CARIAA
Collaborative Adaptation Research Initiative in Africa and Asia

ASSAR
Adaptation at Scale in Semi-Arid Regions

# Are large-scale collaborations worth it?

## *A longitudinal study of researchers' perceptions over a 5 year program*

*CARIAA-ASSAR Working Paper*

*Lucia Scodanibbio, Georgina Cundill Kemp*

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**About CARIAA Working Papers**

This series is based on work funded by Canada's International Development Research Centre (IDRC) and the UK's Department for International Development (DFID) through the **Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA)**. CARIAA aims to build the resilience of vulnerable populations and their livelihoods in three climate change hotspots in Africa and Asia. The program supports collaborative research to inform adaptation policy and practice.

Titles in this series are intended to share initial findings and lessons from research and background studies commissioned by the program. Papers are intended to foster exchange and dialogue within science and policy circles concerned with climate change adaptation in vulnerability hotspots. As an interim output of the CARIAA program, they have not undergone an external review process. Opinions stated are those of the author(s) and do not necessarily reflect the policies or opinions of IDRC, DFID, or partners. Feedback is welcomed as a means to strengthen these works: some may later be revised for peer-reviewed publication.

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# About ASSAR

All authors of this working paper are team members in the ASSAR (Adaptation at Scale in Semi-Arid Regions) project, one of four hotspot research projects in CARIAA. The international and interdisciplinary ASSAR team comprises a mix of research and practitioner organisations, and includes groups with global reach as well as those deeply embedded in their communities. The ASSAR consortium is a partnership between five lead managing institutions - the University of Cape Town (South Africa), the University of East Anglia (United Kingdom), START (United States of America), Oxfam GB (United Kingdom) and the Indian Institute for Human Settlements (India) – and 12 partners – the University of Botswana, University of Namibia, Desert Research Foundation of Namibia, Reos Partners, the Red Cross/Crescent Climate Centre, University of Ghana, ICRISAT, University of Nairobi, University of Addis Ababa, Watershed Organisation Trust, Indian Institute for Tropical Meteorology, and the Ashoka Trust for Ecology and the Environment.

Working in seven countries in semi-arid regions, ASSAR seeks to understand the factors that have prevented climate change adaptation from being more widespread and successful. At the same time, ASSAR is investigating the processes – particularly in governance – that can facilitate a shift from ad-hoc adaptation to large-scale adaptation. ASSAR is especially interested in understanding people's vulnerability, both in relation to climatic impacts that are becoming more severe, and to general development challenges. Through participatory work from 2014-2018, ASSAR aims to meet the needs of government and practitioner stakeholders, to help shape more effective policy frameworks, and to develop more lasting adaptation responses.

## Why focus on semi-arid regions?

Semi-arid regions (SARs) are highly dynamic systems that experience extreme climates, adverse environmental change, and a relative paucity of natural resources. People here are further marginalised by high levels of poverty, inequality and rapidly changing socio-economic, governance and development contexts. Climate change intersects with these existing structural vulnerabilities and can potentially accentuate or shift the balance between winners and losers. Although many people in these regions already display remarkable resilience, these multiple and often interlocking pressures are expected to amplify in the coming decades. Therefore, it is essential to understand what facilitates the empowerment of people, local organisations and governments to adapt to climate change in a way that minimises vulnerability and promotes long-term resilience.

# About the authors

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# 1. Introduction

The global sustainability challenges we face increasingly require the use of new partnerships and approaches to explore solutions that are commensurate with the scale of the problems we confront. From health issues, to agriculture and food security (Kragt et al., 2016), climate adaptation (Boon et al., 2014), water management (White et al., 2019), urban (Diez Roux et al., 2019) and landscape planning (Tress et al., 2007), complex problems necessitate collaboration between different disciplines and sectors. Alliances between research institutions, practitioners and other societal actors are becoming more common (e.g. Brown et al., 2019) as are approaches of co-production of knowledge that span across these partnerships (e.g. Harvey et al., 2018; Vincent et al. 2020).

In the climate change arena, transdisciplinary collaborative research initiatives are increasingly funded, and are setting a new model for the way research is undertaken (Boon et al., 2014; Cundill et al., 2019). Collaborative research projects have been defined as "temporary organisations that exist for the purpose of building and evaluating novel results under a pre-defined research objective and with constraints on resources, costs, and time. The work is carried out in a collaborative setting characterised by heterogeneous partners, a specific application context, collective responsibilities, and, in many cases, support through public-funding agencies" (von Brocke and Lippe, 2015, p.1024). When such collaborations support mutual learning between multiple disciplines, and across multiple knowledge domains, with the goal of co-producing a shared understanding of a common problem, then we can describe such collaborations as transdisciplinary (Scholz and Steiner, 2015).

Collaboration across interdisciplinary teams is challenging (Brown et al., 2015; Kragt et al., 2016), due to the use of different languages, methodologies and approaches; and a relative absence, in the traditional academic system, of reward mechanisms for interdisciplinary publications and research. The significant time requirements involved in knowledge integration makes time a key constraint in collaborative projects. Other barriers include conflicts between knowledge systems, competing organisational priorities, a lack of a common terminology and difficulties associated with bridging different knowledge traditions and agreeing on the formulation of a common problem (Stokols, 2006; Tress et al., 2007). Such challenges can be exacerbated in larger projects, with higher budgets and longer time frames (Tress et al., 2007), where project management, team development and knowledge integration become increasingly challenging (Gaziulusoy et al., 2016). The outcomes of such efforts are contested. For example, while Cummings and Kiesler (2007) found that when multiple universities are included in a research

collaboration, project outcomes decrease, other studies have shown that when face-to-face engagements are part of knowledge synthesis efforts, multi-institutional collaboration significantly increased productivity and positively affected the careers of participants (Hampton and Parker, 2011).

