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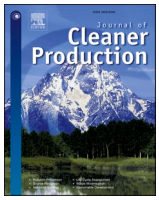

Biodiversity conservation indicators and conflict management: Application of environmental expert-based approach in Romania

Ruxandra Malina Petrescu-Mag [a,b], Dacinia Crina Petrescu [c], Hossein Azadi [a,d,e,*]

[a] Department of Environmental Science, Faculty of Environmental Science and Engineering, Babes-Bolyai University, 30 Fantanele Street, Cluj-Napoca, Romania
[b] Doctoral School "International Relations and Security Studies", Babes-Bolyai University, 1 M. Kogalniceanu Street, Cluj-Napoca, Romania
[c] Department of Hospitality Services, Faculty of Business, Babes-Bolyai University, 7 Horea Street, Cluj-Napoca, Romania
[d] Department of Economics and Rural Development, Gembloux Agro-Bio Tech, University of Liège, Gembloux, Belgium
[e] Faculty of Environmental Sciences, Czech University of Life Sciences Prague, Prague, Czech Republic

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ABSTRACT

Managing conservation projects requires implementing interventions that are influenced by people's knowledge and their ways of comprehending a situation. This complexity often leads to challenges in communication and collaboration, especially in situations where conflicting parties are involved. Therefore, this study was conducted with the aim of strengthening conflict resolution strategies in the context of biodiversity conservation projects. To achieve this objective, the research focused on two main aspects which include the identification of key performance indicators as perceived by environmental experts within a conservation project, and the assessment of conflict management styles employed by these experts. The study performed literature review to select 27 basic performance indicators for biodiversity conservation projects. A survey of 25 experts collected data on their perception regarding the indicators and conflict management style. Using multi-criteria analysis, specifically the direct analysis of a performance matrix, this study ranked 27 basic indicators used to evaluate conservation project performance. The results showed that the most important indicator was "natural regeneration capacity", the most used conflict management style was "integrating", and the least used one was "avoiding". The study recognized that conflicts, when managed effectively, can reveal different perspectives on challenges. Therefore, competitive interests can stimulate innovative problem-solving and generate productive results. This study enhances understanding of conflict management styles, which contributes to improved conflict resolution and, ultimately, better management of biodiversity conservation projects.

1. Introduction

The increasing diversification of anthropic activities has impacted the natural environment at an unprecedented scale. To sustain current global economic growth, the extraction and utilization of natural resources, including both renewable and non-renewable sources, have contributed to changes and declines of biodiversity (Blanco-Zaitegi et al., 2022; Carranza et al., 2020). Biodiversity is considered a core component of the functioning of the environment (Rachel et al., 2021), equilibrium (Merganič et al., 2020), resistance, and dynamics of nutrients (Tilman et al., 2014; Isbell et al., 2015), and plays also a significant role in improving the climate change resilience (Timpane-Padgham et al., 2017; Grooten and Almond, 2018). Today, there are strong pressures to prevent biodiversity loss, reduce direct pressures on biodiversity, improve biodiversity health, and increase biodiversity conservation and management (Tengö et al., 2017; Carranza et al., 2020), and it is not surprising that biodiversity conservation has become a worldwide challenge (Stampa and Zander, 2022; Christie et al., 2021; Houssni et al., 2022).

Conflicts with biodiversity protection initiatives typically require a high level of talent and effort to resolve, and their number and severity are growing globally (Redpath et al., 2013). These conflicts negatively impact biodiversity, livelihoods and human well-being, and could impede the achievement of sustainable conservation management (Redpath et al., 2015). It is essential, however, to better understand what "biodiversity conflicts" means to develop ways to manage these conflicts effectively (Marselle et al., 2021). According to White et al. (2009), a biodiversity conflict contains an active argument between

* Corresponding author.
E-mail address: hossein.azadi@uliege.be (H. Azadi).

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people over wildlife or other elements of biodiversity. Conflicts involving biodiversity are frequently reported in relation to conservation efforts (Salom et al., 2021).

The successful implementation of biodiversity policies and projects is highly dependent on understanding stakeholders' interests and views (Berry et al., 2018). Conflicts that arise within the socio-ecological systems of protected regions frequently decrease the efficacy of conservation measures (Rechciński et al., 2019). Therefore, the central role of individuals in biodiversity conflicts outlines the need for a deeper consideration of the socio-economic and political context of conflicts, rather than restraining the discussion to the ecological context exclusively (Young et al., 2010).

Biodiversity conservation experts' perceptions of the indicators that should be used for the evaluation of the success of a biodiversity conservation project and experts' conflict management style are also relevant within the international context as often resource exploitation and conservation projects involve stakeholders from different countries that must understand each other's needs and perspectives. Experts are primarily defined by their superior performance compared to less skilled people (Ericsson, 2014). In various domains, including sports, music, and sciences, expertise often requires approximately a decade of dedicated practice (Ericsson, 2014; Simon and Chase, 1973). Mieg (2009) further distinguished between excellence, which includes reliably superior performance, and professionalism or professional engagement, such as writing significant textbooks, creating professional methods, or demonstrating best professional practice. In this study the average experience of the experts was 22.4 years (min, max: 10, 44, as explained in Table 1). In the traditional academic sense, as described by Frickel and Arancibia (2022), an "expert" is an individual working in occupations demanding advanced graduate or professional training. Frickel and Arancibia (2022) underlined that their perspective on expertise does not diminish the significance of "lay experts" or "local knowledge" in influencing environmental conflicts or serving as organizing tools for environmental movements, as acknowledged by these authors. Local knowledge, indigenous knowledge, and professionals as experts represent different pathways to expertise. According to Krueger et al. (2012), an expert is defined as anyone with substantial and comprehensive experience or in-depth knowledge related to a particular subject of interest.

Following Hagerman et al.'s (2010) "understanding of experts", in this study, by "expert" we mean individuals with specialized knowledge in biodiversity conservation and demonstrated experience and involvement in biodiversity conservation projects and/or publications. As posited by King et al. (2015), at the global level, there is a considerable need to recognize the differences among stakeholders' values which becomes important when identifying sustainable solutions, and considering the implications of trade-offs within the conservation projects.

Conservation work ultimately takes place through projects (Salafsky et al., 2008) and consequently there is an increased interest for evaluating the impacts of development and conservation projects based on sustainability indicators (Agol et al., 2014). An all-encompassing definition of a project is "any set of actions performed by a group of people and/or organizations in order to accomplish defined biodiversity conservation goals and objectives" (Salafsky et al., 2002).

Biodiversity conservation projects play an essential role in addressing the increasing threats to the planet's ecological balance. However, managing these projects presents challenges that extend beyond the scientific aspects, involving a complex web of perspectives, knowledge systems, and conflicting interests among stakeholders. The success of these projects relies not only on technical proficiency, but also on the ability to navigate complexities and manage conflicts competently.

Table 1
The profile of the experts who participated in this study.

	Average	Min, Max
Age	48.8	35, 66
Gender	60 % men; 40 % women	–
Years of experience in the field	22.4	10, 44

This study addresses the multifaceted area of conservation project management, with the aim of exploring the dynamics of conflict resolution and its implications for successful biodiversity conservation outcomes. This study seeks to improve the understanding of successful conflict management strategies and the ability to promote creative and sustainable solutions by analyzing environmental experts' assessments of performance measurements within conservation programs. The study's emphasis on the conservation of plant species is rooted in the acknowledgment of the crucial role that plants perform in maintaining the health and operational integrity of ecosystems. This study encompasses both the conservation of one and more plant species. The decision to prioritize plant species conservation is intended to lay the foundation for addressing broader ecological concerns, rather than ignoring ecosystem-level considerations. Ecosystems are intricately interconnected, and the conservation of plant species can have ripple effects on the overall balance of ecosystems. Thus, this study acknowledges the interplay between single-species conservation and the holistic preservation of ecosystems. By exploring the perceptions of environmental experts on performance indicators within plant species projects, the study seeks to shed light on how diverse strategies influence not only on specific plants but also on the intricate web of life they support.

The inclusion of the two aspects (performance indicators evaluation and conflict management style) within a single paper can be beneficial and justified for at least two reasons. First, there is an interdependence between performance indicators and conflict management styles within conservation projects. When people seek to reach an agreement, they should first establish mutually agreed-upon standards for evaluating possible solutions (Fisher et al., 2011). Applying this principle to the study context, it can be inferred that effective conflict resolution often relies on how performance indicators are defined and monitored, as these indicators guide decision-making and resource allocation. Separating these aspects into two papers would risk overlooking the crucial interplay between performance indicators and conflict management styles. Second, by presenting both aspects in a single paper, the paper provides a comprehensive understanding of the dynamics at play in biodiversity conservation projects. This holistic perspective helps policy-makers and researchers better navigate the complexities of real-world conservation efforts, where performance indicators and conflict resolution are inseparable components of successful project management.

To address the complexities of conflict resolution in biodiversity conservation projects, this study seeks to answer the following research questions.

1. What are the suitable basic indicators to evaluate the performance of plant biodiversity conservation projects?
2. How do environmental experts perceive and prioritize the performance indicators used in plant biodiversity conservation projects?
3. What are the prevalent conflict management styles employed by environmental experts engaged in plant biodiversity conservation initiatives?
4. How do different conflict management styles influence project outcomes and the potential for innovative problem-solving in the context of plant biodiversity conservation projects?

By addressing these research questions, this study aims to provide valuable insights into the nuanced dynamics of conflict resolution within the context of plant biodiversity conservation projects.

2. Literature review

2.1. Biodiversity conservation and conflict management

Biodiversity is declining globally, primarily as a result of human actions linked to land-use change. The decrease affects not only species diversity but also genetic and ecosystem diversity in a wide range of living organisms (Carranza et al., 2020). In addition to its natural value, biodiversity directly affects the ecosystem benefits that are given to society (Mori et al., 2017).

