and voluntary components of the sustainability initiatives.

Different types of empowerment approaches should be studied, including the type of stakeholders to integrate in different initiatives, which SI are more suitable, and what practices could guide the use of SI beyond selection and voluntary data gathering. It is important to create a network of stakeholders that could work together using SI for a specific goal. This chapter aims to contribute to the transition to a more sustainable society, as SI can have a key role as evaluation and communication tools to enhance an analytical and joint reflection on environmental and sustainability processes.

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Note

1Nonpoint source pollution can result from different diffuse sources. It is caused by rainfall or snowmelt moving over and through the ground, which picks up and carries away natural and human-made pollutants deposing them into lakes, rivers, wetlands, coastal waters, and ground waters (Epa.gov 2017b).

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