



Establishing Baselines: Interest and Community Capacity for Valuing Earth Science Information

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Acknowledgements: We would like to thank everyone who helped disseminate the survey through their networks, especially the CONVEI team, as well as the more than 120 respondents who gave their time to complete it.



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Overview

This report presents findings from a baseline assessment conducted by the Collaborative Network for Valuing Earth Information (CONVEI) to understand current levels of interest, capacity, and barriers related to conducting value assessments of Earth Science Information (ESI). The assessment focused on two core groups: individuals already engaged in ESI valuation and those who produce or use ESI but have not yet incorporated socioeconomic assessment into their work.

We found that while familiarity with valuation methods is relatively high (83%), only 25% of respondents had conducted an ESI-specific assessment, and interest in adopting the practice is generally low. Major challenges include lack of time, limited training, insufficient institutional incentives, and unclear personal benefits. Overall, while most respondents understand the societal value of ESI assessments, few see clear personal benefits, and interest and willingness to invest time or resources in conducting them remain low. Achieving broader and sustained adoption will require a cultural shift supported by institutional incentives, clearer alignment with professional goals, and visible demand from funders.

These insights inform a set of short-term and long-term recommendations to strengthen capacity and adoption of valuation practices, including strategies CONVEI can implement directly, as well as broader efforts for the community of practice.

Executive summary

The Collaborative Network for Valuing Earth Information (CONVEI) is working to build capacity in the Earth Science Information (ESI) community to evaluate and communicate the societal and economic benefits of ESI. As part of this effort, CONVEI conducted a baseline assessment of familiarity, interest, willingness, and barriers related to conducting value assessments. We focused on two communities: (1) those that already regularly conduct value assessments, and (2) those in the ESI community who have not yet conducted ESI valuations and may or may not be familiar with valuation methods. Drawing on responses from over 120 individuals, we identified key gaps in interest, highlighted barriers to adoption, and explored the motivations that drive or hinder engagement in valuation activities.

Familiarity, interest, and barriers in conducting value assessments

We found a gap between the community's awareness of value assessments and their application of these methods to ESI. Within the ESI community, there is agreement that value assessments are important for communicating the value of their work to funders and decision-makers, and that such assessments could also increase the use of ESI overall and improve the societal benefits of their work. These expectations also serve as motivation for conducting value assessments. However, only 25% are interested or very interested in conducting ESI valuations. Barriers to conducting such assessments are seen as higher than both interest and perceived benefits from them. The most common barriers are lack of time and resources, limited training or institutional support, and low perceived personal benefit. There are no external expectations or encouragement from funders or employers to conduct these assessments. These barriers or lack of incentives explain why few (6%) are willing to invest in learning about or conducting value assessments of their work; most either would not (46%) or are unsure (48%). Even among those who know how to conduct value assessments, only a minority (19%) would do so regularly, and most would not (35%).

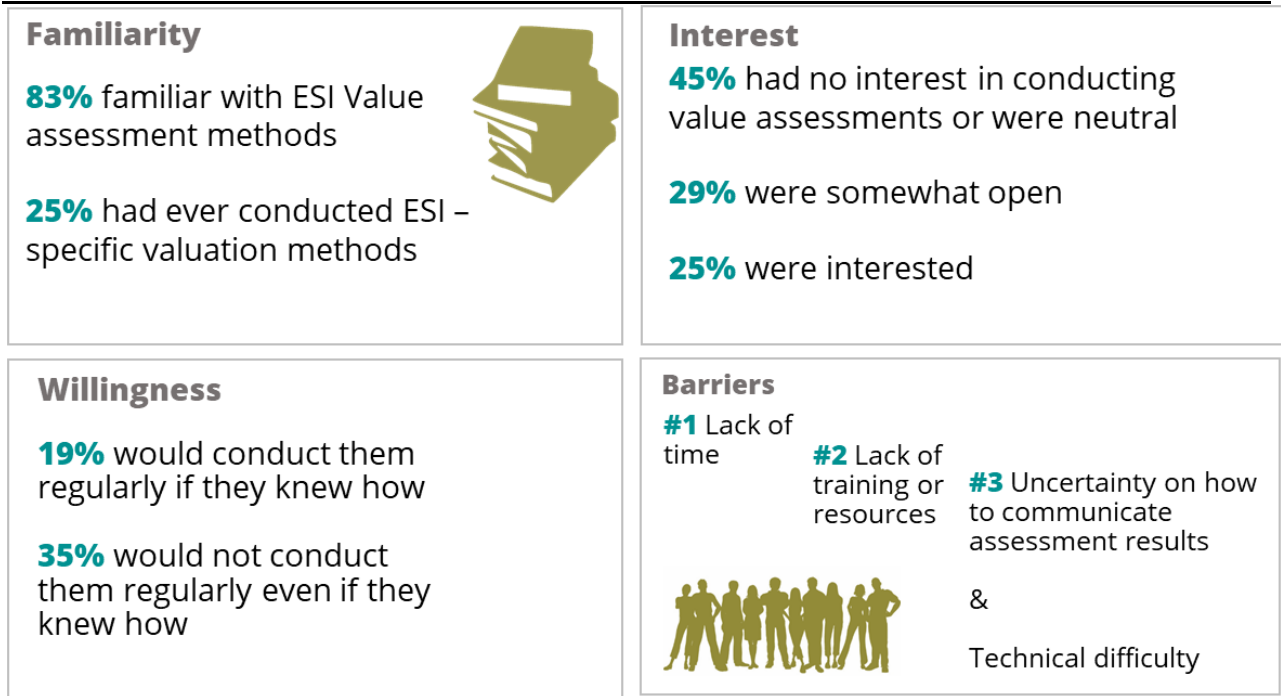


Figure 1. Familiarity, interest, willingness, and barriers of ESI community members in conducting value assessments

Expanding the range of societal benefits quantified

Within the valuation community that already conduct ESI valuations, there is significant interest (expressed by 80% of that subset of respondents) in expanding the types of societal benefits from the application of ESI beyond economic values to measure other values such as mental health benefits.

Strategic implications

While most respondents recognize the benefits of conducting value assessments, these findings suggest that widespread adoption of value assessments is unlikely without a shift in perceived costs, benefits, and institutional expectations surrounding these assessments. CONVEI is well positioned to address issues related to efficacy, specifically, increasing the capacity to conduct ESI value assessments. However, achieving broader and sustained adoption will require a cultural shift supported by institutional incentives, clearer alignment with professional goals, and demand from funders. To effectively support the ESI community in conducting these assessments, CONVEI needs a multi-pronged approach that leverages capacity development, communications, existing incentive structures, and strong partnerships with funders and institutions.

These insights will guide CONVEI’s capacity development strategy. In the short term, efforts will focus on reframing value assessments as tools for demonstrating impact, developing accessible tools and learning materials, and aligning with institutional and funder priorities. Longer-term efforts will need to address deeper structural and cultural barriers, including encouraging funder

mandates, mainstreaming valuation practices across sectors, and sustaining a collaborative, interdisciplinary community of practice.

Key recommendations include:

- **Align with institutional structures and incentives:**
 - Increase awareness of the tangible benefits of value assessments, particularly their role in improving funding opportunities, securing institutional support, and influencing policy. Share clear, accessible stories that demonstrate how the assessments translate into increased visibility for or sustained investment in research.
 - Explore external incentives, such as integrating value assessments into funding requirements or institutional reporting structures. Abstract 'feel-good' motivations alone are not enough to drive sustained behavioral change.
 - Collaborate with funders and research institutions to integrate value assessments into professional expectations, making them a natural and necessary component of research.

- **Lower barriers to conduct assessments:**
 - Leverage existing familiarity with benefit-cost analysis to introduce new value assessment methods in a relatable way.
 - Streamline assessment methods as much as possible to reduce time burden and lower barriers to participation.
 - Engage funders to provide dedicated funding and time for conducting assessments.
 - Build capacity for the ESI community to engage with end users and participate in transdisciplinary collaboration.

- **Build strategic partnerships:**
 - Partner with and learn from private sector organizations and individuals who more easily tie value assessments back to profits and funding.
 - Emphasize alignment with current institutional priorities, such as applied science initiatives and research with impact. There are already many spaces and communities dedicated to improving the impact of their science that could be leveraged to expand the use of value assessments.

- **Develop programmatic messaging and communications:**
 - Clarify how CONVEI's value assessment approach differs from or complements more common value assessments to manage expectations and misconceptions.
 - Articulate the audience and purpose of value assessments (e.g. decision-makers, to demonstrate why they should use such information; funders, to advocate for continued investment in the generation of such information).



- Frame value assessments as a tool for external recognition rather than self-assessment (e.g., helping others—funders, policymakers, and end users—understand the value of research).

Introduction

Despite the wide-ranging applications of Earth Science Information (ESI), including remotely sensed Earth Observations (EO), measuring the societal benefits generated through the use of such information remains limited. Current assessments are often limited in the types of societal benefits measured (namely economic), and the methods used (e.g., value of information, benefit-cost analysis, and stated preference methods). A few use contexts such as agriculture, forestry, and weather dominate the literature, while applications related to health, disaster prevention or response, and security are not well represented in such value assessments (O'Hara, *in prep*). Although ESI value assessment communities such as VALUABLES and GEOValue have advanced valuation work, it remains niche and not widely adopted across the broader ESI community.

The Collaborative Network for Valuing Earth Information (CONVEI) aims to address these gaps and improve the ability to quantify the economic and social benefits of ESI in decision-making and operational contexts. Program activities are organized around the following two interconnected elements.