Conservation measures such as the establishment of protected regions or the preservation of particular species are used around the globe to keep biodiversity and recoup losses. On the other hand, conservation conflictsgrow, as conservation measures become more strict (Winter et al., 2017). According to Redpath et al. (2013), conservation conflicts are "situations which happen when two or more parties with opinions that are held strongly, clash over goals for conservation and when one party is perceived to assert its interests at the expense of another." These disputes have the potential to undermine conservation initiatives and have an effect on human well-being (Zafra-Calvo and Geldmann, 2020); the European "Natura 2000" network locations provide obvious instances of conservation conflicts (Etxano and Villalba-Eguiluz, 2021). Conservation interests have clashed with forestry and farming industries (Zasada et al., 2017); tourism (Horgen, 2021); infrastructure building (Andonegi et al., 2021); and growth interests (Martini et al., 2017) within this unique network.

In the last decades, the participatory approach has become a core instrument in the efforts to manage conflicts over biodiversity objectives (Klenke et al., 2013; Lecuyer et al., 2021). The participation of various societal actors is critical for addressing conservation conflicts and finding equitable and effective remedies. Likewise, a multiple panel of stakeholders in the decision-making and implementation of biodiversity conservation strategies confers legitimacy and compliance (Méndez López et al., 2020) and boosts the transformative learning of good practices (Quang and De Wit, 2020).

Trade-offs between the community's well-being and biological conservation require new approaches to harmonize competing demands. One possible catalyst between research and political agenda is the Intergovernmental Platform on Biodiversity and Ecosystem Services. This expert organization brings together 124 governments and more than 1000 international experts to reconcile the need to fight biodiversity and human well-being degradation (Montana and Borie, 2016). A learning-by-doing approach was valued as the optimum way decision-making must proceed regarding biodiversity conservation in an era of climate change, considering the uncertainties relating to climate change impacts (Hagerman et al., 2010). Javeline et al. (2013) surveyed over 2300 environmental biologists about climate change and threats to biodiversity. They highlighted the opportunity of including experts' opinions in the policymaking process, using standardized surveys, and selecting scientists independent of their policy preferences. However, Alard et al., 2003 and Henle et al. (2008) pointed out that, in conflict resolution, when scientists act as a stakeholder and not as a provider of information, considering that their perceptions, attitudes, and values may differ from those involved in the conflict, their presence may escalate the conflict. The development of more pluralist approaches to biodiversity conservation has been increasingly promoted by practitioners and scientists (Turnhout et al., 2012). Additionally, participatory integrated evaluations have been hailed as a helpful strategy for fostering communication among various fields and knowledge systems (Young et al., 2021). "Participatory integrated evaluations" is an example of a multidisciplinary and collaborative process that brings together, analyzes, and contributes knowledge from various scientific fields to comprehend complicated phenomena.

Despite advances toward more deliberative assessments (Fisher et al., 2020), there is still a dearth of advice on how to adopt inclusive and transparent procedures in conservation practice that accounts for the various aspects of conflicts. Therefore, it is crucial to consider the perceptions of environmental experts regarding the indicators and their style of managing conflicts.

2.2. An overview of the biodiversity conservation context in Romania

There are 1550 protected areas in Romania, of which over two-thirds (606) are "Natura 2000" sites, representing 23% of the country's land area (54 214 km^2) (Biodiversity Information System for Europe, 2022). Over 200 000 ha of virgin woodland remain in Romania's Carpathian area, which is home to roughly two-thirds of Europe's big carnivore populations, including brown bears (*Ursus arctos* Linnaeus), wolves (*Canis lupus* Linnaeus), and lynx (*Lynx* Linnaeus) (Cristescu et al., 2019). After Romania's accession to the European Union, national biodiversity conservation policies aimed to accelerate the creation of the "Natura 2000" network (Evans, 2012). This process caused uncertainty about how to implement biodiversity-specific legislation and through which institutions (Manolache et al., 2017). Consequently, there have been numerous conservation conflicts in Romania related to different types of protected areas, such as "Natura 2000" (Miu et al., 2020). Stringer and Paavola (2013) mentioned the limited involvement in Romania of the NGOs in the implementation of "Natura 2000", a reality rooted probably in the communist legacy of low participation and public authorities' reluctance towards more inclusive governance. However, even countries with no history of centralized authoritarian power were not bypassed by biodiversity conservation conflicts (Morrison et al., 1996; Di Pirro et al., 2021; Oliva-Vidal et al., 2022).

A common language between conflicting parties was challenging in many cases. For instance, in the case of mining, the industry operators did not hire their own biodiversity experts to assess the local environmental situation (Ioja et al., 2015). Custodians misunderstood the "Natura 2000" network's fundamental role and confused this type of protected area with powerful restrictive nature reserve types, such as a national or a natural park (Ioja et al., 2015, 2016).

Conservation project literature testifies to local stakeholders rejection of "Natura 2000" principles, mainly due to poor performance of governance practices to solve the environmental problems, which may lead to conflicts (Blicharska et al., 2016). Thus, the success of a conservation project depends on the synergic effect driven by a multitude of factors. These factors include protective legislation frameworks, coordinated legislation shared by many European countries, supportive public opinion, and practices that allow the coexistence between wildlife and people and relational social capital (Chapron et al., 2014; Gallo et al., 2018).

Regarding the projects dedicated to plant species conservation, within the LIFE Nature and Biodiversity component, 47 projects were co-financed in Romania, which focused mainly not only on the restoration of habitats (alpine and subalpine forests and wet habitats; pastoral ecosystems; wetlands; caves; and natural forests), but also on the conservation of certain animal species (e.g., large carnivores, bats, steppe viper) (European Commission, 2022). For instance, the LIFE Nature initiative will establish a world-class wilderness area in the Southern Romanian Carpathians. The initiative spans over 250 000 ha and comprises of the larger "Natura 2000" site for the Făgăraş Mountains, Piatra Craiului National Park, and Leota Mountain. Out of a long list with intended outcomes of the projects, we mention 500 ha of clear-cuts restored, conversion of 500 ha of spruce monocultures back to a mixed and healthy mountain forest, or 250 ha of alpine grasslands restored with dwarf pine, rhododendron, and juniper (Carpathia European Wilderness Reserve, 2023). Other initiatives were also created to support efforts toward the conservation of plant species. Thus, the FloraRO website (FloraRO, 2023)(https://www.floraro.ro/#) is a non-commercial project that offers current and historical information on the native flora of Romania, and it encompasses the fields of botanical taxonomy, chorology, phenology, and conservation. A Data Repository stores various data regarding Romanian native plant species, and a

collection of original photos of plants from different Romanian habitats and geographical areas, including rare and/or endemic species, is available to those interested.

2.3. Framing the current study within behavioral responses to biodiversity conservation initiatives reflected in the scientific literature

Several international programs have been developed to help governments support, protect, and improve biodiversity and ecosystem services. Public engagement is a key component of these programs, where citizens and experts play a more active role in biodiversity preservation and associated ecosystem services. However, few studies (e.g., Morales-Reyes et al., 2018; Akindele et al., 2021; Lukman et al., 2021) investigated the awareness about the value of ecology, biodiversity, and ecosystem services as an essential issue. The results of Kaltenborn et al. (2016) showed, for example, that biodiversity was perceived as less important climate change, air, and water pollution.

Schebella et al. (2019) argued that since many rare species are endangered worldwide, it is important for human societies to understand the value of biodiversity. However, practical strategies to enhance the recognition of biodiversity by society are limited by the imbalance between public perceptions and expert biodiversity evaluations. Following Sarvašová and Dobšinská (2016) and Bull et al. (2016) findings, there are some crucial issues that experts have identified when it comes to balancing the provision of ecosystem services based on SWOT results. These issues include a more active local stakeholder involvement, enhancing regional initiatives, and economic market-oriented instruments and economic incentives. Caballero-Serrano et al. (2017) investigated residents' perceptions of Sangay Parish (Ecuador) of the features of biodiversity and ecosystem services in a tropical forest. Based on their findings, the protection of ecosystems and their services depends on integrating different users' groups, and developing economically viable alternatives for local people, where environmental education programs play a critical role.

Concerning the acceptance and support of a conservation project, personal and social determinants, such as cultural patterns, social norms, attitudes, and expectations are just as important as personal experiences. As wisely stated by Schultz (2011) and Nielsen et al. (2021), "conservation means behavior", which supports the idea that conservation is a combined effort that relies primarily on people's behavior (such as that of the community, environmental specialists, and investors), rather than that of finances or the natural sciences.

Despite its recognized importance in the success of biodiversity conservation, people's behavior, especially its psychological determinants, received less attention in relation to conservation contexts than the interest focused on compliance with environmental campaigns (McDonald et al., 2014). Traditional conservation campaigns have tried to change people's understanding or attitudes about problems in an effort to influence their behavior. The gap between information or views and following behavior, however, is frequently quite wide. Many prominent environmental campaigns have failed to have positive effects, according to theorists, because people ironically deduce negative social standards from the substance of the appeals (Zasada et al., 2017). Regarding local people, they usually accept and sustain conservation efforts as long as their interests are not threatened; thus, a benefit-based approach is advisable to be adopted (Brédif et al., 2017). However, given the diversity of stakeholders and of their needs and values which were often neglected within the social-ecological literature (Jones et al., 2016) conflicts are inevitable and their improper management hinders the success of conservation projects.