Much of the literature that deals with transdisciplinary collaborations has focused on looser partnerships between different governmental and non-governmental actors (e.g. to deal with water management issues, see Margerum and Robinson (2014)), often at the scale of only one country (e.g. for climate adaptation in the Dutch context (Boon et al., 2014)). Other work has focused on collaborations between interdisciplinary teams, either at a relatively small-scale (e.g. collaborations between small numbers of different institutions at country-level, see Corley et al. (2006); between small numbers of researchers from different disciplines, see Gaziulusoy et al. (2016) and Mattor et al. (2014)), or focusing on specific aspects of the collaboration (e.g. collaborative manuscript development and authorship issues, see Oliver et al. (2018)). Often, these are not empirical studies, but rather based on models that call for testing with real world case studies (e.g. Hall et al., 2012); or they consist of quantitative, statistical studies (e.g. Cummings and Kiesler, 2007) that look across large numbers of projects and available literature (e.g. vom Brocke and Lippe, 2015). The benefits and limitations of transdisciplinary collaborations, as perceived by the participants of such collaborations themselves, remain under-explored. There is also very little work that focuses at an international project scale in an empirical manner, or longitudinally across time. While some work has focused on discussing the effects and effectiveness of bringing different disciplines or societal actors together, few have looked at the experiences of participants of larger consortia composed of partners working at different scales (globally to locally), from diverse cultures and geographies, from the north and south, that together seek to address complex societal problems.

In this context, the first objective of this paper is to assess perceptions of whether the benefits of such a consortium model exceed its transaction costs from the perspective of participants themselves. We pursue this objective by looking at the experience of members of a large-scale five-year collaborative research project at two points in time (midway and at the end of the project). Secondly, we seek to explore the extent to which these costs can be potentially outweighed, again from the perspective of participants, by providing recommendations to aid in the design of future programmes.

## 1.1. Background to the ASSAR project

The Adaptation at Scale in Semi-Arid Regions (ASSAR) project was a five-year (2014-18) more than 10 Million Dollar collaboration between 17 academic and practitioner organisations located in 10 countries across four continents. ASSAR's primary research objective was to enhance understanding of barriers and

enablers to sustained and effective adaptation in semi-arid regions of Africa and Asia. With case studies in Southern Africa (Namibia and Botswana), East Africa (Kenya and Ethiopia), West Africa (Mali and Ghana) and three states of India, ASSAR focused its attention on the most marginalised, seeking to understand the root causes of their vulnerability, the responses that have been taken to adapt to climate change and the capacities that exist to do so.

To achieve this, the project supported the involvement of more than 250 researchers and practitioners throughout the project duration. Approximately 130 of these were active at any one time, though these ranged from full-time project staff (in both research and support roles) to researchers with part-time roles that could have as little as five or ten percent of their time allocated to the project. Project members included researchers ranging from master's and PhD students, to senior academics established in a range of disciplinary fields (including economics, governance, climate science, gender, agriculture, ecology, etc.). The partnership also included non-governmental organisations with established global and local networks to work with the research teams and contribute to research uptake and impact. At the end of the project, approximately 80 journal articles and book chapters had been published or were under review; more than 200 communications outputs (including briefs, videos, toolkits, radio shows) were produced; close to 50 students graduated; and at least 2,000 stakeholders from community, government, private sector and civil society had been engaged in project activities (such as workshops and training events).

The University of Cape Town, as project lead, housed the project management unit, comprised of the principal investigator, a consortium coordinator and the communications team, who provided administrative, strategic and technical support to the partnership. A project steering committee, composed of the principal investigator, and the co-principal investigators and leads from ASSAR's five core organisational partners provided direction to the project. Annual meetings were convened among a rotating subset of project members (approx. 60 per meeting) to review project progress and modify course as needed; identify and work together on cross-regional synthesis topics; and learn from one another and strengthen relationships.

Capacities, particularly of early career researchers, were built through supporting scholarships for students and providing grants (through a "small opportunities grant") for exchanges with ASSAR senior experts, for promoting collaboration across teams and for funding impact-related activities. Capacities of external stakeholders were strengthened through participation in numerous workshops that ranged from participatory scenario processes and vulnerability assessments, to training on climate science and adaptation, experiential learning activities, or rural livelihoods-related support.

# 2. Methods

Two surveys were conducted with members of the ASSAR consortium, one in September 2016 (midway through the project) and the second in November 2018 (at the end of the project). The purpose of the survey was to gain a longitudinal view of what members of ASSAR considered to be the most valuable and the most challenging aspects of being part of a consortium, and therefore to assess the extent to which perceived benefits of learning through a collaborative and large-scale project outweighed the significant transaction costs. The survey, administered by email and answered through Google Forms, consisted of both Likert scale and open-ended questions, most of which were compulsory. 13 questions were asked in the first round. In the second round, two questions were removed because they were only relevant while the project was ongoing; and seven new questions were added in order for respondents to reflect back on the ASSAR experience overall. To assess how beneficial the project had been, questions inquired about respondents' most important lessons learned, their most valuable experiences and most useful part of working in a consortium. To assess transaction costs, respondents were asked about their most challenging experiences and the difficulties involved in working in a consortium. In order to then better understand whether benefits outweighed the costs, respondents were asked to rate their levels of satisfaction with both what they personally, and the project overall, had achieved, and to provide an explanation for their responses. The last question inquired about respondents' recommendations for future projects of a similar design.

Sixty-one and 82 respondents answered the first and second surveys, respectively. Given that approximately 130 individuals were active at any one time in ASSAR, this response rate constituted approximately 50% or more of the ASSAR population. For open-ended questions, in the first round, the responses were analysed inductively using thematic analysis (Braun and Clarke, 2006). Codes were developed iteratively. In the process of coding each response, the primary codes that were developed were further refined (de Wet and Erasmus, 2005), to capture, as accurately as possible, the range of relevant responses. For most survey questions, an "other" code was included, in order to capture responses that were outside of the existing codes when it was not deemed useful to add additional ones. Depending on the richness of the answers, each response could fall under more than one code. Once all the primary codes were defined in this first round of analysis, a further process of higher-level categorisation was undertaken (yielding secondary categories), to capture broader themes that the primary codes spoke to. The same process was followed for the second survey at the end of the project, although coding and categorisation from the first round were used to analyse responses in the first instance, with new codes and categories added if none of the existing ones adequately captured the

responses. In some cases, analysis of the second survey led to a decision to refine the codes of the first round too, thus leading to a revision of the first analysis.