1. Socioeconomic Assessments: focus on the valuation of operational ESI tools in case studies
2. Community and Capacity: focus on building the network and enhancing the capacity necessary to support widespread adoption of ESI valuation practices across sectors

To increase the number of people conducting ESI value assessments, it is essential to understand the behavioral, institutional, and structural factors that influence adoption. This baseline assessment explores current levels of interest and capacity, identifies key motivators and barriers, and offers insights to inform CONVEI's strategies for tool development, capacity building, and engagement. These findings are critical for designing effective communications, fostering adoption, and building a sustainable, interdisciplinary community of practice.

Methods

Foundational frameworks and survey design

To inform the design of this survey and the interpretation of results, we drew on two complementary frameworks (Table 1). The first is the Theory of Planned Behavior (TPB), a psychological model that explains how individuals make decisions to adopt new behaviors (Ajzen, 1991), such as conducting ESI value assessments. The second is the Oslo Manual, a guide developed by the OECD and Eurostat to understand institutional and systemic factors that support or hinder the adoption of innovation (OECD & Eurostat, 2018).

In the context of this survey, the TPB helps identify key motivators and barriers that could influence whether individuals choose to adopt ESI value assessments. Based on the TPB, behavioral intention is shaped by three core constructs: self-efficacy (i.e., belief in one’s ability to perform the behavior), perceived social norms, and perceived benefits versus risks (Ajzen, 1991). In parallel, the Oslo Manual offers a framework for understanding the diffusion of innovations by highlighting systemic barriers to adoption, mainly: cost-related barriers (e.g., resource constraints or funding limitations); knowledge-related barriers (e.g., awareness or expertise gaps); and market-related barriers (e.g., lack of demand, institutional support, or decision-maker interest) (OECD & Eurostat, 2018).

We also asked individuals about their role in the ESI value chain—whether they considered themselves ESI producers or users—as their motivations, perspectives, and contexts for performing value assessments may differ. Producers and users are typically categorized by their proximity to ESI in the information value chain. For the purposes of this study, a producer is someone who processes, manages, or generates raw EO data to make it accessible for further use. This includes individuals who are involved in data collection, satellite operations, calibration, or data processing. A user is someone who takes EO data and converts it into information by interpreting, analyzing, or integrating it into products that can be used in decision-making processes. This can include applying EO data into models, policy recommendations, or risk assessments.

The survey also included questions related to respondent characteristics such as discipline, sector, highest degree earned, year in which their highest degree was earned, demographics, and career level. The survey included a 5-point Likert scale, multiple-choice, and ranking-format questions, along with several open-ended items to gather detailed insights. It was implemented and disseminated using Qualtrics and reviewed under IRB protocol number 16-24-0725.

Table 1. Framework constructs, definitions, and associated survey focus areas

Construct	Definition	Survey questions focus
Self-efficacy	Individual’s belief in their ability to successfully perform the behavior	Confidence in conducting ESI value assessments
Societal norms	Extent to which an individual feels that others (peers, institutions) support or expect the behavior	Support from organization or community for assessments
Perceived benefits relative to risks	Perceived usefulness vs. costs or difficulties	Overall willingness or desire to conduct assessments Perceived relevance of assessments to work

Cost-related barriers	Financial/resource constraints	Access to funding, staff time
Knowledge-related barriers	Awareness and expertise gaps	Familiarity with ESI and value assessment methods
Market-related barriers	Lack of demand or institutional buy-in	Perceived demand from funders, policymakers, or leadership

Survey dissemination

The survey was distributed to two target audiences: (1) the ESI community and (2) the value assessment community, which consists of individuals who consider ESI value assessments a topic of research or work and consequently have familiarity with common value assessment methods.

We define ESI, ESI community, and Value Assessments as follows:

- Earth Science Information (ESI): information products derived from satellite and other remote measurements of Earth. This includes maps (e.g., geology, land use, biomass), models (e.g., carbon storage), and other representations of knowledge of the Earth system.
- ESI Community: individuals and organizations who produce, use, or apply ESI in their work. This includes researchers, practitioners, analysts, and decision-makers, across private, government, non-profit organizations, and academic sectors.
- Value Assessments: the processes used to evaluate the benefits, costs, and overall impacts of a resource, service, or information product. These assessments aim to determine the value of something based on its contribution to outcomes such as decision-making, well-being, changes in perspectives, or policy impact. Common methods include Return on Investment, Value of Information, and Cost-Benefit Analysis, among others.

Several strategies were used to disseminate the survey to target audiences. The survey was disseminated using a network-of-networks approach, leveraging the diverse connections of the CONVEI advisory board and consortium partners. Where existing relationships existed, the survey was sent directly to organizational leaders, such as directors or senior staff, who were encouraged to distribute the survey within their teams to maximize participation.

To target the existing value assessment community, the survey was emailed to communities such as GEOValue and VALUABLES, with the request to distribute widely through their networks. A data-science-driven approach was also used to identify individuals involved in producing and using ESI by extracting lead author contact information from relevant publications identified in prior topic mapping exercises. From this effort, 5,782 individuals were identified.

To engage the academic community, the survey was sent to approximately 100 universities and community colleges across the United States, including Historically Black Colleges and

Universities, Tribal Colleges, Research Universities, and Hispanic-Serving Institutions. Department heads, administrative leads, or center directors from each institution were sent an email invitation with a survey link that they could distribute to researchers, instructors, and students who use ESI in their work. Departments contacted included Earth Science, Geology, Geography, Environmental Studies, and Atmospheric Sciences.

Results

The survey was conducted from August 24, 2024, to November 15, 2024. Due to the network-of-networks approach, not all survey distributions could be tracked, so the response rate is an approximation based on the trackable emails received by the value assessment and academic communities. Of the 5,782 individuals identified in the topic mapping exercise, 2,369 people received the email containing the survey, and 983 opened the email. The distribution sent to the 100 universities and community colleges resulted in 89 successfully received emails and 23 opens. A total of 167 responses were recorded, with 120 included in the analysis. Responses excluded include 27 that were opened but had no questions completed, and 19 that were started but respondents quit before providing substantial data. The 120 respondents included in the analysis did not answer every survey question but were included if most questions were addressed. Of those surveys we were able to track, the response rate was approximately 14.5%, and the completion rate was 59%.

Respondent characteristics

Of the 120 respondents, 69% were users (83 individuals) and 31% were producers (37 individuals). Within the value assessment community (40% of total respondents), 25% were producers and 71% were users. Among those not engaged in value assessments (60% of respondents), 35% were producers and 68% were users. These figures suggest that users are more likely than producers to be involved in valuation-related work, with producers underrepresented in the value assessment community. Given similar response patterns between users and producers, their results are combined unless noted. Not all participants responded to every question; results are reported using only the number of respondents who answered each specific question.

Respondents represent a range of disciplines. The largest proportion identified their field as Ecology (33%), followed by Data Science (25%), Climate Resilience (23%), Agriculture and Food Security (18%), and Conservation (17%). Other thematic areas of NASA Earth Action are represented among the remaining 38% of respondents (e.g., Disaster Response and Water Security) (Table S1).

Most respondents were affiliated with the academic sector (68%), followed by public/government roles (20%), NGOs or nonprofits (5%), and the private sector (3%). The majority identified as senior-level professionals (37%), with mid-career (19%) and early-career individuals (18%) also well represented, reflecting a highly experienced respondent pool. Only a minority identified as

students (5%) or 'other' (5%). Most participants held a Ph.D. (80%), with fewer reporting a master's degree (17%), and only a handful indicating a bachelor's as the highest degree earned (1%). Most respondents (66%) identified as men and 28% as women. The average year of highest degree completion suggests an estimated respondent age of around 47–48 years, assuming a traditional academic trajectory. For other demographic data, refer to supplemental materials (Figure S1).

Familiarity and interest with conducting value assessments

Most respondents—across both the valuation and non-valuation communities (83%)—reported being familiar with at least one value assessment method, with the most recognized methods being benefit-cost analysis, willingness to pay, and economic impact analysis (Figure 2). When asked if they were interested in learning more about these methods, 59% (73 respondents) expressed interest, while 41% (49 respondents) did not (N = 122). Among those interested, 92% (67 respondents) specified which methods they would like to explore further, with the top choices being value chain analysis, decision analysis, welfare analysis, and value of information (Figure 3)—notably, the same methods respondents were least familiar with.

Despite high familiarity with valuation methods, across both the valuation and non-valuation communities, most respondents (75%, N = 100) had not previously assessed the value of ESI. Fifteen respondents in the ESI community have conducted a value assessment of ESI at least once but do not consider themselves part of the value assessment community. Similarly, only 15 individuals in the value assessment community have conducted an assessment of ESI specifically. Across both groups, value assessments of ESI are not common.

Those who have not conducted value assessments of ESI were asked if they were interested in doing so in the future, and nearly twice as many (48%, N = 68) expressed little to no interest in conducting value assessments of ESI compared to those who did (25%) (Figure 4).