With awareness about the conflicts, drivers of conservation projects have the potential to advance solutions for increasing the efficiency of the conservation project (Dickman, 2010; Meinecke et al., 2018). Communities living in protected areas often do not directly or immediately benefit from conservation projects, leading to a lack of awareness or support for conservation efforts, and in some cases, even to acting against them. The direct benefits of conservation for society are changing the attitudes towards supporting conservation goals and aligning behaviors to ensure conservation efforts (Andonegi et al., 2021). Biodiversity conservation experts are another important stakeholder group besides local people because they participate in all stages of a conservation project, from the initial idea to the post-implementation evaluation stage and in the follow-up of new projects. Thus, they can be involved in conflicts with various groups (e.g., local people or public authorities), and their decisions and behavior influence conflict development. Although the role of participatory approaches in natural resource management has increased recently, especially by the involvement of local people (e.g., in the design of strategies) (Allasiw et al., 2023), in Romania, experts with formal training are still the ones the most often involved in the design, supervision, and evaluation of biodiversity conservation projects. Buxton et al. (2021) elicited experts' input to reveal what information is needed to advance policy actions to conserve biodiversity in Canada. They believed that it was not a dearth of knowledge that hampered biodiversity protection, but rather mechanisms to translate information into useful actions, which needed to be prioritized. The importance of knowledge exchange among science and policy actors was also emphasized by Karcher et al. (2022), who concentrated on enhancing knowledge exchange at the intersection of marine science and policy. A key discovery indicates that engaging in a participatory process can effectively bridge the gap between knowledge and action, offering solutions to the challenges confronted by the social-ecological system (e.g., Behboudian et al., 2023; Pagano et al., 2019). It is also seen as a driver for changing human behavior and attitudes about nature and producing transformative change (Díaz et al., 2019).

While community, as well as other groups, such as authorities, were investigated concerning conflicts (White et al., 2009; Peterson et al., 2010; Redpath et al., 2013; Young et al., 2016; Pourcq et al., 2017; Baynham-Herd et al., 2018), there is still a dearth of information in the biodiversity conservation or conflict management literature concerning the environmental experts. Against this backdrop, the authors of this study considered important to investigate this group of stakeholders. The authors argue that two issues are highly relevant for conflict management in relation to experts: their perceptions (such as perceptions about the importance of performance indicators) and their conflict management style.

In this study, the term "perception" was used with the meaning found in the marketing literature. Hanna et al. (2017) defined perception as the process of selecting, organizing, and interpreting sensations into a meaningful whole. This process is highly subjective and influenced by an individual's frame of reference. For example, people perceive "higher" or "lower" plant diversity in selected pictures depending on their biodiversity literacy (biologists vs laypeople) (Breitschopf and Bråthen, 2023) In this study, experts evaluated various concepts, assigning scores on a scale from 1 to 7, and, as a result, provided their interpretation of reality. Therefore, the term "perception" was deemed appropriate. In this study, the primary focus was on examining the "experts' perspective", which was referred to as "perception". It's important to note that knowledge, specifically propositional knowledge concerning factual information (distinct from skills or procedural knowledge, like knowing how to swim), has a clear connection to perception. The term is widely used, but its definition remains a subject of significant debate. Cambridge Dictionary (2023) defines it as "understanding or information about a subject gained by experience or study, or known by an individual or generally by people". Zagzebski (2017) defined knowledge as "justified true belief" and as "cognitive contact with reality arising from acts of intellectual virtue". Studies showed that perception is influenced by knowledge (Abdel Rahman and Sommer, 2008) and that perception is a source of knowledge (Rock, 1985). There are various understandings of "perception" and "knowledge" in the literature (Pritchard, 2013) and this study does not aim to debate on them. In this paper, the term "perception" was used to serve the purpose of this study. The meaning

assigned here to "perception" was explained to create a common understanding of this word among readers in the context of the present paper.

The current social approach can shape or re-shape the whole context regarding the implementation of biodiversity conservation projects by highlighting the importance assigned to evaluation criteria, understanding of priority issues for experts, knowledge regarding their behavioral patterns in conflict situations, etc. Concerning the experts' perceptions, the authors selected experts' perceptions regarding the indicators that measure the performance of the conservation project. Following Shear et al.'s (2003) understanding of indicator, the "basic performance indicator" was defined as a parameter or value, used alone or in a combination suitable for all types of conservation projects, that is able to provide information on different stages of development of a project and to assess the progress toward one or more objectives.

Biodiversity conservation is a complex and multifaceted endeavor shaped by various purposes and perspectives, each rooted in distinct values, objectives, and motivations. Therefore, this study examines this from the perspective of ecological integrity and sustainability. In this context, the primary aim is to maintain and restore the natural balance and functioning of ecosystems, as emphasized by González (2023). Conservation efforts are dedicated to protecting biodiversity to ensure the resilience of ecosystems and their ability to provide vital services (Shaver et al., 2022). This perspective emphasizes the key role of biodiversity in maintaining ecological stability, encompassing processes like nutrient cycling, pollination, and pest control. Protection of species and the recovery of endangered species are the focus of another perspective (Williams et al., 2022). In this study, the focus is on protecting individual species, especially those facing the threat of extinction. Conservation efforts are directed towards preventing the loss of species and facilitating their recovery. This perspective acknowledges the unique value of each species and places significant emphasis on the ethical and moral responsibility of protecting them (Rolston, 1985). In the context of biodiversity conservation from cultural and indigenous perspectives, there is a strong emphasis on respecting and preserving cultural practices and traditional knowledge that are deeply intertwined with specific landscapes and species (Ford et al., 2020). This perspective acknowledges the cultural significance of biodiversity. In this case, conservationists collaborate closely with indigenous and local communities to protect biodiversity while respecting their cultural heritage (Molnár et al., 2023).

In the context of habitat restoration and protection within biodiversity conservation projects, success can be measured by specific achievements. For example, the project could be considered a success if it results in the creation of new protected areas, the revitalization of a deteriorated wetland, and the elimination of obstacles that previously divided a forest habitat. The extent and number of these protected areas often serve as common indicators to assess the effectiveness of conservation efforts (Armenteras et al., 2003; Ferreira et al., 2022; Maxwell et al., 2020; Rochette et al., 2019; Rodrigues and Cazalis, 2020). Similarly, another critical measure of conservation project success involves the provision of ecological services that benefit humans, including ecosystem products and life support functions. These services highlight the effectiveness of biodiversity projects due to the provision of a tangible value obtained from the protection of natural ecosystems (Cheng et al., 2023). Regarding species diversity, a successful outcome may entail documenting the return of various amphibian species to an area previously impacted by human activities (Chandler, 2023). Such a development would signify an enhancement in species composition, illustrating progress in the conservation effort."

Despite significant efforts to develop biodiversity indicators, they are often underused in decision-making (Rochette et al., 2019). It is reported that the success of conservation projects relies on measuring and evaluating their sustainability (Spânu et al., 2022). The selection of robust indicators can be challenging. According to Heink and Kowarik (2010) and (McQuatters-Gollop et al., 2019), several indicators are experimentally evaluated to determine if they meet the criteria that justified their selection. The indicators should address not only the scientific problem, but also the decision-making requirements and policy objectives for biodiversity conservation (McQuatters-Gollop et al., 2019). Moreover, according to (Burbano-Girón et al., 2022) [citing (Franklin et al., 1981; Noss, 1990)], a comprehensive representation of biodiversity must measure three attributes: composition, structure, and function. Considering these requirements, the process of indicator selection aimed to choose indicators that fell into one of the following categories: "compositional" (e.g., natural species dominance and diversity of ecosystems), "structural" (e.g., integration with the landscape), and "functional" indicators (e.g., self-sustainability of the system). Additionally, as native vegetation is threatened by overgrazing, ongoing clearance, or poor land management (Lawley et al., 2016), the current study included two other categories of indicators to predict the outcomes of a project. The first category refers to "evaluative" indicators (Li et al., 2021). Evaluative indicators are known to be associated with significant factors and have the ability to estimate a site's conservation value or habitat quality (e.g., social acceptance of conservation projects and environmental justice). In this context, the second category is referred to as "performance" indicators. These indicators are typically employed to assess the effectiveness of a project in terms of goal attainment or progress toward those objectives, as outlined by Cabeza et al. (2015). Their primary purpose is to quantify the tangible outcomes of conservation projects using measurable terms. These measurable aspects may include the duration of the conservation project, its efficiency, and effectiveness.

Practically, in the present study, a two-fold reason supported the decision to investigate perceptions, more precisely, environmental experts' perceptions of the 27 basic performance indicators. One reason was that perceptions (also named frames) used in the conflict management process and negotiation are essential for understanding and recognizing the behaviors that have the potential to create and maintain win-win solutions. These perceptions reveal what information is needed to make a decision and they will guide the negotiator's behavior (Petrescu-Mag et al., 2018). Another reason to evaluate the expert perceptions on basic performance indicators is that these indicators measure the success of a project, thus guiding its implementation and influencing dispute resolution (Ioja et al., 2015; Todorović et al., 2015).

Conflict management refers to the actions people take in response to the conflicts they encounter, either intentionally or actually, as a pattern (Ma et al., 2008; Van de Vliert, 1997; Ma et al., 2008; Van de Vliert, 1997; Winardi et al., 2022) or the approach adopted to manage conflict (Thomas, 1992). When applying classification criteria to conflict management, various styles can be observed. The conflict management style is caused by many factors (e.g., personality, concern for relationship, habits, and social norms) which can be identified when we study the structure of the conflict. Conflicts may be analyzed from a procedural or structural perspective. A process model is focused on the descriptions of conflict steps and a structural model tries to identify the parameters that encourage different conflict management styles (Thomas, 1992). A structural model is concerned with the variables that influence conflict behavior and take into account four types of variables. These variables are: (a) behavioral predispositions or styles of the conflicting parties; (b) social pressure (e.g., norms); (c) incentive structures (e.g., parties' stakes and the existing conflict of interests between parties' objectives); (d) rules and procedures regarding the interaction process between conflicting parties (Thomas, 1992). Consequently, the effect of these four variables will generate a certain conflict management style. These variables can also be identified in Niemelä et al. (2005) study, who recommended to include three dimensions (adapted from (Daniels and Walker, 1997) in conflict analysis and management in a biodiversity setting: substance (how things are), procedure (how things are done), and relationships (how people behave). These perspectives indicate that in relation to a biodiversity conservation project, conflict management includes many aspects. They range, from ways to negotiate

disagreements to the understanding of different value systems, and support of communication processes over a longer term with stakeholders of the biodiversity conservation project. This study focused only on the identification of experts' conflict management style. For this reason, the term "conflict management style" refers only to how experts behave in conflicts their behavior being identified using the methods described in section 3.4..