# 3. Results

In both surveys (at the midpoint and at the end of the project), the profiles of respondents reflected the makeup of ASSAR, with early career researchers comprising approximately 50% of the sample, senior researchers comprising roughly 30%, and practitioners and communications specialists accounting for the remaining 20%.

### 3.1 The benefits of being part of a consortium

The vast majority of respondents indicated that it was either important or extremely important to them personally that ASSAR was a consortium, and this remained consistent throughout the project (**Figure 1**).

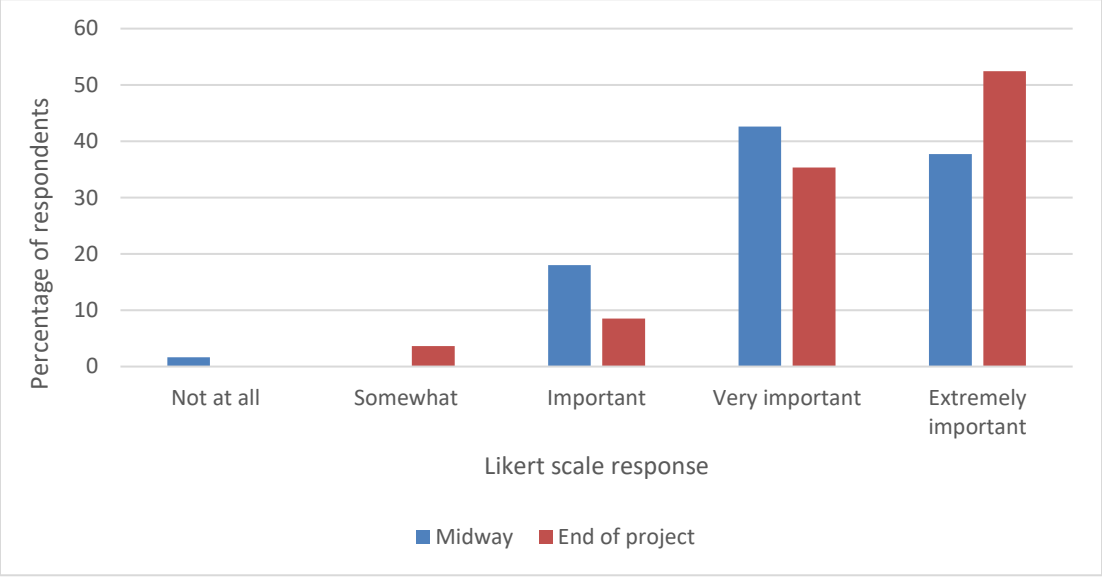


**Figure 1**: Likert scale responses to the question "How beneficial is it to you that ASSAR is a consortium" (n=61 for the midpoint survey, and n=82 at the endpoint).

In both surveys, respondents referred to the consortium's multi-disciplinary and collaborative design as the most beneficial aspect of working in a consortium. ASSAR's inclusion of members with diverse expertise (from both research and practice), different career stages, and cultural and geographical backgrounds enabled learning and sharing of experiences, knowledge, approaches and perspectives across a range of diverse cross-regional partners. The ability to network and build new relationships;

mentor and be mentored; develop personally and professionally; and access new knowledge, resources and funding were also recognised as benefits of being part of the consortium. For example, one respondent explained:

> *Having such intelligent, interesting colleagues for 5 years, spread across the world! Meeting future collaborators and networking with premier institutions. Learning more about the African context, especially from the East Africa team on gender dynamics. Being able to mentor junior researchers and help them not make the mistakes I did :) Also, ASSAR … facilitated me to attend several international events …. So it has been very rewarding professionally and personally.* [Response from endpoint survey]

The perceived highlights from the ASSAR experience shifted throughout the lifespan of the project for respondents. At the midpoint of the project, face-to-face interactions through project meetings, collaborative research and team diversity were most highly valued (**Figure 2**). At this time, meetings were critical enabling factors for team members to get to know each other, most of whom had never worked together before. Appreciation of the value of undertaking fieldwork and research increased by the end of the project, likely because it took time for the research framework to be agreed on; thus, research activities were more prominent (and appreciated, as project highlights) in the second half of the project. At the endpoint, almost 40% of respondents valued the opportunity to increase knowledge and skills, indicating that new capacities were one of the key benefits respondents associated with a large-scale collaboration (**Figure 2**).