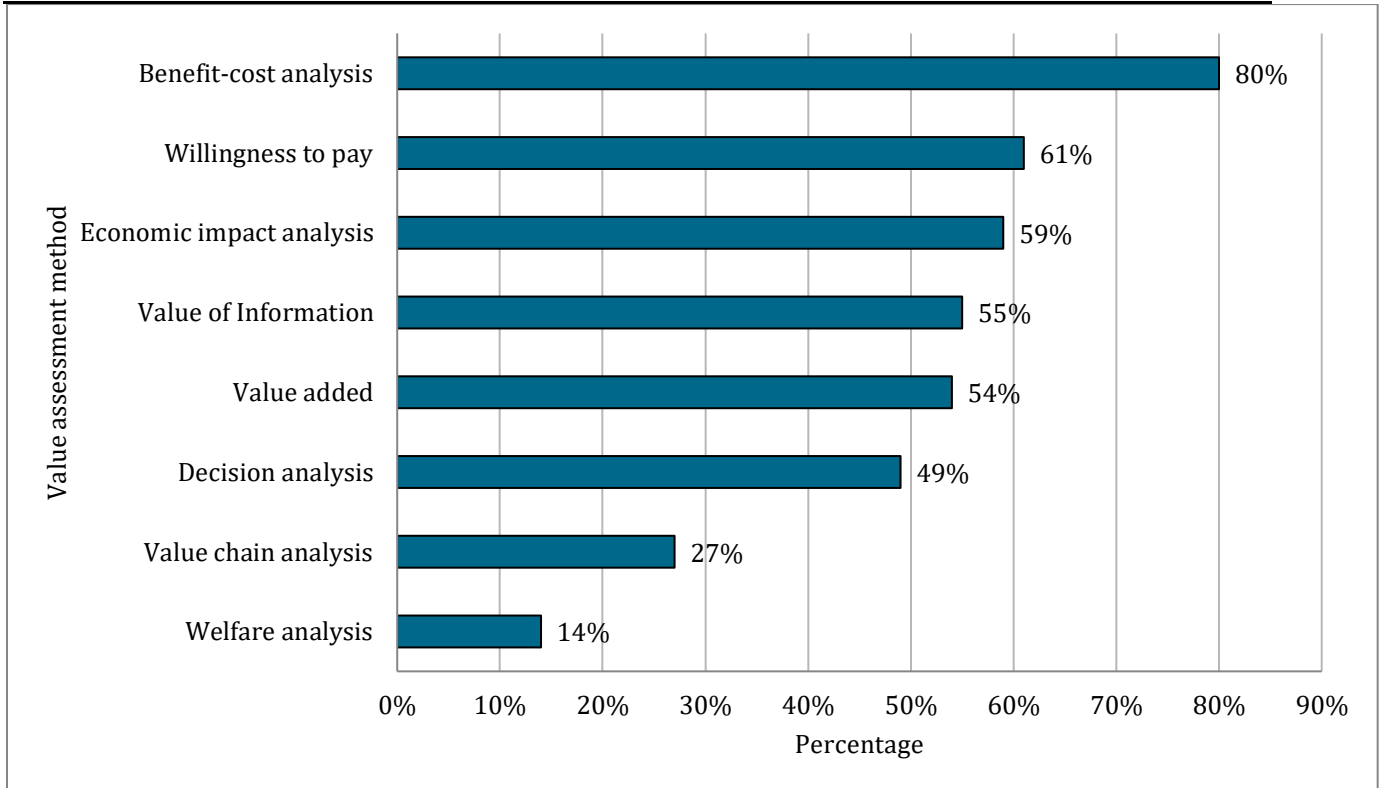


Figure 2. Percentage of respondents who indicated familiarity with a given value assessment method. Multiple choices were allowed, and familiarity was not specified by level of knowledge or expertise (N = 100).

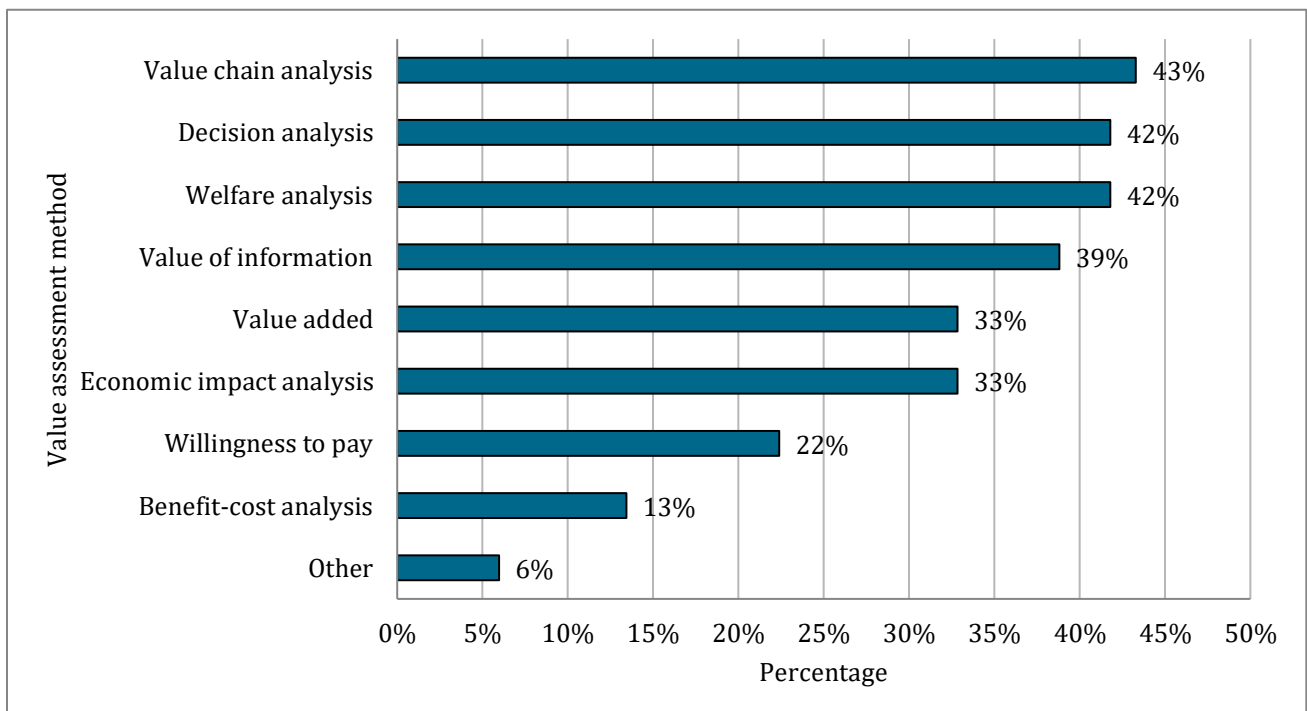


Figure 3. Value assessment methods that respondents were most interested in learning more about. Multiple choices were allowed (N = 67).

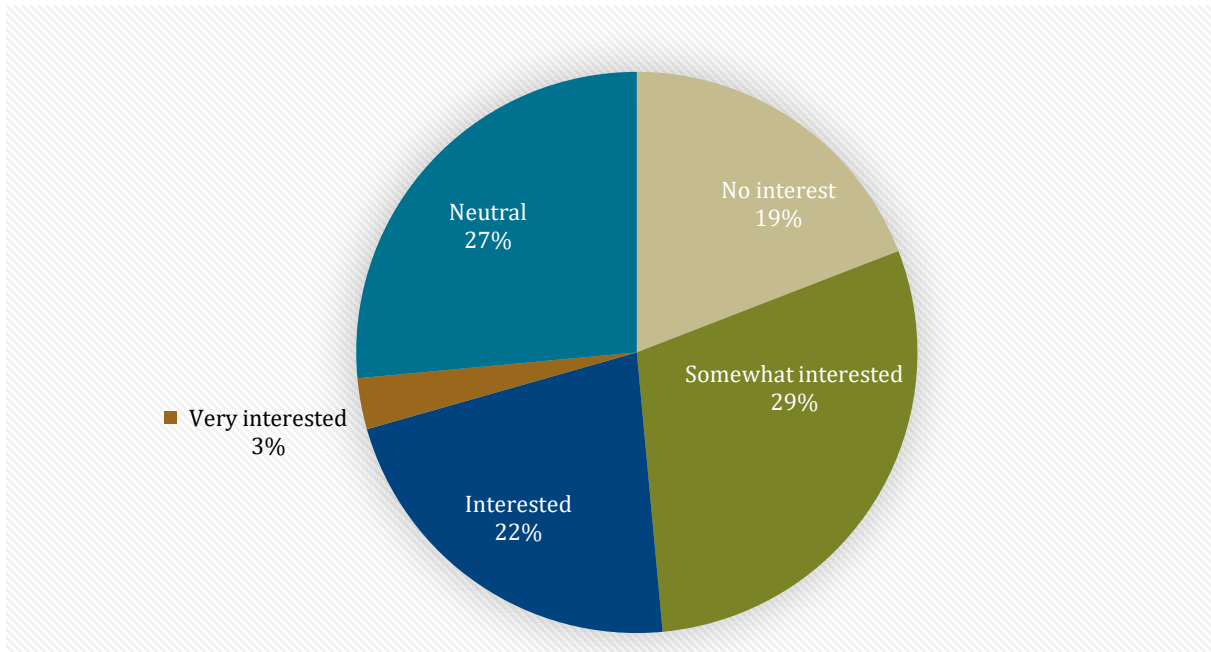


Figure 4. Interest of ESI community respondents in conducting value assessments of ESI (N = 68).

The ESI community was also asked if they were willing to invest time into learning and performing value assessments. Most respondents (75%) indicated they were willing to invest “None at all” or “Very little” time (Figure 5)(N = 52). Only 12 respondents (23%) indicated they would invest “A moderate amount”, and one respondent was willing to invest “A lot” of time. When asked if they would be willing to invest funding toward learning or conducting value assessments of their work—either for themselves or others—respondents overwhelmingly answered “Maybe” (48%) or “No” (46%)(Figure 6). Only 3 respondents (5.7%) said they were willing to invest funding (Figure 6).