Most individuals believe that the world seems the same to everyone else as it does to them. In other words, what people consider to be fair, significant, urgent, normal, or essential is frequently assumed to be shared by others (Voss and Raz, 2016). Consequently, they also often assume that people behave similarly to them, including in conflict. Accurately identifying the other's style helps us assign the correct meaning to their actions and react adequately and effectively. For example, university degree programs or other professional trainings for conservation practitioners can benefit from knowing experts' conflict management styles in several ways. Training sessions can be tailored to address areas where experts need improvement. It can help trainers communicate effectively with experts, to prevent conflict escalation, and to build trust and relationships. Trainers can help other stakeholders (e.g., local people and authorities) to react properly to experts' conflict management style. All these can improve the value gained by each party and resource use (such as time and money associated with the project).

While it is clear that perceptions and behaviors of biodiversity experts towards the success of conservation measures are relevant to conflict (resolution), many other aspects are critical and often more closely related to specific conservation actions, governance, and communication (Bosone and Bertoldo, 2022; Bennett et al., 2019). In recent years, however, various scholars e.g., Bennett et al. (2019); Niesenbaum (2019) called for greater convergence of ecological values to improve biodiversity conservation. Ecologists and other environmental professionals have proposed recommendations of land-use developers to protect habitats and minimize the adverse production impacts on biodiversity (Bax et al., 2019; Quispe Zúñiga, 2020). Zoning ordinances, subdivision and land-use laws, growth management systems, and conservation development structures are among the planning and preservation instruments available to implement these rules. (Kaplan-Hallam and Bennett, 2018). These methods for protecting biodiversity are frequent instances of effective practices (Bennett et al., 2019). A conservation project's participation, or the extent to which locals are engaged in those projects to increase community members' understanding of conservation goals, is one of the key factors in determining the project's success (Takala et al., 2022).

3. Methods

3.1. Selection of basic performance indicators

For the identification of environmental experts' perceptions regarding the indicators used to evaluate the success of a conservation project, first, the literature review was performed to find the widest possible categories of indicators used in plant species conservation projects. The literature review step responded to the first objective of this study. Based on the selected scientific studies (Heink and Kowarik, 2010; Bal et al., 2018), previous uses of indicators for conservation projects were identified, regardless of conservation type (e.g., bog restoration and biodiversity conservation in agricultural landscapes). The indicators extracted from the literature for the current study complied with the criterion of being suitable in plant species conservation projects. As a result, in this study, the indicators used have been named "basic performance indicators".

In addition to the basic indicators, each conservation project may require using of other indications tailored to the specificity of the project to generate a more comprehensive project success evaluation. However, the scope of this study was to generate and evaluate the basic set of performance indicators for plant species conservation projects and not to focus on a set of indicators dedicated to a specific conservation project (e.g., gypsum-quarry restoration, restoration of coastal halophyte vegetation, revegetation, and reclamation of metalliferous mine wastes).

We followed several steps often used when performing a literature review (Harris et al., 2014; Khan et al., 2003; Uman, 2011; Wright et al., 2007). First, we formulated the review question as "What are the basic performance indicators used in plant species conservation projects?". Second, we defined the inclusion and exclusion criteria (time span, language, topic, peer-reviewed journals, impact factor, and database). A time span of 32 years, 1990–2022, was the reference time frame for selecting the studies. The following parameters were used to find and pick 115 manuscripts and documents: English papers published in peer-reviewed journals with an impact factor greater than 0.1 or those found in Scopus, books, and laws. The third step was to develop the search strategy (selection of the platform, backward and forward snowballing, responsibilities assigned between the authors in terms of personal communication with experts in the field). Searches were carried out on electronic databases downloaded from Anelis plus network (e.g., Cambridge Journals, Emerald Management Journals, ScienceDirect Freedom Collection-Elsevier, Scopus-Elsevier, SpringerLink Journals, Springer, Web of Science-Core Collection, and Wiley Journals) (Information portal). The fourth step was to select the studies (list of abstracts was retrieved and reviewed; then, to achieve the inter-rater reliability, two of the authors reviewed the full-text of the papers that appeared to meet the inclusion criteria). Titles and abstracts were independently checked and, eventually, 42 full-text documents were kept, and 27 basic performance indicators were chosen. The fifth step was to assess the study quality (e.g., study design, COREQ guidelines for qualitative research, representativeness of the sample for quantitative studies). The last two steps were to extract the relevant data, and analyze and interpret the results. Fig. 1 offers a snapshot of the literature search process.

3.2. Multi-criteria analysis and the expert-based approach

Multi-criteria analysis under the form of direct analysis of the performance matrix was used to establish preferences between performance indicators, taking into account several evaluation criteria. This method was selected to achieve the second study objective. Multi-criteria research is a group of techniques that include a wide range of distinct approaches, but they all require a process of judgment (Department for Communities and Local Government, 2009). They are used to rank options or distinguish between the most preferred one and the rest, or between acceptable and non-acceptable options. The main contribution of multi-criteria analysis is that it offers a solution to decision-makers that need to process large amounts of complex information (Department for Communities and Local Government, 2009). The flexibility of the required number of participants is an important advantage of multi-criteria analysis, and, thus, the number of decision-makers involved in multi-criteria analysis may include all key stakeholders, a limited number of them, or even only the analyst (Department for Communities and Local Government, 2009; Macharis et al., 2012; Ward et al., 2016).

Multi-criteria decision analysis is a decision-making analysis used to solve operational research problems with a finite number of decision options (Mutikanga et al., 2011). In this method, decision-makers have to choose the best option (alternative) among the limited set of options based on a set of criteria (Dahooie et al., 2019). An elementary method of multi-criteria analysis is the direct analysis of the performance matrix using the weighted sum (Mutikanga et al., 2011). This consists of the decision-makers' evaluation of options using given criteria, allowing the experts to easily define the benefits and disadvantages of the options and choose the right one. This approach was chosen for the present study because it could be extended to subjective criteria, such as those specific to environmental programs, and because a large number of participants were not needed. In this present study, the evaluation was made by a

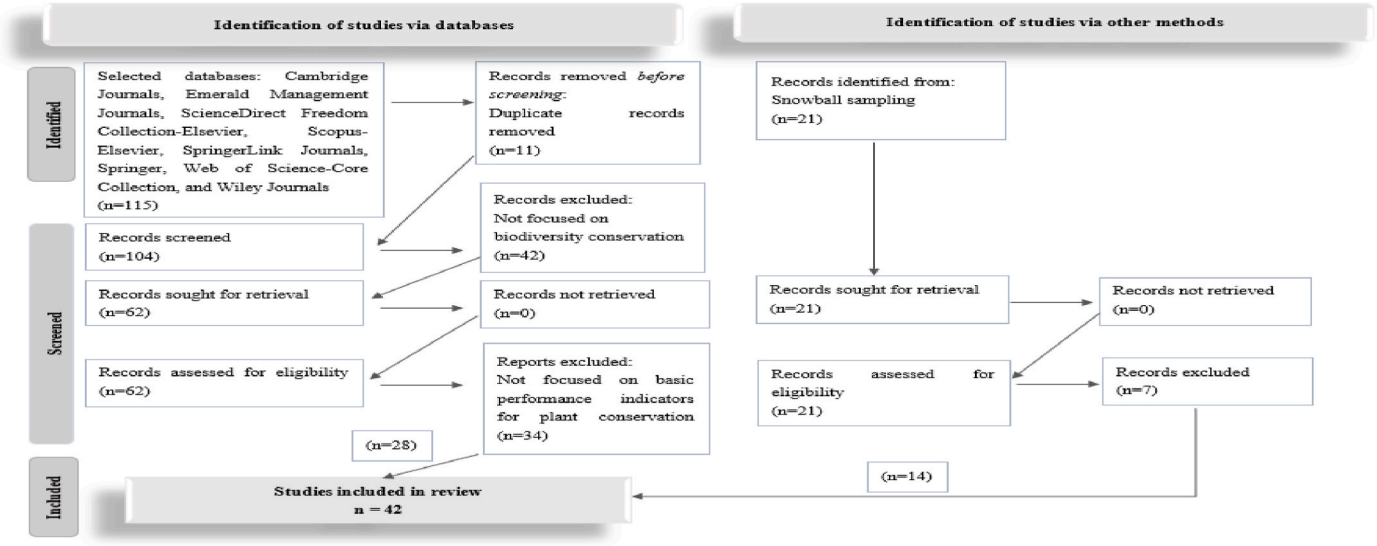

Fig. 1. Flow diagram of the literature review process.

panel of 25 environmental experts (with experience in biodiversity conservation). The experts were selected based on the following steps. First, we searched Google to identify NGOs and other organizations that implemented biodiversity conservation projects in Romania (during 2010–2020). Second, a list with protected areas was accessed (http://anap.gov.ro/). An email was sent to 100 contacts from these two sources requesting them to respond to an online questionnaire. The final group that responded to the questionnaire contained 25 environmental experts (Table 1). A similar number of participants were used in other studies focused on biodiversity. Karcher et al. (2022), for example, identified 49 prospective specialists and eventually had 33 of them participate in the survey to provide ideas on how to enhance knowledge sharing at the intersection of marine science and policy. Hagerman et al. (2010) presented the findings of 21 in-depth conversations with biodiversity and climate change adaptation specialists about the effects of climate change on conservation strategy.