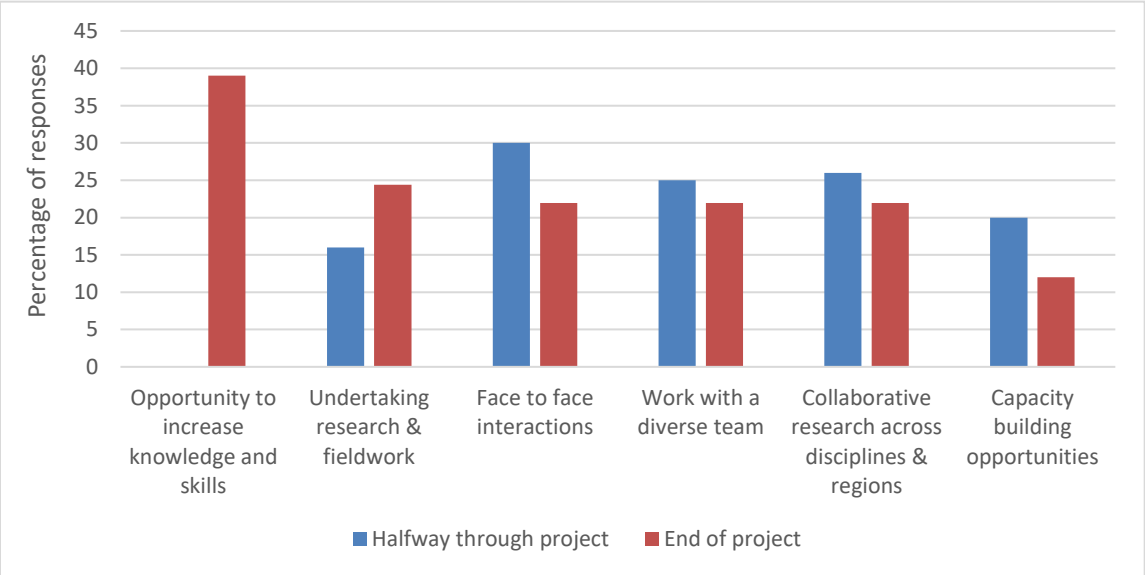


**Figure 2**: The five most frequently cited valued experiences in ASSAR at the midpoint and the endpoint of the project. Note that where respondents offered more than one response, these were also captured.

While Figure 2 illustrates the five most cited responses to the question regarding perceptions of the most valued benefits of being part of ASSAR, an analysis of all responses to the same question illustrates some noticeable shifts over time. Responses were grouped into one of four codes (see **Figure 3**). While at the project midpoint 47% of responses indicated a value attached to the opportunity to work and learn collaboratively, by the endpoint the value attached to personal professional development had become much more prominent (**Figure 3**). This is likely a feature of the growing maturity of the consortium in terms of capacity to collaborate across disciplines and regions; opportunities for professional development having been seized by the end of the project; and the training of students over time. These responses are illustrated in the following quotes:

> *My most exciting and enriching experience was the Annual meeting in India and the …* [ASSAR Small Opportunity Grant] *during which I met with a considerable number of ASSAR team members.* [Response from midpoint survey]

> *It is an undeniable fact that my participation in the ASSAR project has improved my ability to work in a team. Right from the beginning of my participation to the end, I have always been happy about how senior members and colleagues made contribution to shaping my proposal, instruments, analysis of data and discussion of my results.* [Response from endpoint survey]

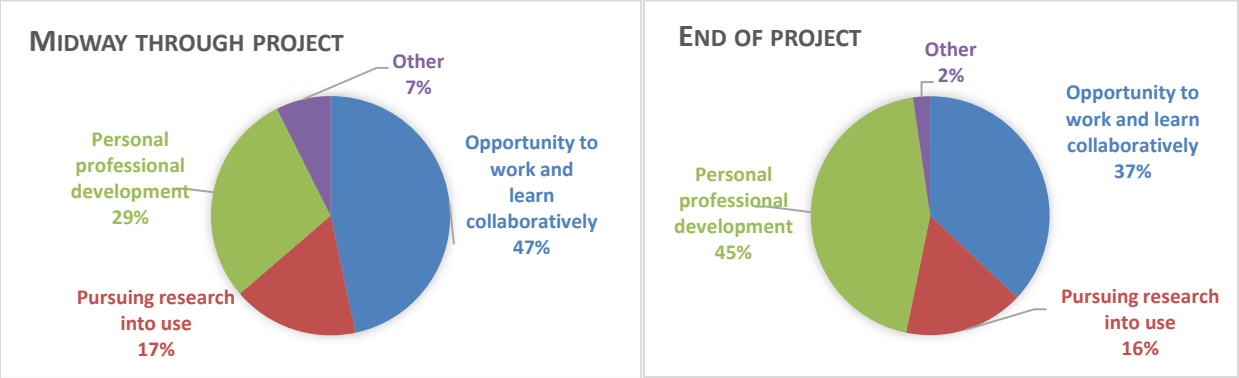


**Figure 3**: Benefits from ASSAR that respondents valued the most (n= 61 at the midpoint; n= 82 at the endpoint).

When asked specifically about the kinds of learning that ASSAR members benefited from, these mostly revolved around new ways of thinking and acting; appreciating the value brought by ASSAR's collaborative, cross-regional network; and learning about how to work collaboratively (**Figure 4**). While responses midway through the project highlighted the novelty factor (e.g. new ways of conducting research, new content, realising the importance of research uptake and impact, and gaining a broadened

understanding), at the end of the project the respondents most valued the skills and lessons that they could apply to future endeavours, and the new ways of thinking about and conducting research (**Figure 4**). A set of responses that emerged only during the endpoint survey related to learning about the implementation of research uptake and impact in practice. These responses went beyond acknowledging only the importance of the approach (captured at the midpoint under "importance of RiU"), and emphasised learning as a result of the actions on the ground, and the impacts achieved, during the second half of the project.