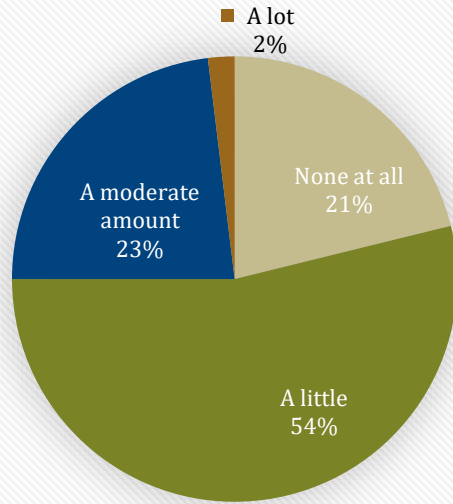


Figure 5. Amount of time ESI community respondents are willing to learn and perform value assessments of ESI (N = 52). No respondents selected ‘a great deal’, so that option is omitted from the figure.

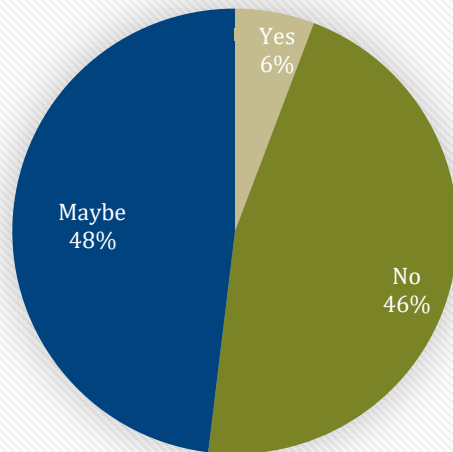


Figure 6. Willingness of ESI community respondents to invest funding to learn and perform value assessments of ESI, for themselves or others (N = 52).

Perceived benefits and motivations for conducting value assessments

For the ESI community, many respondents associate value assessments with opportunities for cross-disciplinary collaboration (67%). Most respondents also see some level of applicability of value assessments to their work (86%)(Figure 7). Interestingly, when respondents had to choose a

simple “Yes” or “No” in response to whether value assessments are associated with improved social impact, 67% selected “Yes”. However, when presented with a Likert-scale question asking whether conducting assessments would improve the social impact of their work, only 49% agreed (Figure 8). This suggests that while many conceptually associate value assessments with social impact, fewer are confident that conducting them will directly lead to such outcomes. Although the question was essentially the same, the difference in response could be due to differences in how people respond to binary versus scaled questions, with the former reflecting aspirational belief and the latter prompting more critical evaluation.

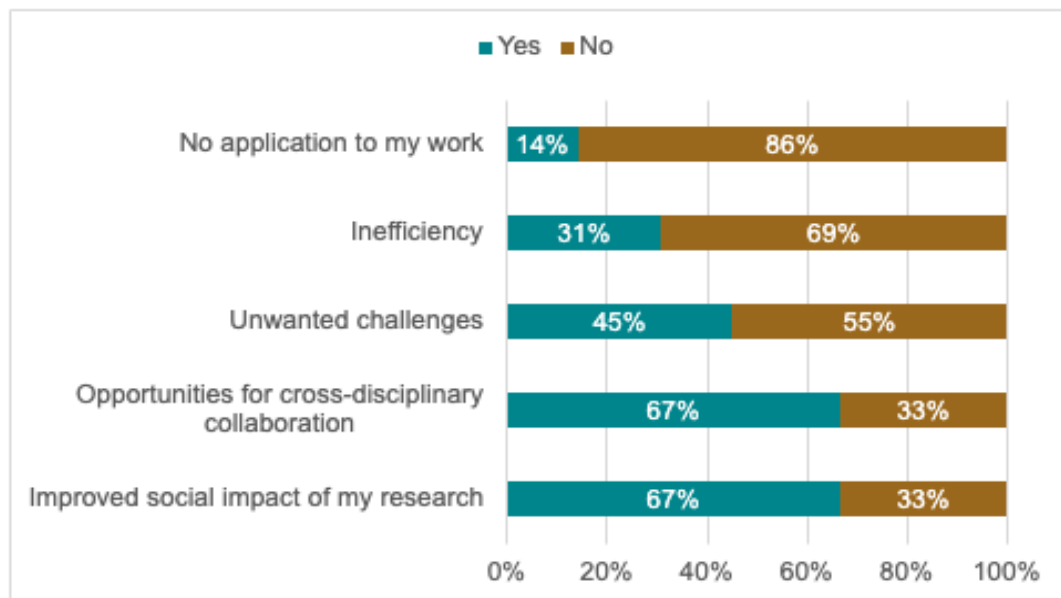


Figure 7. Perceived relevance of value assessment to individuals’ work in the ESI community. Analysis includes only fully completed responses and excludes those in the value assessment community (N = 42).

Most respondents within the ESI community agreed that understanding the value of ESI increases its use (71%)(Figure 8). A potential barrier to conducting value assessments, however, lies in the lack of encouragement from funders and employers. Most respondents in the ESI community reported not being encouraged by their funders (75.8%; 24 disagree, 20 neutral) or employers (84%; 27 disagree, 22 neutral) to conduct value assessments. However, despite this lack of encouragement, nearly half see value assessments as an effective way to demonstrate the importance of their work to funders (48%) and policymakers (56%).

Perceptions of normativity around value assessments—an important predictor of behavior—are mixed. While much of the ESI community was neutral (53%) about others’ interest in assessing the value of ESI, 40% believe there is interest, indicating some potential for fostering a movement across the community to perform them.

Respondents in the value assessment community show an even stronger recognition of the utility of value assessments as a communication tool compared to those who do not consider value assessments a significant topic of work (Figure 9). The value assessment community agrees that value assessments effectively communicate the importance of ESI to both funders (87.5%) and policymakers (80%). Nonetheless, a lack of external support from funders and employers is still persistent in the value assessment community, with most feeling neutral to having support (Figure 9).

Notably, members of the value assessment community are more likely to believe that value assessments enhance the societal impact of science (77.5%) compared to those outside the community (49%)(Figure 9).

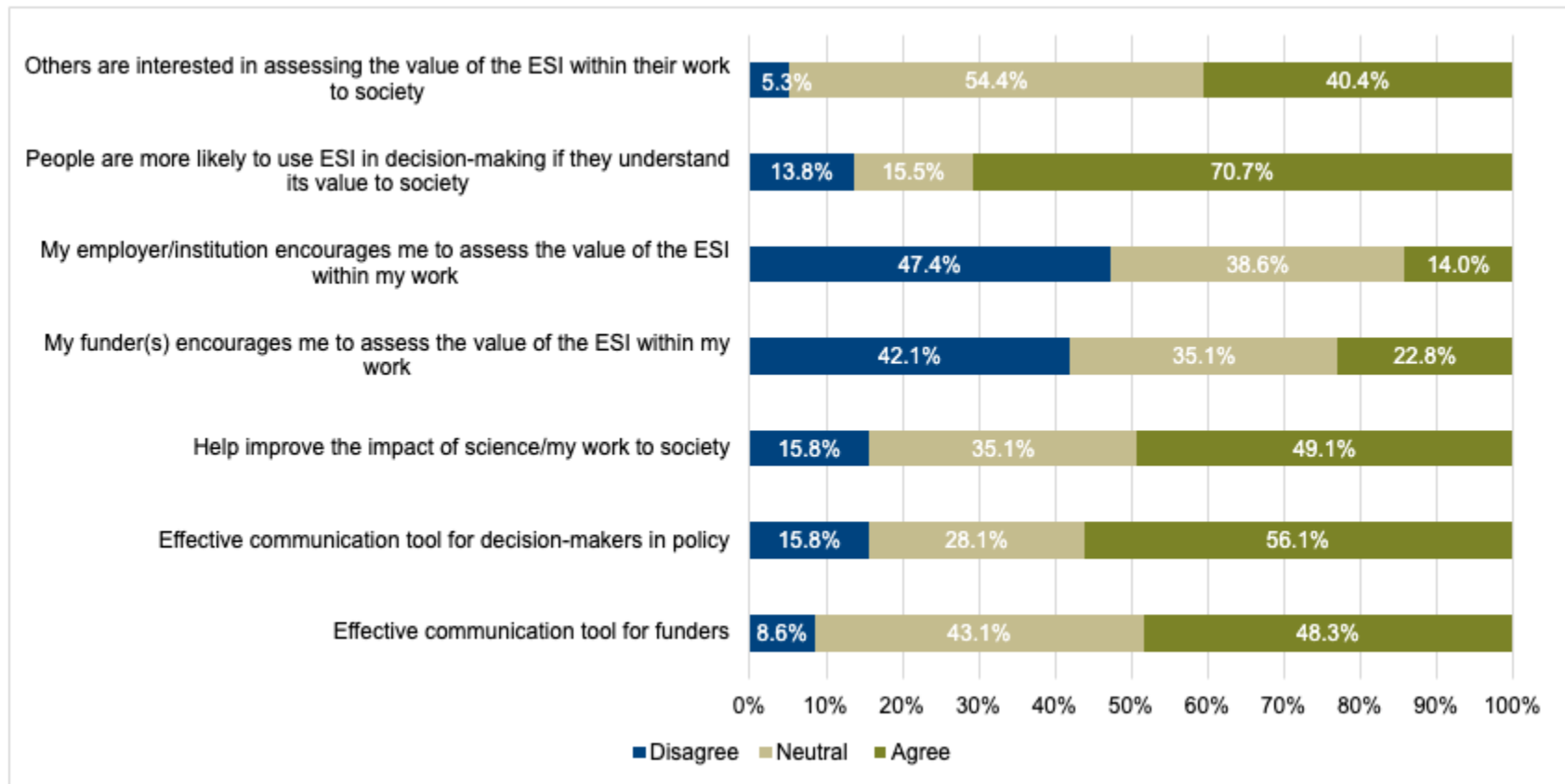


Figure 8. Distribution of ESI communities' level of agreement with statements related to perceptions of ESI value assessments (N = 58). Figures might not equal 100% due to rounding.