The expert-based approach was preferred to evaluate the suitability of the performance indicators and select those most suitable for evaluating a conservation project. The reason for using an expert panel is that the procedure can be used when uncertainty is high, indicators are not comparable, and a high number of criteria must be compared (Linstone, 1975). This is often the case of environmental projects, such as conservation and management ones (Battisti and Zocchi, 2018). Various methods involving expert-based approaches were used worldwide for conservation or other ecological projects (Lowe and Lorenzoni, 2007; Amici and Battisti, 2009; Kang et al., 2016; Dagonneau et al., 2017).

3.3. Procedure to obtain experts' perceptions of performance indicators

A performance matrix was used in this study to establish preferences between performance indicators. The entries or the options of the matrix were represented by performance indicators that should be used for the evaluation of the efficiency of a conservation project: 27 basic performance indicators selected from the literature review. Each of the 27 indicators was evaluated by a panel of 25 environmental experts on a scale from 0 to 10 based on four evaluation criteria. The four evaluation criteria were selected by researchers from the scientific literature and adapted to the specificity of this study (Table 2) as follows. Researchers initially selected five evaluation criteria that were used in other studies to measure the success of a "project" (Table 2, left side) (Beck, 2016; Ghosn et al., 2016; Guillet and Semal, 2018; Marques et al., 2011; European Commission, 2019; OECD, 2019). Then, considering that in the present case, the purpose was to evaluate "indicators" (for projects), researchers adapted the five initial evaluation criteria (Table 2, left side: relevance, efficiency, effectiveness, impact, and sustainability), and four evaluation criteria resulted (Table 2, right side; importance, cost level of the use of the indicator, ease of use within the affected human community, and ease of technical use). Practically, environmental experts evaluated four times the same 27 indicators. The first time, they evaluated the 27 indicators from the perspective of their relevance for the evaluation of the project success (the first criteria). The second time, they evaluated the 27 indicators from the perspective of their cost, and so on. Being aware that the four criteria can be perceived more important by some experts compared to the others, experts were requested to evaluate their importance. The four criteria were weighted by the panel of experts, on a scale from 0 (meaning "I strongly believe that this criterion must not be used") to 10 (meaning "I strongly believe that this criterion must be used"). The experts' evaluations of these four criteria were then used by researchers to weight experts' evaluations of the 27 performance indicators and to obtain the final weighted scores of the performance indicators.

3.4. Experts' conflict management style and their perception of biodiversity conservation conflicts in Romania

The third research objective was to determine the experts' dominant conflict management style. This was identified using Rahim's (1983) questionnaire with a structure adapted by Song et al. (2006) (Table A1, Annex). Various instruments are used to evaluate a person's dominant conflict management style, including Thomas-Kilmann Conflict Mode Instrument, Rahim's Inventory of Organizational Conflict, Hall's Conflict Management Survey, etc. (Volkema and Bergmann, 1995). They all consider three levels (low, medium, and high) of two variables: care for self-interest and care for the interests of others. As a result, five conflict management styles are generated: "Integrating" (high concern both for self and for others); "Accommodating" (low concern for self and high for others); "Forcing" (high concern for self and low for others' interests); "Avoiding" (low concern both for self and for others); and, "Compromising" (moderate concern both for self-interests and for others' interests). For the present study, Rahim's questionnaire was preferred because it has been often used in conflict management style research (Lu and Wang, 2017). Experts were asked to show their compliance with statements that defined their conflict management style on a scale from 1 (strongly disagree) to 7 (strongly agree).

To understand experts' perceptions regarding biodiversity conflicts in Romania, they were asked if there were conflicts related to

Table 2
Criteria used to evaluate projects and their adaptation in the current study to generate evaluation criteria employed for the evaluation of the indicators used for the appraisal of the performance of a biodiversity conservation project.

Criteria used to evaluate projects (selected from literature)		Criteria to evaluate the indicators (used in the present study)	
Name	Meaning	Name	Meaning
1. Relevance	The capacity of the indicator to reflect the goals and objectives of the project, its importance for the evaluation of the project, or its necessity to be used to have a correct evaluation of the project.	1. Importance	The necessity to use the indicator.
2. Efficiency	It refers to the inputs/outputs ratio.	2. Cost level of the use of the indicator	It refers to the costs involved by the use of the indicator in the evaluation of project efficiency.
3. Effectiveness	The extent to which an action fulfills its objectives.	3. Ease of use within the affected human community[a]	The ease of obtaining the community support for the implementation of the project.
		4. Ease of technical use[a]	The ease of technical implementation of the project actions.
4. Impact	The positive and negative changes produced by the project.	–	"Impact" was not considered suitable as a criterion to evaluate indicators.
5. Sustainability	The permanence of the effects of the project.	–	"Sustainability" was not considered suitable as a criterion to evaluate indicators.

[a] Ease of use was split in two indicators to better adjust to the characteristics of the biodiversity conservation projects implementation and performance.

biodiversity conservation projects in Romania and if the answer was "yes", to indicate who are the conflicting parties. They were also asked to say if conflicts had negative influence on the project's performance (on 7-point scale, from 1 = no negative effect to 7 = very strong negative effect).

The questionnaire was validated, pretested, and adjusted before its implementation. A panel of four environmental experts confirmed the questionnaire's validity (validity is concerned with whether a test measures what is supposed to measure). They evaluated the content validity, which is whether the questionnaire items are measuring the construct they aim to assess in a good way (i.e., what indicators should be used, what criteria, and what are the conflict management styles) and whether the items are sufficient to measure the topic of interest. To this end, experts assessed the following aspects of the questionnaire: "the questions were clear and easy"; "the questions covered all essential aspects about study topics"; "they would like the use of this questionnaire for future assessments"; "the questionnaire lacks important questions regarding the study topics" (Tsang et al., 2017). The experts also evaluated face validity, which is the ability of the questionnaire to be understandable and relevant to the investigated population (i.e., environmental experts) (Tsang et al., 2017). Moreover, the questionnaire was pretested to make sure that the wording was appropriate and understandable for respondents and was adjusted accordingly where needed. An overview of the research methods used in the study and their connection to study objectives are presented in Fig. 2.

4. Results

4.1. Selection of a set of basic performance indicators

The three objectives of the study are closely interconnected and provide a comprehensive framework for evaluating the success of plant species conservation projects in Romania. In line with the first objective, we identified the most used indicators in similar projects. The 27 basic performance indicators selected from the literature are described in Table 3. Their meaning was explained to the respondents in the questionnaire.

4.2. Experts' perceptions regarding indicators for the evaluation of project performance

The second research objective focused on gathering the views of Romanian environmental experts on the most appropriate basic performance indicators to be used in assessing the success of the conservation project. Because the indicators can be judged using different criteria, the importance of these criteria was also evaluated. Thus, the relative importance of the four criteria (see Table 2 for criteria) that should be used in the evaluation of the performance indicators was evaluated by the 25 experts, following the recommendation to think how important each criterion should be in evaluating the suitability of indicators. On average, the "Importance of the indicator" received 7.2 points, the "Ease of use within affected community" received 7.3 points, the "Ease of technical use" collected 7.2 points, and the "Cost level" received 6.2 points.

The results of the analysis of performance indicators show that according to the experts, the most important indicator for the evaluation of the performance of biodiversity conservation projects was "Natural regeneration capacity" (with weighted score (WS) = 5.9), while the least appropriate one was "Environmental uncertainty" (WS = 4.8) (Fig. 3).

The study focused on the relationship between the evaluation of the 27 indicators and factors such as gender, age, and years of experience. An independent-sample *t*-test was conducted to compare the scores for men and women for the evaluation of the 27 indicators, considering each of the four evaluation criteria ($27 \times 4 = 108$ evaluations). In most cases, there was no significant difference in scores for the two groups. A significant difference was observed only in three cases: the absence of

threats, participatory features, and social value. Taking into account the cost associated with using the indicators in all three scenarios, women perceived the cost to be significantly higher than how men perceived it [t (23) = 3.39, p = .002; t (23) = 2.35, p = .028; t (23) = 2.50, p = .02]. An independent-sample *t*-test was also run to compare the scores for men and women for the evaluation of the four criteria used to evaluate the indicators and no significant difference was found. This means that gender is not important in the evaluation of the indicators.

The relationship between age and the evaluation of the 27 indicators considering the four criteria was investigated using the Pearson product-moment correlation coefficient. The relationships observed were predominantly positive. This suggests that as the age of the experts increased, the importance of the indicator, the perceived ease of using the indicator, and the perceived cost of using the indicators all tended to increase. In most cases, this study found a correlation (48 %: small strength; 16 %: medium strength; 1 %: high strength; 35 %: no relationship). Similarly, in about half of the cases, a correlation exists between the years of experience and the evaluation of the 27 indicators (47 %: small strength; 2 %: medium strength; 3 %: high strength; 48 %: no relationship). These results show that we can expect that experts' evaluations often vary according to their age and experience, although the connection is usually weak. Thus, for example, the results indicate that older experts will assign higher importance to certain indicators. Consequently, they will support the use of the indicators that are more important to them and will negotiate harder to include them among the indicators used for the evaluation of the project success."

"The relationship between gender, age, and years of experience, on the one hand, and conflict management style on the other hand was studied. An independent-sample *t*-test was conducted to compare the scores for men and women for the conflict management style. For this purpose, this study calculated an average score for each style from the items that composed the styles, so this study ran four t-tests. Only one significant difference was found, for the integrating style, with this style representing better women compared to men [t (23) = −2.10, p = .047].