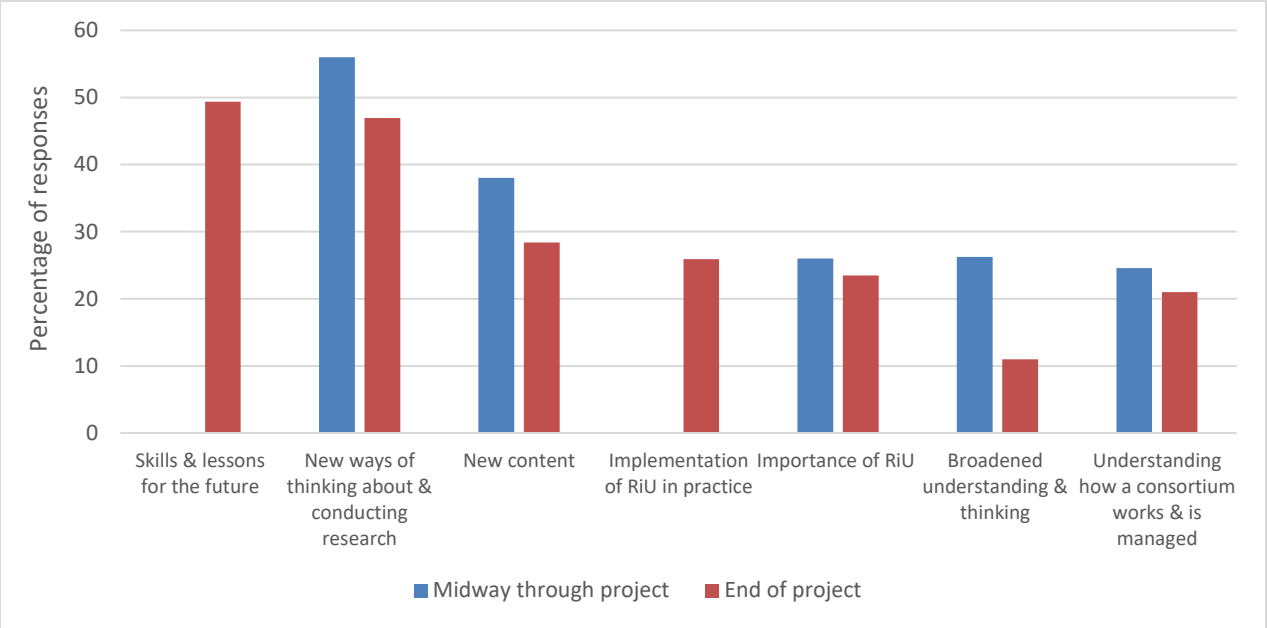


**Figure 4**: Most important learning through engagement with ASSAR (n=61 at the midpoint and n=81 at the endpoint). Note that RiU refers to research uptake and impact.

> *Designing ASSAR with a [*research uptake and impact*] component to me has been the highlight. Often most project do not go beyond producing policy briefs. I was particularly impress with the way …* [Participatory Scenario Analysis] *ended up with …*[Peer to Peer] *learning with feedback session. Addressing same subject (climate change) from many disciplines were also valuable to me. Often studies in Kenya tend to be sectoral in nature. Organizing multi disciplinary, multi-institutions, multi-country studies requires a serious secretariat to follow up of all possible outputs. As a research scientist all the above learning are important for future engagement in research.* [Response to endpoint survey]

These different types of learning were enabled mainly through face-to-face interactions and capacity building opportunities, such as workshops and conferences (**Figure 5**). Online interactions and tools were more important in the earlier part of the project, when the novelty of the programme's knowledge

management platform was more highly valued. At the project midpoint, 48% of the responses which mentioned online interactions referred specifically to an intranet system designed to enable joint work on shared outputs, holding calls and storing documents, as well as to weekly digests that kept the consortium partners informed about important documents, upcoming events and meetings, items for celebration, deadlines and external opportunities. The "other" responses included specific reference to literature and online reading materials (in both surveys), and – at the end of the project – involvement in synthesis processes and the opportunity provided to have a safe learning space, which was used to try innovative and creative tools, or to engage in debates even when not an expert.

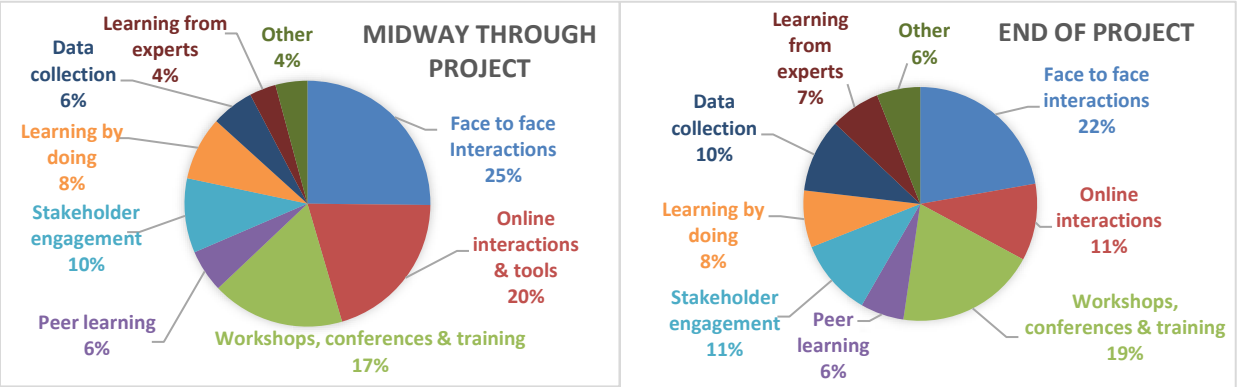


**Figure 5**: Types of interactions that supported learning (n=61 at the midpoint and n=81 at the endpoint).

### 3.2. Challenges of being part of a consortium

More than 50% of respondents referred to the transaction costs as the most difficult aspect of working in ASSAR at both the midpoint (53%) and the endpoint (51%) of the project. Specifically, these transaction costs included the amount of logistics and consequent time investment required to work together (**Figure 6**). This included organising meetings, implementing work timeously and effectively in teams, communicating across time zones, and the difficulty involved in reaching decisions among multiple partners. Particularly at the midpoint, many respondents referred to the overwhelming nature of the project ("too much", **Figure 6**), although this was somewhat less prevalent at the endpoint. At both the midpoint and endpoint, respondents identified the challenges involved in working comparatively, working remotely and maintaining trust in this kind of dispersed context.

The politics of working together were also an important concern that made up 21% and 24% of the responses at the midpoint and endpoint respectively. Competing interests, priorities and agendas was the most frequently cited difficulty at the end of the project (**Figure 6**), and was already an important challenge at the midpoint. Building and maintaining trust (the last category in **Figure 6**) and power

dynamics (included in the first) were cross-cutting challenges that highlighted the tricky political terrain of working together.