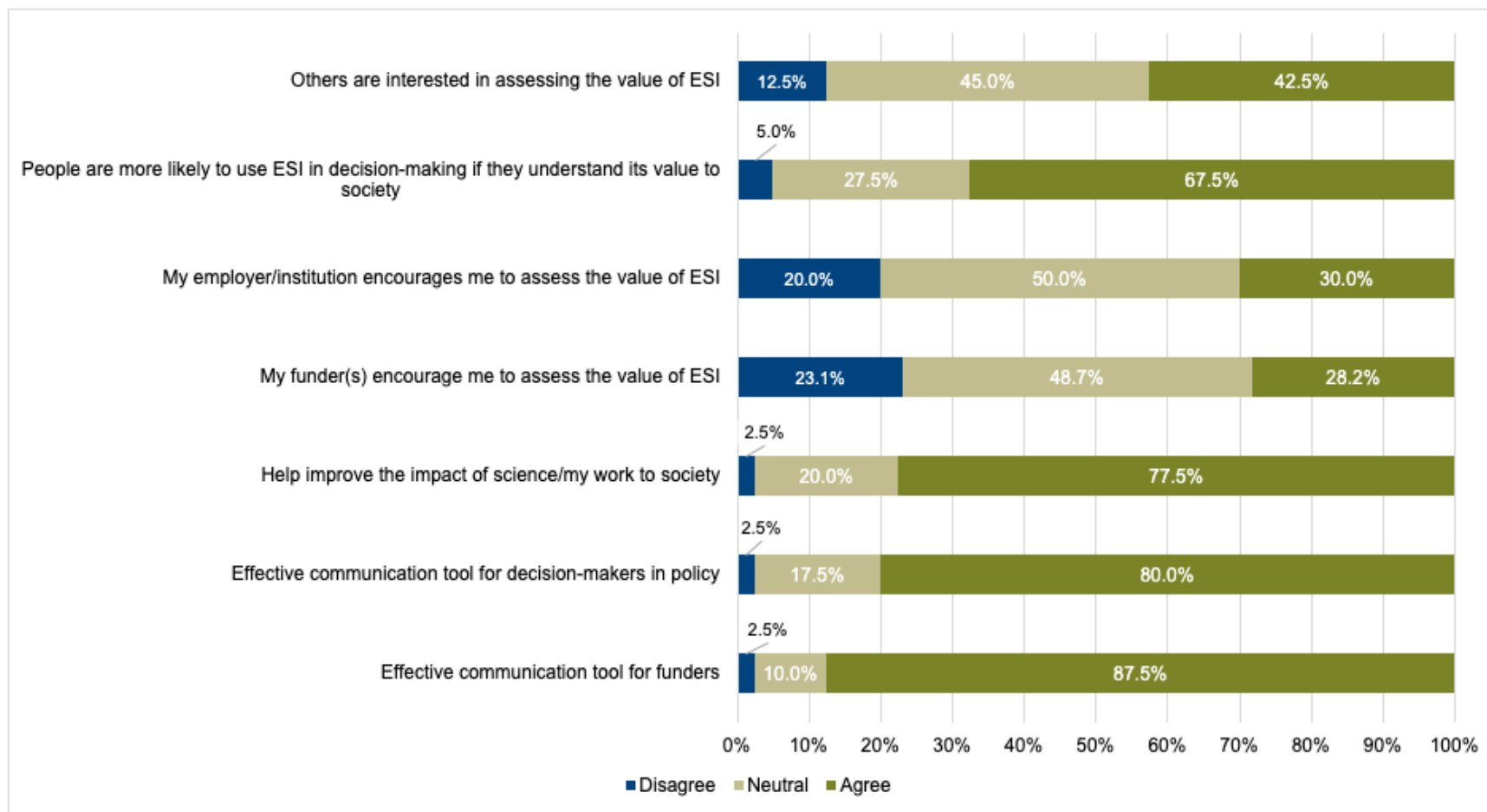


Figure 9. Distribution of value assessment communities' level of agreement with statements related to perceptions of ESI value assessments (N = 41). Figures might not equal 100% due to rounding.

Motivations

Overall, in both the ESI and value assessment communities, respondents are more motivated to conduct value assessments for reasons that influence broader societal and decision-making outcomes, particularly by ensuring their work is applied and impactful, rather than as a means for personal or institutional recognition.

Motivations for conducting value assessments of ESI from the ESI community

Among the ESI community, external-facing motivations strongly drive interest in conducting value assessments of ESI (Figure 10). The most compelling motivators included “encouraging decision-makers to use information” and “demonstrating the importance of their work to policy decision-makers.” Across all respondents, 75% rated “encouraging decision-makers to use information” as significantly or extremely motivating, and 67% rated “demonstrating the importance of their work to policy decision-makers” similarly. “Understanding social impact” and “justifying funding” were also strong motivating factors, though slightly lower in overall ratings.

“Encouraging investment in Earth observing technology” was a relatively strong motivator, with 62% of respondents rating it as significantly or extremely motivating. While 25% selected “somewhat,” only a small minority (13%) rated it as having very little or no motivational value.

Moderate motivations included practical or compliance-related reasons, such as “receiving funding to perform value assessments” (46%) and fulfilling funder or institutional requirements (63% and 39%, respectively). These motivations were important but generally secondary to those tied to broader societal impact or influence. In contrast, internal-facing motivations were much less compelling for most respondents. Nearly half (44%) rated “consideration in promotion processes” as “not at all” or “very little” motivating. Similarly, demonstrating value to colleagues was not a strong motivator, with only 37% rating it as significantly or extremely motivating.

This pattern also emerged in open-ended responses, where 17 respondents in the ESI community explained why they would conduct value assessments of ESI. Motivations were primarily centered around demonstrating or understanding the impact of their work (9 respondents): “To show the benefit of my work,” “To assess the impact of results,” or “I want to make sure that the work I’m doing matters.” Others (4 respondents) were interested in increasing the use and utility of their work: “Make my outputs more valuable for my primary stakeholders,” and “I want people to use the information I have produced.” A smaller number of respondents were motivated by the potential to support funding or reporting needs (2 respondents), and a few cited intellectual curiosity as a reason (2 respondents).

Motivations for conducting value assessments from the value assessment community



The difference between external and internal motivators is especially evident among respondents who already conduct value assessments (Figure 11). When asked what motivated them to conduct value assessments of ESI, respondents ranked “To encourage investment in earth observing technology and resources” (79%), “To demonstrate to policy decision-makers the importance of ESI” (76%), “To encourage decision-makers to use ESI” (70%), and “To justify the need for continued or increased funding and resources” (73%) as their strongest motivators (Figure 11).

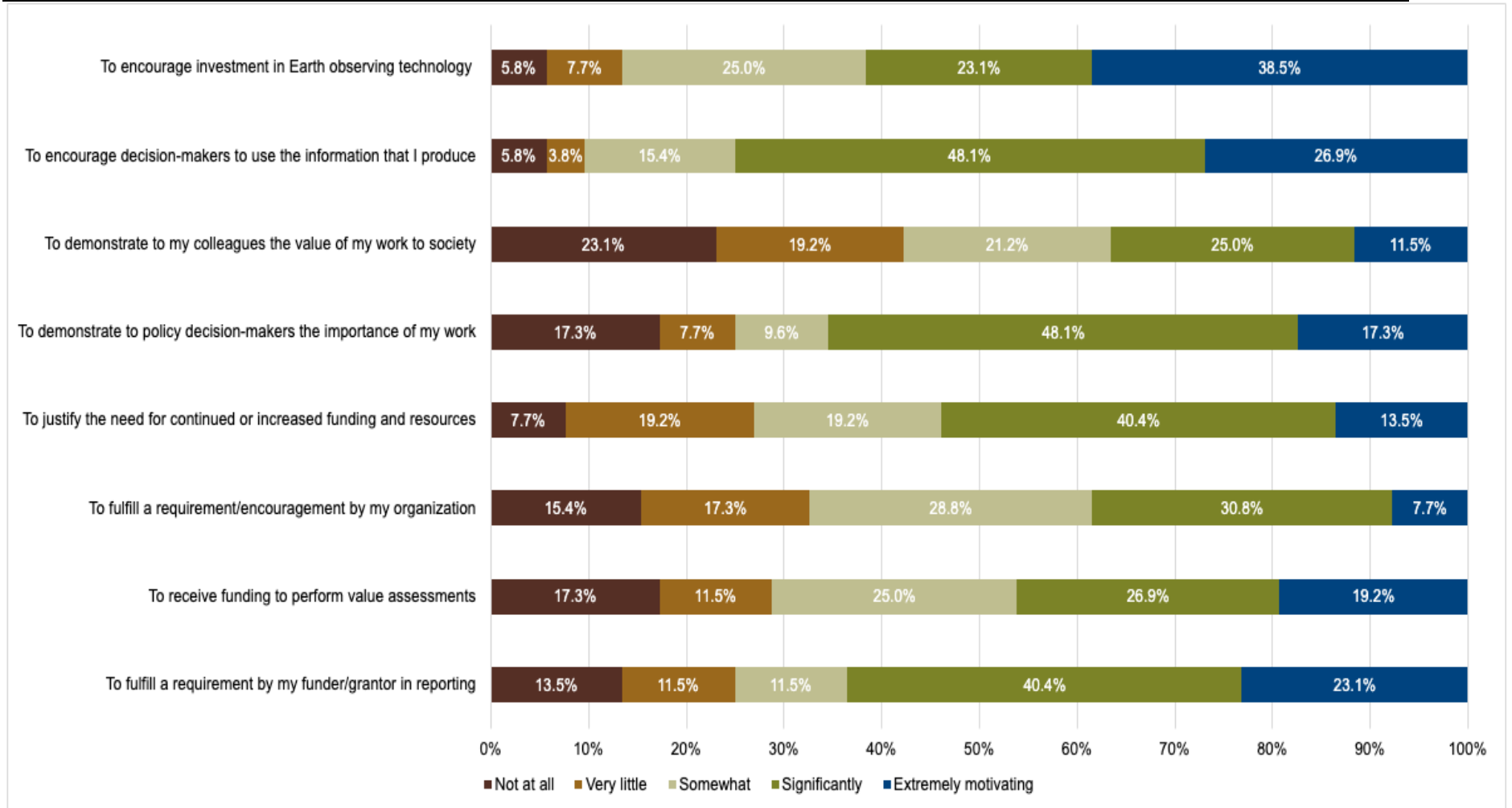


Figure 10. Degree of motivation for reasons the ESI community has for conducting value assessments of ESI (N = 52). Excludes respondents who belong to the value assessment community. Figures might not equal 100% due to rounding.