The relationship between age, years of experience, and conflict management styles was investigated using the Pearson product-moment correlation coefficient. The accommodating style was not influenced by age and experience. The forcing style was weakly and positively correlated with age, meaning that this style was more representative of the older experts compared to the younger ones. The length in years of experts' experience did not influence use of this style. The avoiding style was weakly and positively correlated with both age and experience. The compromising style was weakly and negatively correlated with age and experience, indicating that the younger and less experienced experts compromise more often. Finally, there was no correlation between age and the integrating style but an average correlation with the years of experience.

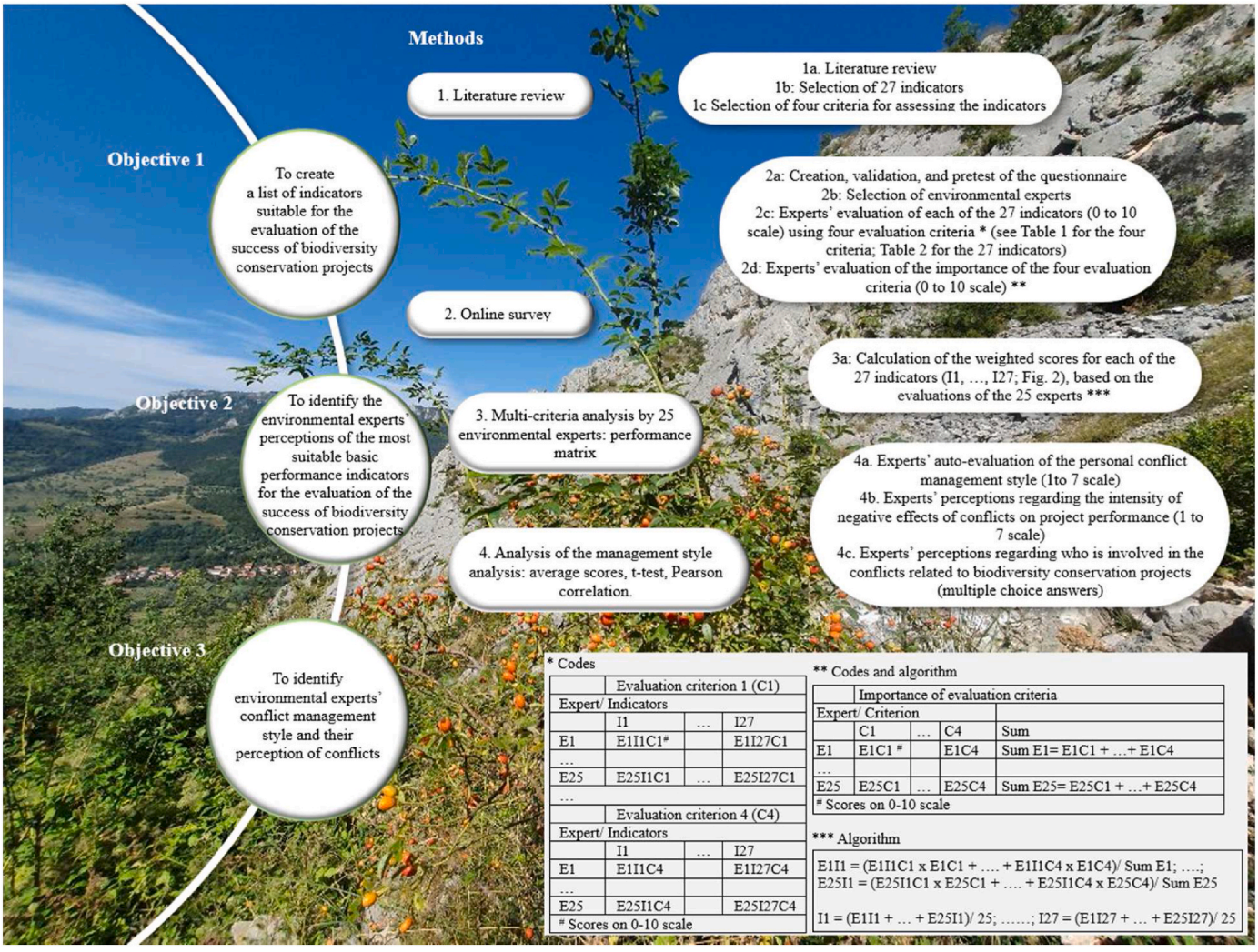

Fig. 2. Overview of the research methods [Photo: Rich plant biodiversity (e.g., dog rose, ash, wild pears) on a limestone massif, in Rimetea village, Romania, during summer 2023); Source: authors' personal archive].

Table 3
Basic performance indicators used in the evaluation matrix and their meaning.

Indicator description	Referenced literature
Self-sustainability of the system: It means that the system must be self-perpetuating and there is no need for subsidies (external support) (biocides, fertilizers, or irrigation) to maintain itself.	(Brown and Lugo, 1994; Palmer et al., 2005; Dos Santos et al., 2008; Keenelyside et al., 2012)
Natural regeneration capacity: It evaluates the potential of the species to re-establish after a disturbance occurs.	(Meli et al., 2013)
Natural species dominance: It evaluates the dominance of individual species in a selected area where the project will be implemented.	(Meli et al., 2014)
Absence of threats: It refers to the cessation of threats such as overutilization and contamination; elimination or control of invasive species.	(Keenelyside et al., 2012)
Integration with the landscape: It means to become a part of the landscape.	(Ruiz-Jaen and Aide, 2005)
Productivity: It refers to the productive nature of the system and this should be as the original one.	(Brown and Lugo, 1994)
Diversity of ecosystems: It refers to the richness and abundance of organisms within different trophic levels.	(Nichols and Nichols, 2003; Ruiz-Jaen and Aide, 2005; Keenelyside et al., 2012; Asaad et al., 2017; Han et al., 2020)
Vegetation structure of an ecosystem: It is usually determined by measuring the vegetation cover (e.g., herbs, shrubs, trees), woody plant density, biomass, or vegetation profiles: These measures are helpful in predicting the direction of plant succession.	(Wilkins et al., 2003; Ruiz-Jaen and Aide, 2005)
Ecological processes of an ecosystem: They refer, for example, to nutrient cycling and biological interactions (e.g., mycorrhizae, herbivory). They are important because they provide information on the resilience of the restored ecosystem.	(Ruiz-Jaen and Aide, 2005)
Vulnerability to invasions: It means that the ecosystem has to resist invasion by other species.	(Brown and Lugo, 1994)
Ecological replacement: It means that the conservation program should be a source for the ecological replacement to re-establish a lost ecological function and/or modify habitats.	(McGowan et al., 2017)
Genetic (un)certainty: It means that an understanding of the genetic population structure of planned species may be very relevant and helpful. Reduced populations can suffer a loss of genetic diversity with implications for long-term viability.	(Ellstrand and Elam; IUCN, 2017; Hoban et al., 2021; Martínez-Jauregui et al., 2021)
Effectiveness: It encompasses the establishment and maintenance of an ecosystem's values. If this feature is accomplished, the restoration project can produce the intended or expected result.	(Keenelyside et al., 2012)
Efficiency: It makes the restoration project function in the best possible manner with the least waste of time and effort. An efficient ecological restoration maximizes beneficial outcomes while minimizing consumption of time, resources, and effort.	(Li and Pritchard, 2009; Keenelyside et al., 2012)
Time horizon of the conservation project: It refers to the time needed to respond to management interventions and maintain the gains of biodiversity conservation.	(Gullison and Hardner, 2009; Guerrero et al., 2013)
Environmental uncertainty: It refers to random or at least unpredictable changes in weather, food availability, predators, parasites, etc.	(Soulé, 1987; McGowan et al., 2017)
Adaptive capacity to different soils: It means the capacity of a system to adapt to different soils.	(Sharma and Sunderraj, 2005)
Resilience to natural disturbances: It refers to the ability to prepare for, absorb, recover from, and more successfully adapt to adverse natural disruptions.	(Ruiz-Jaen and Aide, 2005)
Application of precautionary principle: It refers to the need to anticipate harm before it occurs and act accordingly.	(Australian Government, 2003)
Ethics: conservation ethics drive collection and display policies, site development plans, building materials, educational offerings, interpretation, resource consumption, and other activities.	(White, 1996; Havens et al., 2006; Berry et al., 2018)
Nonmonetary values: It refers to the capacity to maintain cultural sustainability, cultural vitality, diversity, and conviviality, the supply of ecosystem services such as habitat provision or carbon fixation.	(Ehrenfeld, 1981; Putnam, 2000; Axelsson et al., 2013)
Participatory feature: It refers to the involvement of project partners and stakeholders.	(McDonald et al., 2016; Derak et al., 2018)
Social acceptance of conservation project: It implies the understanding of how conservation projects can affect communities. It is particularly critical as often a misunderstanding jeopardize social and biological goals.	(Luz, 2000; Turner et al., 2000; Meli et al., 2014; Persha and Andersson, 2014)
Social value: It identifies locally salient species that shape the perceptions of local people of (i) the natural abundance of the species and (ii) the local values of species for the provision of food, materials, medicine, and/or cultural practices (their utility).	(Garibaldi and Turner, 2004; Meli et al., 2014; Dans and González, 2019; St-Laurent et al., 2022)
Technical feasibility for the propagation of species: It identifies cost-effective techniques for successful species propagation (e.g., treatment requirements for seed germination, alternatives for introduction in the field).	(Knowles et al., 1995; Meli et al., 2014)
Legitimacy of the project: It secures institutional and legislative support. This indicator refers, in fact, to legal and administrative feasibility and political viability (meaning the project' consistency with the current national/international legal framework, its degree of ease of implementation, and its acceptability by various relevant stakeholders who hold the political power).	(Paloniemi and Tikka, 2008; Krause and Nielsen, 2014; McDonald et al., 2016; Choulak et al., 2019; Kokkoris et al., 2020)
Environmental justice: It implies equity in the sense of fair social allocation of burdens. Within the present study, only the distributional dimension of environmental justice is considered ("who gets what" meaning how the "goods" and the "bads" of the conservation project are distributed within a community).	(Barrow and Murphree, 2001; Petrescu-Mag et al., 2016)

4.3. Assessment of experts' conflict management style and their perception regarding biodiversity conservation projects

The third objective aimed to determine the conflict management style of the experts. In terms of conflict style evaluation, the mean values of conflict management styles were calculated (Lu and Wang, 2017). As shown in Table A2., Annex, "Integrating" was the dominant style, while "Avoiding" was the least used one.