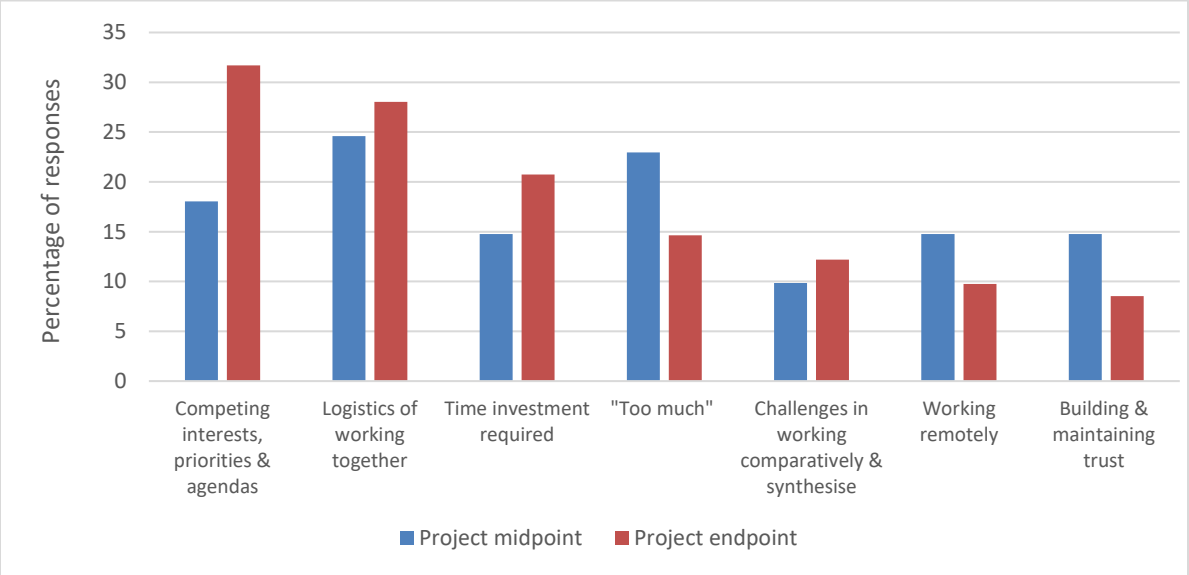


**Figure 6**: Most frequently cited difficulties of working in a consortium (midpoint n=61, endpoint n=82).

In the early stages of the project, respondents felt its overwhelming nature more ("Too much" category in **Figure 6**) emphasising there was "*too much to digest and act on*", "*multiple emails*", "*too much reporting at too many levels*". Also, partners who never worked together needed to get to know each other and build trust, yet this was difficult to achieve through the additional challenge of being dispersed.

> *Strong partnerships and trust have been slow to develop due to the lack of time spent together. [*Online meetings*] and emails take much longer to develop trust than handshakes and hugs.* [Response to midpoint survey]

Although these challenges remained present throughout the project, it seems respondents gradually got used to them, and others became more prominent, such as attempting to work comparatively and synthesise results. The challenge of working across competing interests, priorities and agendas only escalated with the passing of time, and required an increasing time investment, as the project was implemented. These challenges included clashing priorities across personal and institutional realms; the difficult balance between country and regional-level activities versus cross-regional, programmatic work at the consortium level; own versus standardised methods; research versus administrative requirements, etc.

For example:

> *The main difficulty I think relates to the different ideas that people have as to what are the main priorities for the consortium and trying to balance these fairly. Inevitably there is too much work which means we have to make difficult choices about what to focus on and what to let slide. In practice this means prioritising which is difficult when we all have (slightly) different priorities.* [Response to endpoint survey]

These findings are supported by the most challenging experiences respondents faced, which mostly revolved around the difficulties of working together (**Figure 7**). Here one can see once again the struggle tied to the initial absence of relationships, which often led to failed teamwork (which was the most cited challenge at the midpoint, yet the 8th most cited challenge at the endpoint) and the pervasive difficulties tied to conflicting expectations, competing demands on time and putting collaboration into practice.

> *When working as a team fails - working in ASSAR as a consortium require commitment and active engagement of all members. This is not only important issue across the regions but even within a region partners from each country need to have regular meetings, check-up and updating each other. As a postdoctoral research who is directly involved in fieldwork activities within the partner countries it become difficult when you are planning for fieldwork or asking for feedback on the tools that you have developed for fieldwork, or report you write and members within the regions are not responsive as you were expecting.* [Response to midpoint survey]

Interestingly, difficulties tied to the start-up phase, such as setting up the research programme and the initial uncertainty faced by respondents, remained important (if not graver) concerns even at the end of the project (**Figure 7**). The "initial uncertainties" category in Figure 7 refers to, as examples, limited initial clarity around expected outputs and activities, uncertainty on the project's philosophy and focus, discomfort tied to initial tensions in the team, and getting up to speed with the multiple facets of the project (including approaches, jargon, acronyms), especially for those who joined the project after its start. As research implementation got fully underway, in the second half of the project, responses tied to the challenges of delivering on one's work became more prominent.

> *Cross-regional interaction with co-researchers since I joined when the teams had already formed and research topics decided.* [Response from endpoint survey]