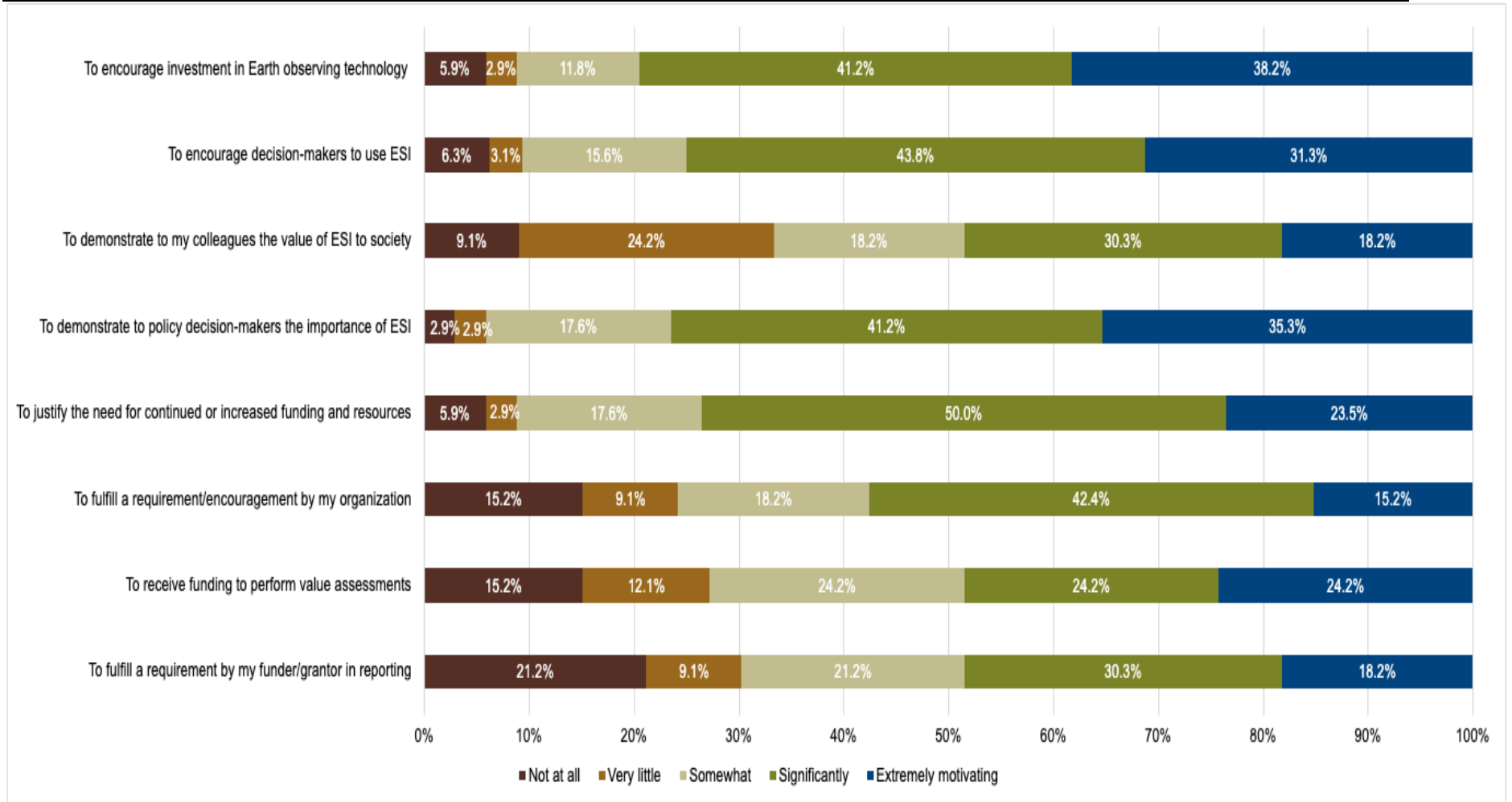


Figure 11. Degree of motivation for reasons the value assessment community would or does conduct value assessments of ESI (N = 34). Figures might not equal 100% due to rounding.

Perceived barriers and costs to conducting value assessments

Barriers and costs for the ESI community

Among respondents in the ESI community, the most significant and consistent barrier to conducting value assessments is lack of time. In a binary “Yes/No” question, 60% (N = 42) of respondents associated value assessments with significant time costs (Figure 12). In a separate question, 45% (N = 53) ranked “Lack of time” as their biggest barrier to conducting value assessments of ESI (Table 1). This was echoed in open-ended responses where 30 respondents within the ESI community elaborated on their lack of interest in conducting value assessments. The most common reason was lack of time and competing priorities (30%), with respondents citing busy schedules and a desire to focus on core scientific responsibilities—for example, “I would rather focus on the scientific questions at hand.”

“Lack of training or resources” was the second most frequently ranked barrier, followed by “uncertainty about communicative effectiveness of value assessments,” “Lack of interest,” “Little to no demand from funders,” and lastly, “Unclear counterfactual” (Table 1).

Low perceived personal benefit was also a noted barrier, with 33% (N = 42) indicating this in response to a binary “Yes/No” question (Figure 12). Even when respondents were asked to assume they knew how to conduct a value assessment of ESI, 34% (N = 58) still said they were not interested, and another 45% were neutral—suggesting that disinterest stems from more than just technical or resource-based barriers (Figure 13).

In an open-ended question asking why the ESI community was not interested in conducting value assessments, lack of alignment with job responsibilities was another common theme. About 26% (N = 30) stated that value assessments fall outside of their scope of work, describing them as “not part of my job,” “somebody else’s job,” or “not a priority of assigned tasks.”

Additional open-ended responses prompting respondents to list any additional barriers (N = 12) revealed further concerns not captured in the fixed-response options. The most common was low perceived utility (5 respondents), with several emphasizing that outputs like papers, grants, and proposals were more important for career advancement and institutional recognition. As one put it: “Other outputs (papers, proposals) are much more important for maintaining my research program.” Another noted: “Citations of key papers in the thousands and international awards gave confidence that our research was worthwhile.” These comments suggest that respondents see existing ways to measure values are perceived as good enough proxies for assessing the value of their work.

Another barrier was conceptual or practical challenges such as unclear methodologies or difficulty tracking data usage (3 respondents), for example: “We’ve found it very difficult to understand how data are being used by end/applied users and decision-makers because these cases are often not well documented or published...” and “The concept appears very abstract to me.” Others named institutional or structural barriers (3 respondents) such as “It’s not required for reporting” and “Institutional politics and/or district of analysis.” Ethical or ideological concerns (2 respondents) also emerged as a barrier for some, with skepticism about neutrality and integrity of value assessments discouraging them from performing them, for instance: “...there is sufficient slack in all valuation methods to heighten the moral hazard of manipulating the assessment to achieve desired result.”

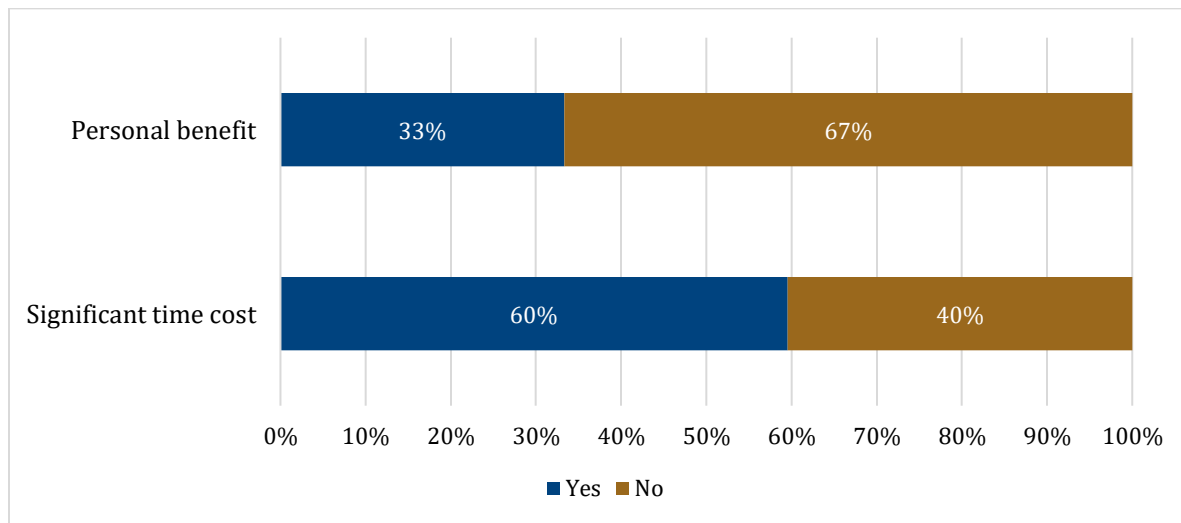


Figure 12. Response to the question, “Considering value assessments, which of these phrases resonate with you? Imagine them under the following context: “I associate assessing the value of the ESI that I produce with ...” of which they had to answer “Yes” or “No”. Analysis includes only fully completed responses and excludes those in the value assessment community (N = 42).