The relationship between gender, age and years of experience, on the one hand, and conflict management style on the other hand was studied. An independent-samples *t*-test was conducted to compare the scores for men and women for the conflict management style. For this purpose, we calculated an average score for each style from the items that composed the styles, so we run four t-tests. Only one significant difference was found, for the integrating style, with this style representing better women compared to men [t (23) = -2.10, p = .047].

We used Pearson product-moment correlation coefficient to see the relationship between age, years of experience and the conflict management styles. The accommodating style was not influenced by age and experience. The forcing style was weakly and positively correlated with

age, meaning that this style was more representative for the older experts compared to the younger ones. Experience did not influence the use of this style. The avoiding style was weakly and positively correlated with both age and experience. The compromising style was weakly and negatively correlated with age and experience, indicating that the younger and less experienced experts compromise more often. Finally, there was no correlation between age and the integrating style but an average correlation with the years of experience.

The panel of experts who participated in this study acknowledged conflicts as a hindering factor of biodiversity conservation projects in Romania. They assigned 5.8 points to the degree of negative effects of conflicts on project development (the strongest degree on the scale was represented by 7 points).

An examination of environmental experts' perceptions regarding who is involved in biodiversity conservation conflicts shows (Table A3.) that the most important factor in maintaining biodiversity is the perspective of local communities, having the highest frequency (F = 36). The frequency (F) shows how many times "Local community" was mentioned by the experts as being involved in biodiversity conservation conflicts with other stakeholders. F value can range from 175 [when a stakeholder is mentioned by each of the 25 experts in all possible pairs with the other (seven) stakeholder categories] to 0 (when a certain stakeholder is not mentioned by any expert). Then, there are environmental experts (independent from the conservation project, coming from NGOs, universities, etc.) (F = 29); the biodiversity conservation project team (F = 20); environmental public authorities (for example, ministry of the environment, environment agency, national environmental guard) (F = 19); other public authorities (other than the environmental ones, such as city hall, court of accounts) (F = 13), companies (F = 13), citizens living in other areas (F = 4). Nobody mentioned other groups (F = 0) and two experts considered there was no conflict (F = 2) (Table A3.).

5. Discussion

Economic activities and the preservation of financial benefits can seriously threaten the sustainability and conservation of biodiversity and greatly reduce the efficiency and public spending on local biodiversity conservation. The expert opinion in Romania showed their great interest in environmental protection activities. They can act as experts and opinion leaders in front of the public to increase people's understanding of the importance of protecting natural ecosystems and ensure a balance in ecosystem ecological goals. Furthermore, a holistic approach is required: the integration of the views and needs of all stakeholders (e.g., community, companies, and experts) and stakeholders' engagement that can ensure a balanced achievement of their objectives (de Vente et al., 2016). This view is in line with the result of the analysis by Cosyns et al. (2020).

The reviewed scientific literature generated a broad list of indicators used in plant species conservation projects. Next, the use of multicriteria analysis that consists of the decision-makers' evaluation of alternatives (with the help of certain criteria) and the experts' opinions, generated the ranking of indicators. The results show that the attention to protecting natural ecosystems to preserve human welfare and valuing natural ecosystem protection projects, should be parallel to meet the objectives of these projects.

Based on the findings (Fig. 3), the most important indicators used to evaluate the performance of a biodiversity conservation project include

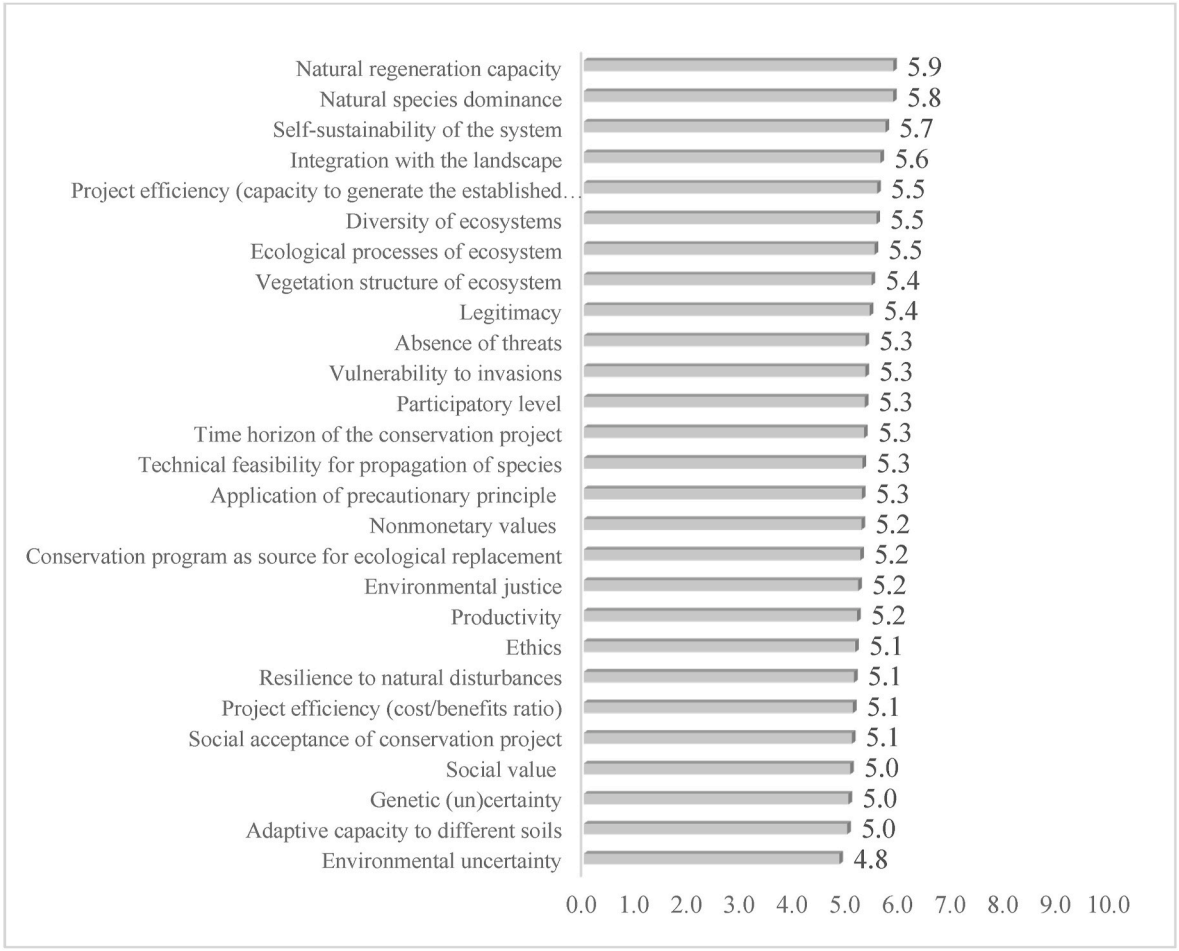

Fig. 3. Weighted scores of indicators used to evaluate the performance of a biodiversity conservation project (Note: These indicators are coded I1, …, I 27 in Fig. 2).

"Natural regeneration capacity" and "Natural species dominance". Assessing the natural regeneration capacity of a species is a key indicator of its ability to recover from disturbances such as habitat loss or climate change. This indicator can provide insights into the resilience of the species and its potential for long-term survival. It can be said that the perceived benefits of natural regeneration include the greater resistance of young plants against cold, drought, and insect damage. Using high density species in restoration projects may help to restore ecosystem function or provide habitat for other species more quickly than using lower density species. However, relying solely on high density species in conservation projects can also have negative consequences. High density species may be more prone to disease or other threats, which could lead to the loss of a large number of individuals. Additionally, high density species may not be as genetically diverse as lower density species, which could limit their ability to adapt to changing environmental conditions. Dominant species also indirectly alter the relationship between species richness and ecosystem performance (Hillebrand et al., 2008). "Environmental uncertaint", the least preferred project success indicator, may not be a suitable performance indicator for biodiversity conservation projects because it is largely beyond the control of project managers and may not accurately reflect the success of conservation efforts. Additionally, many factors contributing to environmental uncertainty may be unpredictable, making it difficult to measure them over time.

Knowing how environmental experts rank the indicators that show environmental conservation project success can be very useful for several reasons. From the viewpoint of conflict management, the environmental experts will assign priority to the high scores' metrics if they were involved in a conflict related to biodiversity conservation. While the indicators with lower scores would be compromised more quickly when attempting to find consensus with other parties. Knowing what indicators experts find the most important can facilitate communication and collaboration between stakeholders, such as experts, project managers, and community members. This can improve the alignment of objectives and actions, and enhance project outcomes. It also supports decision-making by providing a basis for evaluating alternative strategies, assessing trade-offs, and identifying risks and uncertainties. Furthermore, by identifying the most important indicators, conservation projects can prioritize resources to be successful in these directions. Understanding how experts rank the indicators can help in the design and evaluation of conservation projects. It can help identify areas that may need more attention, or suggest modifications to project goals or methods to ensure a more comprehensive and effective approach. We infer that is important to select appropriate performance indicators for biodiversity conservation projects that are relevant, measurable, and reflective of the project goals. By focusing on indicators that are within the project managers' control and reflect conservation efforts' project success, the managers can effectively evaluate project performance and make informed decisions about future conservation strategies.