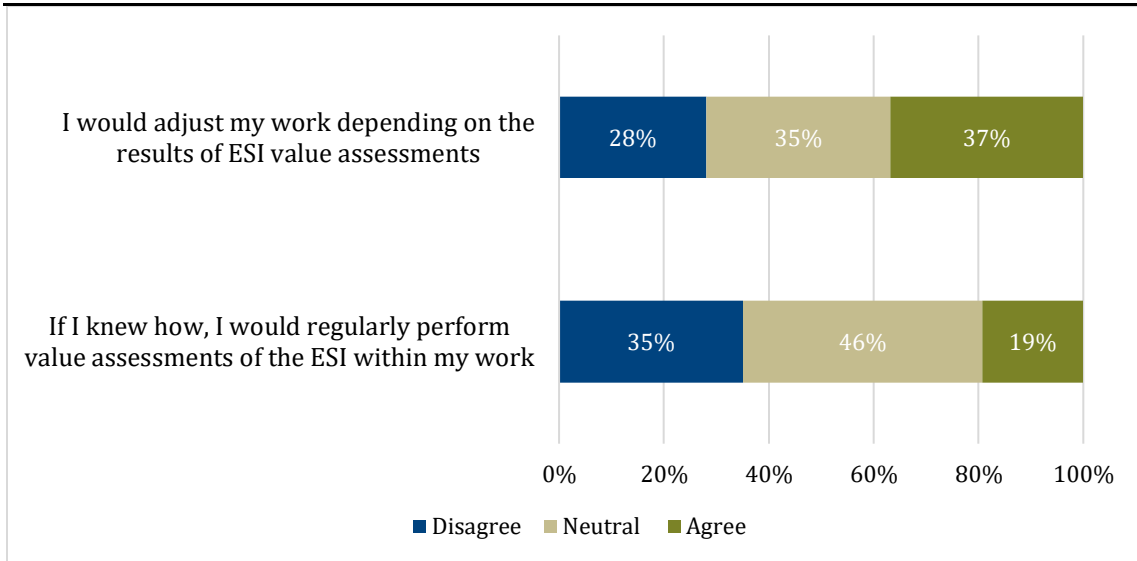


Figure 13. Distribution of ESI communities’ level of agreement with statements related to perceptions of ESI value assessments (N = 58).

Barriers and costs of the value assessment community

The value assessment community also ranked “Lack of time and training/resources” as challenging barriers with “Lack of interest” and “Uncertainty about communicative effectiveness” being of least concern (Table 1). For the value assessment community, the third biggest barrier was “Unclear counterfactual,” whereas for the rest of the respondents it was “Uncertainty about communicative effectiveness.” This difference is likely due to the value assessment community having more experience conducting assessments.

Additional open-ended responses prompting respondents to list any additional barriers (N = 20) revealed further concerns not captured in the fixed-response options. Barriers that the value assessment community has personally experienced in conducting value assessments overlap with the expected barriers of the ESI community. The most mentioned barrier was methodological and data challenges (11 respondents) with responses describing difficulties related to quantifying causal links, developing counterfactuals, or obtaining necessary information. One respondent explained, “Quantifying the causal link between use of satellite data and a positive outcome on-the-ground is methodologically challenging.” Another emphasized, “Economic counterfactuals are very weak.” Resource constraints, such as insufficient time, limited funding, and lack of dedicated resources, were reemphasized by 8 respondents. Communication barriers were also raised by two respondents, focusing on the difficulty of conveying the value of ESI to decision-makers and engaging with end users. Another barrier mentioned by some (2 respondents) was institutional

constraints, particularly unclear mandates or lack of prioritization for assessments within their organizations.

Table 1. Ranked barriers to value assessment adoption. For the ESI community, these were the perceived personal barriers to conducting value assessments. For the valuation community, they ranked the perceived barriers for others (not themselves) to conduct value assessments.

Barrier	ESI community rank (N = 53)	Valuation community rank (N = 35)
Lack of time	1	2
Lack of training or resources	2	1
Lack of interest / no relevance to my work	3	6
Little to no demand from funders	4	5
Uncertainty about communicative effectiveness of value assessments	5	4
Unclear counterfactual	6	3

Engagement with end users

As contacting end users may be an important part of the valuation process, we asked questions to all respondents intended to gauge connection with end users or information beneficiaries. Overall, 72.8% (N = 59) of respondents reported having an end user in mind for their work, with only 27% (N = 59) reporting they had none. For those who had an end user, most (N = 42) reported that connecting with them was either “Somewhat difficult” (32.5%) or “Neither easy nor difficult” (32.5%). A third of respondents reported that connecting with end users was “Somewhat easy” (23%) and a few “Extremely easy” (9%).

Thirty-seven respondents in total, in both the value assessment and non-value assessment community, reported their end users. Of those, 21 identified specific end users such as “farmers,” “National Weather Service,” or “fisheries managers.” This suggests that many individuals have a clear audience in mind who they believe directly benefits from or uses their work. However, a large portion of respondents (43%; 16 respondents) identified broad or unspecified end users, using terms like “stakeholders,” “the public,” or combinations like “government agencies, industry.” There was no discernable difference in the reported ease of connecting with end users between those who named specific audiences and those who listed broad or general group(s). While most respondents report having an end user in mind, the fact that 37% of them failed to specify a particular group raises questions about the clarity of their level of engagement.

Additional insights from the value assessment community

Choosing values to measure

Understanding how values are selected in current assessments can inform which methods to prioritize in capacity development efforts. Seventeen respondents from the value assessment community described how they determine which values to measure in ESI.

The most frequently cited factor—mentioned by five respondents—was stakeholder relevance. Respondents emphasized the importance of selecting values that are meaningful to decision-makers and other end users, with one noting: “Assess the values that are of priority to the primary stakeholder,” and another adding: “I choose values that are relevant to stakeholders, not data producers.” This highlights the view that value assessments should be shaped primarily by the needs and priorities of those who will use the data to inform decisions. However, access to these end users is often a challenge.

Other respondents based their selection on alignment with research objectives, often building on past metrics or choosing values that contribute to their academic or analytical goals. As one explained, “Values closely align with research objectives.” For example, the number of citations is a common metric of success in academic contexts.

Practical considerations also played a significant role. Three respondents cited resource constraints—such as limited time, funding, or data availability—as shaping their choice of which values to assess. One noted that value selection is often “dictated by the product and information it provides,” highlighting how the characteristics of ESI itself can guide the assessment.

The value assessment community is interested in expanding the range of values used to measure impact of ESI to conceptual values such as kinship, safety, and fairness in decision-making processes. Most (44%, N = 34) respondents indicated that they had “Significant” or “Substantial” interest in expanding the range of values they measure (Figure 14). Asked in a separate 3-point Likert scale question, 70% (N = 41) of respondents agreed that value assessments should be expanded to include conceptual values (Figure 15).

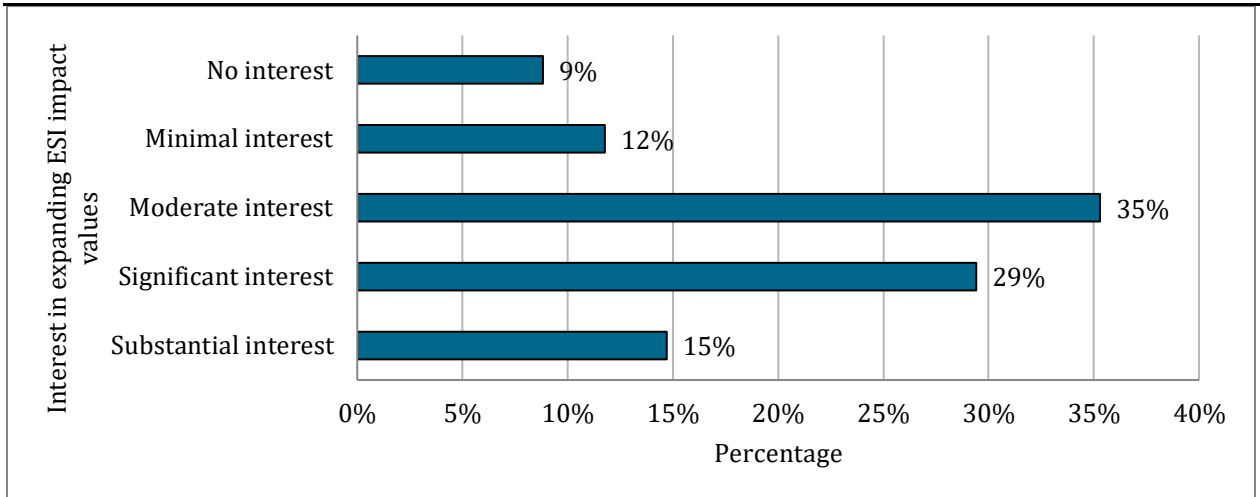


Figure 14. Interest of the value assessment community in expanding the range of values used to measure impact of ESI to include conceptual values (e.g., kinship, procedural justice, feelings of safety)(N = 34).

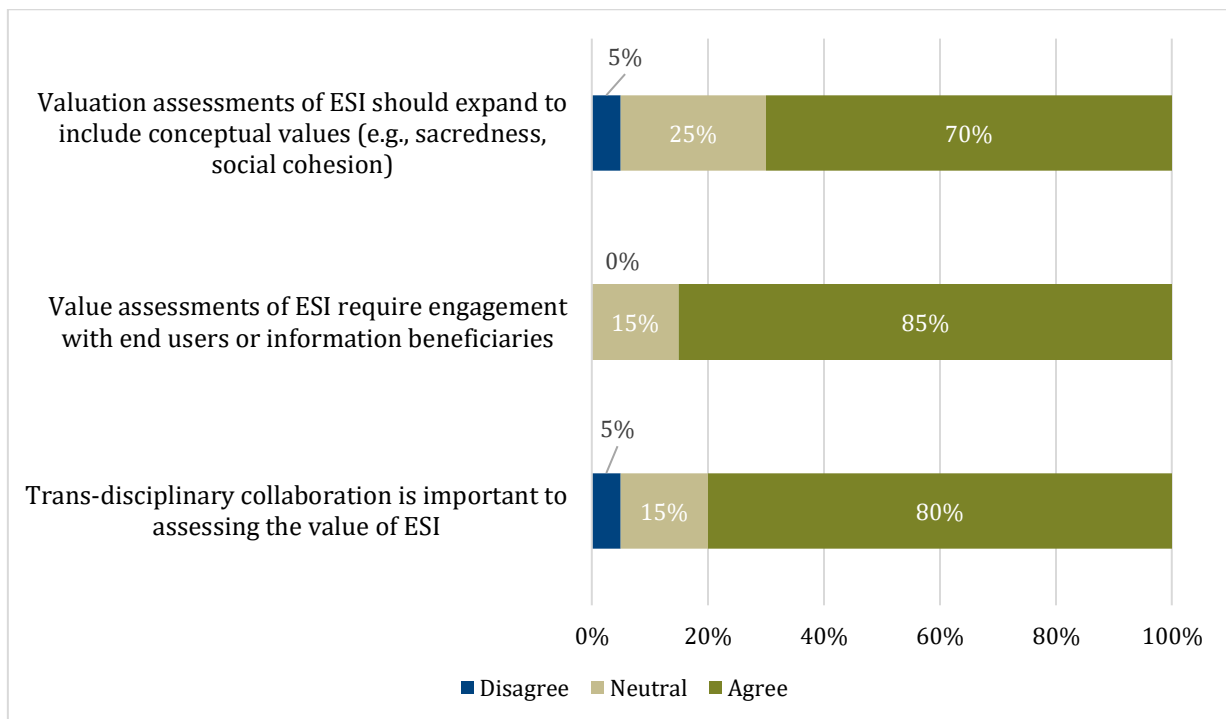


Figure 15. Distribution of value assessment communities’ level of agreement with statements related to perceptions of ESI value assessments (N = 41).

Important skills for performing assessments

According to the value assessment community, important skills broadly needed to conduct value assessments include technical skills and stakeholder/end user engagement. The range of

analytical and technical skills mentioned includes geospatial analysis, causal inference, economic cost-benefit modeling, and validation. Respondents emphasized the importance of understanding stakeholder needs, collaborating with end users, and ensuring assessments align with their priorities. They agree that engagement with value assessments of ESI requires engagement with end users and information beneficiaries (85%, N = 41).

Transdisciplinary collaboration seems to be a common approach used for conducting value assessments, with 78% (N = 27) of individuals who have performed value assessments of ESI confirming that they worked with others from different disciplines to carry them out. The value assessment community agrees that transdisciplinary collaboration (80%, N = 41) is an essential component of conducting meaningful assessments.

Community needs and recommendations

Understanding motivations and enabling factors for performing value assessments within the ESI community is essential for shaping targeted capacity building, communication, and engagement strategies. The baseline assessment reveals a relatively low interest in conducting ESI valuations among respondents outside the existing valuation community. Nearly half (49%) expressed little to no interest, while only 25% demonstrated enthusiasm. Similarly, most respondents were hesitant or unwilling to invest time or resources into valuation activities, citing practical constraints such as limited time, funding, and training. However, disinterest appears to go beyond practical challenges, suggesting deeper motivational barriers, including unclear personal benefits and limited institutional encouragement. It will be challenging to convince individuals to prioritize value assessments amid an already demanding workload. Based on the survey results, this is unlikely to happen without strong external incentives, despite well-meaning motivations.

To effectively increase the adoption of value assessments, CONVEI needs to recognize the complexity of these barriers and adopt a holistic approach. Addressing the lack of clear personal incentives and institutional support is crucial. Simply providing educational resources or training is unlikely to significantly boost adoption without also offering tangible external incentives or aligning these assessments with institutional expectations. Thus, CONVEI should work closely with funders and institutions to integrate ESI valuations into professional expectations and reporting structures, making valuations a necessary and beneficial practice rather than an optional one.

While respondents recognized the theoretical benefits of conducting value assessments—such as influencing policy, encouraging investment in ESI resources, and improving societal impact—they remain skeptical due to perceived high costs and unclear practical benefits, particularly for those that are not part of the value assessment community. This skepticism is compounded by uncertainty around the audience and purpose of socioeconomic impact assessments, as many respondents are more familiar with traditional academic metrics like citations to track impact. To enhance the perceived relevance of valuations, CONVEI should clearly communicate that these assessments are intended primarily for external stakeholders—such as policymakers, funders, and

end users—and strategically share tangible success stories that demonstrate their real-world utility and outcomes.

Survey respondents, while familiar with valuation methods—83% reported familiarity—indicated limited practical experience, with only 26% having conducted an assessment of ESI themselves. This gap between knowledge and practice suggests the need for clear, accessible guidance and replicable examples through practical case studies and microlearning materials. Such resources can demystify valuation processes, reduce perceived complexity, and enhance confidence in performing valuations.

Additionally, respondents identified substantial barriers around engaging end users and collaborating across disciplines—activities deemed essential by experienced valuation practitioners. Therefore, CONVEI should also prioritize building skills for effective stakeholder engagement and fostering transdisciplinary collaboration.

Ultimately, widespread adoption of ESI valuations hinges on shifting institutional norms and expectations. Currently, few respondents receive institutional encouragement to perform valuations, indicating a need for systemic change. CONVEI should therefore advocate for institutional policies and funding criteria that encourage or require value assessments, embedding these practices into professional and organizational cultures.

Addressing community needs and successfully mainstreaming ESI valuation practices will require an integrated strategy that combines technical training, effective communication, clear demonstration of practical benefits, robust incentive structures, and strategic partnerships with institutional and funding bodies.

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Supplemental materials

Table S1. Respondents’ field of study; multiple selections allowed (N = 79).

Discipline	Count
Ecology	26
Data Science	20
Climate Resilience	18
Agriculture and Food Security	14
Conservation	13
Water Security	6
Management	4
Economics	4
Geology	4
Disaster Response	2
Humanitarian Aid	2
Mathematics	2
Health	1
Earth and Atmospheric Sciences	6
Geography	4
Oceanography	3
Biology	1
Botany	1
Meteorology	3
Forestry	1

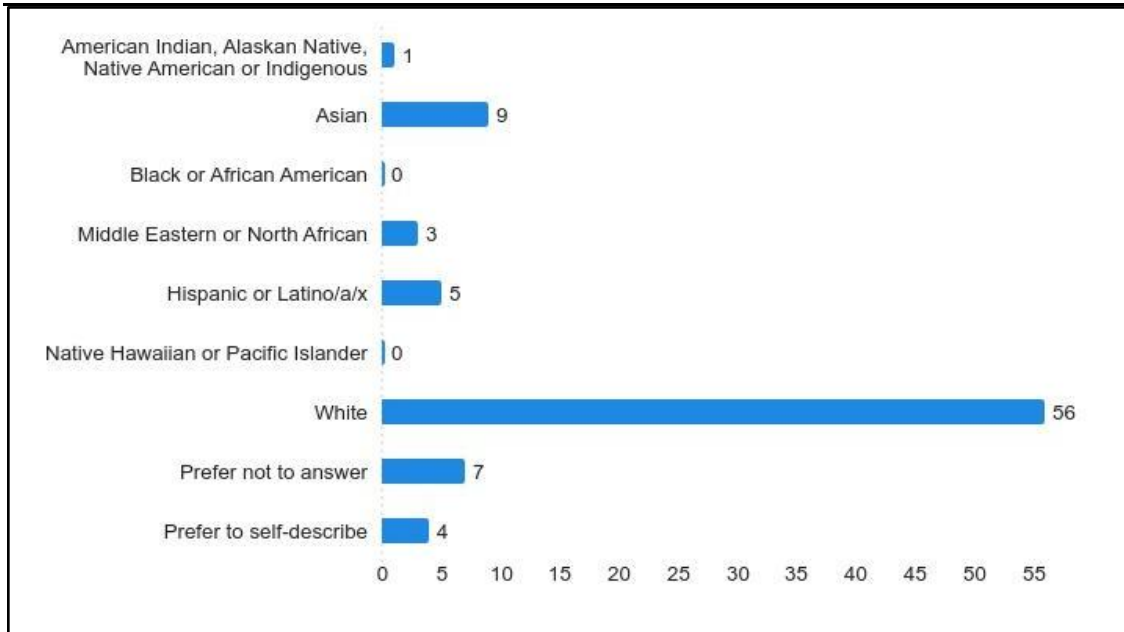


Figure S1. Respondents' race and ethnicity; multiple responses allowed (N = 82).