Regarding the criteria used to evaluate the indicators (importance; cost level of the use of the indicator; ease of use within the affected human community; and ease of technical use; Table 2), the use of weights (i.e., experts perceptions of the importance of these four criteria for the evaluation of a project success indicator) allow us to increases accuracy of the evaluation. Thus, by giving more weight to the most important criteria, the evaluation becomes more accurate and reflective of the true situation. The fact that the most important criteria is the "Ease of use within affected community" (7.3 points) highlights the perceived (by experts) importance of the community in the success of the project implementation and in measuring the success. The cost associated with the use of the indicator is less important than the rest (6.2 points). One reason can be that the cost level of the use of the indicators may be considered relatively low and, therefore, the importance of this criterion is considered lower than the others.

Conflicts can arise during conservation projects, and understanding how experts manage conflicts can ensure that conflicting issues are addressed and resolved in a constructive manner. No conflict management style is necessarily better than others; each can be useful depending on the situation. A wide array of solutions (from negotiation to education-information campaigns) and different conflict management styles (from "Integrating" to "Forcing") adopted for biodiversity conservation projects in various parts of the world, bear witness to the fact that the conflict management strategies must be tailored to the specificity of each situation (Soliku and Schraml, 2018). The fact that investigated environmental experts prefer the "Integrating" style (Table A2.) can indicate that they will be successful in interest-based bargaining techniques, they will try to understand the needs of other parties, and they will invest efforts in building solutions that satisfy the interests of all. Perhaps, the type of situation investigated here (biodiversity conservation), which requires the pursuit of altruistic objectives, stimulates the adoption of this style. Additionally, the understanding that conflicts are a significant cause of failure may motivate them to pursue this approach. Practitioners in charge of creating management plans for nature reserves in the Northern French Alps used an "Integrativ" or a "Collaborativ" approach, which aided them in achieving their conservation objectives (Arpin, 2019). The less frequently used style was the "Avoiding" one. This can be ineffective if the underlying issues are not addressed, leading to unresolved conflicts that may resurface. The experts' low tendency to avoid conflict (Table A2.) indicates that they have little concern for interpersonal conflict (Shell, 2001). It also suggests that these specialists are beneficial when issues need to be resolved and conflicts need to be made public.

The fact that indicators have values between 4.8 and 6.0 (on a scale from 0 to 10) and that most experts prefer the same style of management, implies that experts have the same pattern of judgment and behavior in conflict management, which may be due to their common professional background.

Experts considered that the groups of stakeholders who are the most often involved in conflicts in the case of biodiversity conservation projects in Romania are the local communities, environmental experts (from NGOs, research, etc.), and conservation project teams (Table A3.). Thus, the interviewed experts recognized environmental experts' role in managing those conflicts.

Certain limitations are evident. In the present case, experts' perceptions were gathered using a structured questionnaire with close-ended questions. Future research should interview them to get more contextualized perceptions from their work and increase the number of participants. Regarding experts' perceptions about conflict and their conflict management styles, it would be of a high practical use in future research to compare their perceptions and styles with those of other stakeholders and to increase the number of participants. In particular, local knowledge in addition to expertise by training should be used by involving community members in interviews, workshops, and other participatory approaches. Future studies should also investigate the impact of biodiversity legislation on conservation projects. Therefore, a bottom-up approach must be embedded when shaping laws and policies on biodiversity conservation, which is in line with the European Commission (2021) "better regulation" approach.

6. Conclusions

The present study does not offer blueprint saving solutions on "best practices" for biodiversity conservation projects or which indicators to use or when to decide on starting a conservation project. Still, it aims to contribute to multidisciplinary debates dedicated to the need for conservation projects by offering a menu of options for actions where social aspects should be most inclusive.

The evaluation matrix showed that much more has to be done till "environmental justice", "ethics", "social value", or "participatory feature" have their say within the governance of protected areas. This position does not plead for an anthropogenic approach to environmental protection but raises a red flag that environmental experts can become a partner in conservation projects and co-management should be judged

as the best option. This approach is more important because local communities, conservationists, and public authorities are in danger from conflicts over resources.

We revealed that investigated experts preferred the "Integrating" conflict management style, indicating that they are aware that conflicts often cause the failure of a conservation project. The preference for the "Integrating" style disclosed by interviewed experts suggests that conflicting interests will have higher chances of being harmonized, and a mutually satisfactory solution can be found due to experts' preference for involvement. From a practical perspective, this suggests that it would be beneficial to determine experts to actively participate in conflict management processes within biodiversity conservation projects.

Conflict is not necessarily destructive. Managed efficiently, conflict can bring to the surface different perspectives and aspects of a problem that can be used to improve the initial proposal. Additionally, competition between interests can motivate people to be more productive in developing creative solutions. Improving the understanding of conflict management styles contributes not only to effective conflict management but also to better management of the biodiversity conservation project area.

CRediT authorship contribution statement

Ruxandra Malina Petrescu-Mag: Conceptualization, Methodology, Investigation, Formal analysis, Writing – original draft, Writing – review & editing. **Dacinia Crina Petrescu:** Conceptualization, Methodology, Investigation, Formal analysis, Visualization, Writing – original draft, Writing – review & editing. **Hossein Azadi:** Supervision, Writing – original draft, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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Annex.

Table A.1
Conflict styles and related questions (adapted after Song et al., 2006).

Conflict style	Questions (answer options: 1 = totally opposed to respondent's behavior to 7 = totally representative of respondent's behavior).
Integrating	I try to bring all issues into the open in order to resolve them in the best way.
	I encourage others to express their feelings and views.
	I work hard to thoroughly, jointly learn about the issues.
	I openly share concerns and issues.
Accommodating	I try to satisfy the expectations of others.
	I try to help others not "lose face" when there is a disagreement.
	I make supplementary efforts to get along with each other.
	I try to meet each other's restrictions (regarding schedule, location, etc.) whenever I can.
Compromising	I try to investigate an issue to find a solution agreeable to us both.
	I look for middle ground to resolve disagreements.
	I arrive at compromises that both areas can accept.
	I propose compromises to end deadlocks.
Forcing	I try to put the needs of the project I represent first compared to other party's needs.
	I tenaciously argue the merit of my positions when disagreements occur.
	I want the other to make concessions, but I don't want to make concessions myself.
	I treat issues in conflict as a win-lose contest.
Avoiding	I try to keep differences of opinion quiet.
	I avoid openly discussing disputed issues.
	I smooth over conflicts by trying to ignore them.
	I avoid being "put on the spot" by keeping conflict to myself.

Table A.2
Conflict management styles of the experts (average scores)

Expert/Style	Integrating	Accommodating	Compromising	Forcing	Avoiding
Expert 1	7.0*	5.0	5.3	4.3	4.0#
Expert 2	7.0*	7.0*	7.0*	4.0	1.0#
Expert 3	7.0*	6.3	4.0#	4.0#	5.5
Expert 4	5.8	6.3*	5.8	4.0	1.8#
Expert 5	6.5*	6.0	6.5*	4.3	2.5#
Expert 6	6.3*	4.3	3.8	4.8	3.0#
Expert 7	6.3*	6.0	6.0	5.0#	5.5
Expert 8	6.5*	5.3	5.5	3.8	1.3#
Expert 9	7.0*	6.3	4.0	5.8	3.3#
Expert 10	6.8*	6.3	6.3	4.0	1.8#
Expert 11	5.8*	3.3	3.8	3.3	2.0#
Expert 12	6.8*	6.3	5.8	5.0	3.5#

(*continued on next page*)

Table A.2 (*continued*)

Expert/Style	Integrating	Accommodating	Compromising	Forcing	Avoiding
Expert 13	5.3	5.8*	5.5	3.5	2.5#
Expert 14	4.3	5.0	5.3*	4.0	1.8#
Expert 15	6.5*	6.3	4.5#	4.8	4.5#
Expert 16	6.0*	4.0	4.5	3.5	3.0#
Expert 17	6.8*	5.8	6.5	3.8	2.0#
Expert 18	6.0*	6.0*	5.8	3.5	2.3#
Expert 19	6.8*	5.8	4.5	4.0#	4.8
Expert 20	5.0*	4.0	4.0	3.5	2.3#
Expert 21	5.8*	5.0	4.5	4.0	3.0#
Expert 22	6.8*	4.8	4.8	3.5#	4.0
Expert 23	6.0*	4.5	5.3	4.5	4.0#
Expert 24	6.0*	4.8	4.5	4.5	4.0#
Expert 25	6.0*	4.8	4.8	4.0	3.8#
Sample Average	6.2*	5.4	5.1	4.1	3.1#

* Preferred style; # Avoided style.

Table A3
Frequency and percentage of environmental experts' perceptions regarding the existence of conflicts between various stakeholders within biodiversity conservation projects (percentage is indicated between brackets)

	Local community	Citizens living in other areas	Environment experts	Environmental public authorities	Other public authorities	Companies	Conservation project team	Other groups	No conflict
Total	36 (20.6)	4 (2.3)	29 (16.6)	19 (10.9)	13 (7.4)	13 (7.4)	20 (11.4)	0 (0.0)	2 (1.1)
Local community	–	4 (2.3)	9 (5.1)	7 (4.0)	4 (2.3)	5 (2.9)	7 (4.0)	–	
Citizens living in other areas		–	–	–	–	–	–	–	–
Environment experts			–	7 (4.0)	5 (2.9)	4 (2.3)	4 (2.3)	–	–
Environmental public authorities				–	1 (0.6)	1 (0.6)	3 (1.7)	–	–
Other public authorities					–	–	3 (1.7)	–	–
Companies						–	3 (1.7)	–	–
Conservation project team							–	–	–
Other groups								–	–
No conflict									2 (1.1)

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