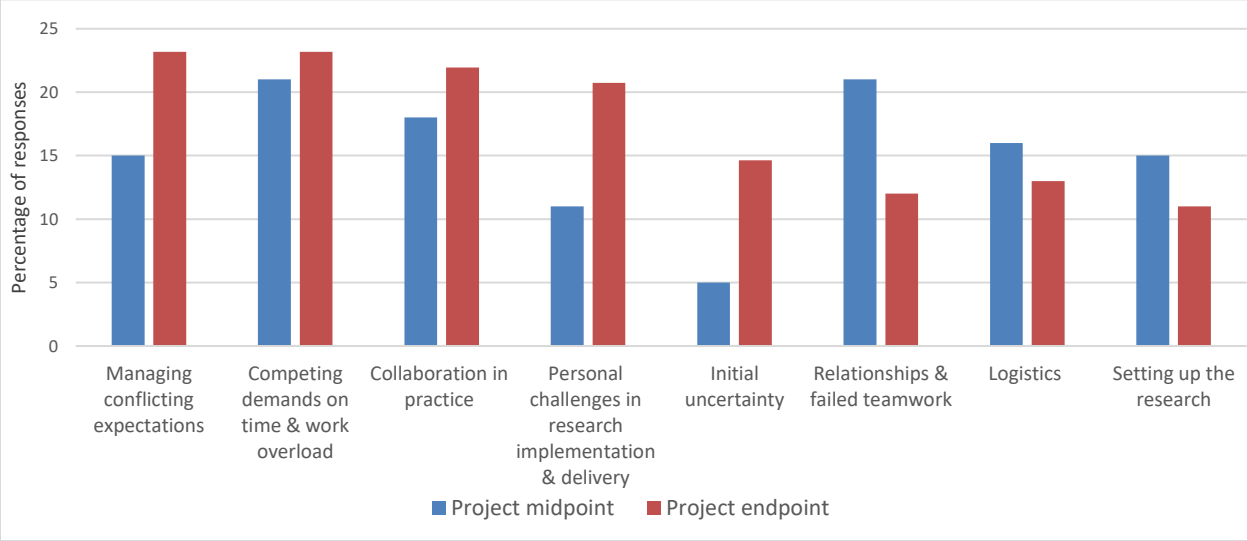


**Figure 7**: The most challenging* experiences in ASSAR (Midpoint n=61 and endpoint n=82). *This figure shows the top five most cited challenges for each survey, and only three were common across the surveys, hence the eight categories shown in this figure.

### 3.3. Was it worth it?

At the end of the project 78% of respondents claimed to be highly or very highly satisfied with what they personally achieved in ASSAR (**Figure 8**). Of these, respondents were most satisfied with their professional growth, their increase in knowledge and skills, and the fact that they and the project had delivered. However, a number of respondents, even within these highly satisfied categories, pointed to shortcomings or disappointments, such as the initial delays in getting the research off the ground, which negatively affected both the cross-regional/ cross-thematic synthesis work, and the number of publications that were produced by the end of the project. These negative perceptions were reflected in the "satisfied" category, where disappointments revolved around having joined the project too late to be able to meaningfully contribute; desires to have had more interactions and learning across regional teams, disciplines, and levels of seniority; and project management and team challenges.

> *I am satisfied because of the skills, knowledge and experience that I've gained, and because it has had an impact on me in the sense that it has made me sure of my career path. However, I regret not having more time to focus on publishing papers …- I feel that this was largely because I had to pick up other people's slack half the time. I also struggled at times with still being at [the university] - I really needed to get out of the [university] 'bubble' after my masters. So the project was great for me career-wise, but in terms of personal growth I*

> *think I would have gained more elsewhere.* [Response from endpoint survey, from "highly satisfied" category]

The vast majority of respondents were either highly or very highly satisfied with what the project achieved overall at both the midpoint and the endpoint of the project (**Figure 8**). This was particularly in relation to the project's contribution to knowledge, its research uptake and impact achievements on the ground, and the internal and external capacities built. For example, respondents who were highly satisfied explained:

> *I think ASSAR has managed to inspire and influence a wider global discourse on climate change and its myriad intersectionalities. It has through the course of five long years built capacities, perspectives and networks that will go a long way in serving individuals and societies grappling with complex issues of climate change, development and policy. In terms of dissemination and visibility, ASSAR has done a good job in my opinion. Also it has made significant inroads into global climate policy platforms like IPCC etc. which perhaps could result in broadsweeping impacts*. [Response from endpoint survey, from "highly satisfied" category]

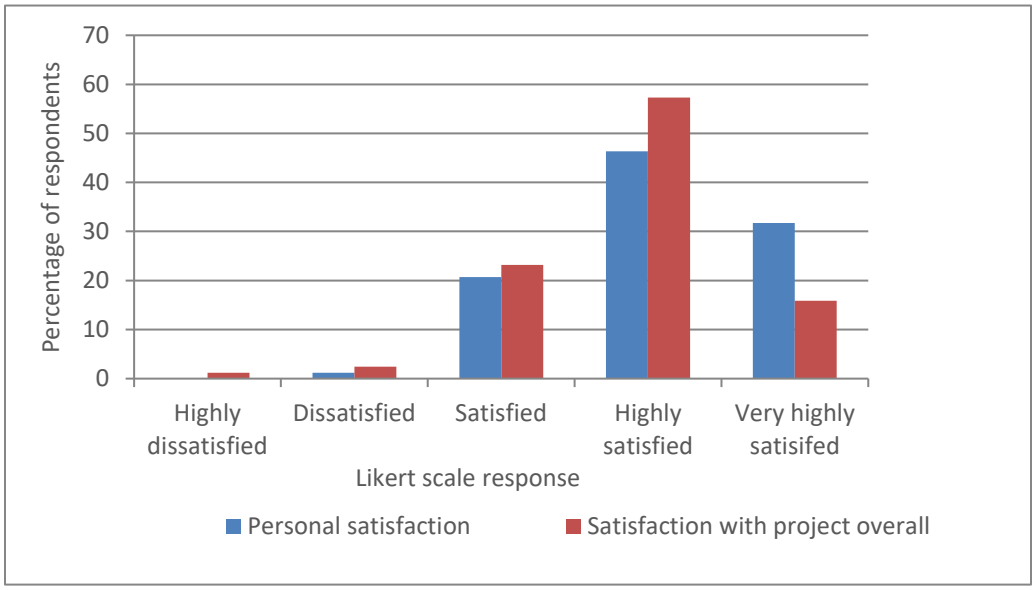


**Figure 8**: Respondent's level of satisfaction with what they personally, and the project overall, achieved (n=82)

When looking in more detail, however, only 37.5% of the project steering committee's responses fell in these categories, compared to close to 82% of the early career researchers'. Respondents in the "satisfied" category (which is where most steering committee member responses fell, from both academic and practitioner backgrounds) referred to the achievements in both research uptake and impact and the

research synthesis process not being commensurate with the amount of funding the project benefited from. This likely reflected their understandably higher expectations, when compared to early career researchers'. For example, at the endpoint of the project, respondents explained:

> *It is starting to achieve more and in one year's time I might revise this score, but to date I would say the consortium has not delivered insights compatible with such large funding (however, I think this is generally an issue with large consortium projects). I have some reservations also that the variable operational model across the regions and partners has not always led to sufficiently robust and/or critical research*. [Response from endpoint survey, from "satisfied" category]

> *I think ASSAR has contributed significant research in specific areas (such as gender, the importance of more localised views etc.) in relation to climate adaptation as well as the strong research that is coming out of the regions on specific topics. I think (as mentioned above) that the synthesis work could be stronger which would also allow us to make more of the findings we have. Relatedly, the [research uptake and impact] elements which, although good, have not achieved as much as I hoped for. I think that the biggest issue here relates to the structure of the consortium meaning that much [research uptake and impact] work could not happen until nearer the end of the project. In practice this means that, like the synthesis, the [research uptake and impact] has also been squeezed somewhat.* [Response from endpoint survey, from "satisfied" category]

A final question in the survey invited respondents to identify recommendations for a future programme. **Table 1** below shows a number of these responses categorised according to the most frequently cited challenges experienced by ASSAR respondents (i.e. Figures 6 and 7).

**Table 1**: Subset of the most cited recommendations for how to overcome previously cited challenges, were ASSAR to be repeated, categorised according to Figures 6 and 7.

| Challenge | Respondent's recommendations |
|---|---|
| **Competing interests, priorities and agendas/ Managing conflicting expectations/** | Use inception phase to **ensure everyone is on the same page** (e.g. natural and social scientists; academics and practitioners; different consortium members; different mindsets and expectations).<br><br>Include an **initial visioning process** with all partners, and interrogate this vision (in a creative way) at different project stages.<br><br>**Clarify what is possible** and what is not possible with all consortium members. |

| | |
|---|---|
| **Initial uncertainty** | Be aware of, and **address power dynamics**.<br><br>Ensure **transparent communication** across consortium partners and members, and consistency in terms of expectations.<br><br>Have **clear criteria for partner selection**, and ensure their involvement and commitment from project conception until its end. |
| **Logistics of working together/**<br><br>**Collaboration in practice/ Challenges in working comparatively and synthesising** | Seek to **strike a balance between delegating**, trusting and giving autonomy to the team, and being stricter about **people being accountable**, meeting deadlines and contributing to collaborative work.<br><br>**Decide on clear objectives and outcomes**, and co-develop the strategy and workplan (including methods, framework) with some top-down prescription in order to avoid delays.<br><br>Spend enough time **agreeing on consortium governance** (to avoid some partners feeling like underdogs, and to clarify everyone's contribution, roles and responsibilities) and the concept of "partnership".<br><br>Facilitate a number of **smaller work teams/ cross-cutting activities** from the start (across disciplines and countries).<br><br>Allow sufficient **time for research synthesis** activities.<br><br>Hold **regular consortium meetings** (once per year is not sufficient).<br><br>Ensure administrative and financial systems allow for **timeous disbursements of funds** to partners. |
| **Competing demands on time and work overload/ Time investment required/ "Too much"** | Plan for the presence of **strong, involved and decisive leadership** for every stage of the project, to enable it to run smoothly and effectively, and provide the necessary (and often overlooked) support for the team managers.<br><br>**Do less** (less breadth, more depth and focus).<br><br>**Spread the workload and decision-making responsibilities** more broadly to avoid over-burdening those with assigned leadership roles.<br><br>**Set valuable but achievable targets** that take into account available time and available capacities (for both research and research uptake). |

| | |
|---|---|
| | Invest in **sufficient full-time staff**; and ensure part-time staff deliver on their commitments.<br><br>**Invest adequately in research, project management and administration, communications and research uptake roles**, ensuring these roles are reflected both centrally and in-country. |
| **Relationships and failed teamwork** | Invest in team, and **trust and relationship building** (e.g. through an initial retreat) before work planning.<br><br>Include as many **face-to-face meetings** and learning opportunities in the course of the project as is possible.<br><br>Give **equal representation to all partners** and prioritise local partners' learning.<br><br>Make adequate **provision for non-anglophone partners**.<br><br>Focus frequently on **the needs and wellbeing of people** within the team, as remote interactions can cause the humaneness to be lost, and a nurturing environment is required to deliver the best work.<br><br>Have a **unit responsible for** managing people's relations (**conflict resolution**).<br><br>Be flexible to **accommodate the dynamics and the pace of the different countries** (countries have a different way of doing things). |

# 4. Discussion and conclusion

The purpose of this study was to gain a longitudinal view of the benefits and challenges experienced by the members of a large-scale consortium comprising multi-disciplinary researchers and practitioners from 17 different partner organisations located in 10 countries. Our aim was to understand the most valuable aspects of being part of a consortium, and from there to assess the extent to which the perceived benefits of learning through a collaborative large-scale project outweighed the transaction costs experienced. We found that the vast majority of respondents felt that it was either beneficial or extremely beneficial to them that ASSAR was a consortium, and this did not change significantly from the midpoint to the endpoint of the project. All respondents were also able to identify new areas of learning, and these learning opportunities primarily emanated from the consortium design of the project. However,

respondents also identified a wide variety of transaction costs, and the most challenging aspects of ASSAR related primarily to characteristics of the project tied to it being a consortium. Indeed, a closer look at the challenges identified reveals significant strain experienced by consortium members, and this analysis can shed light on future design of consortia to minimise the transaction costs identified.

Nevertheless, at the end of the project, approximately three quarters of respondents claimed to be highly or very highly satisfied with what they personally, and the project overall, achieved. It is worth noting, however, that project leaders were less satisfied than others in the consortium. This might suggest that consortia are 'worth it' for early career researchers who have the most to gain from learning and networking opportunities, but less so for later career researchers and practitioners. Indeed, early career researchers that seek to advance their transdisciplinary understanding and skills in isolation have been found to face numerous challenges (e.g. related to the type of institution in which they are embedded, methodological and theoretical drawbacks, and practical difficulties as it comes to designing and obtaining funding for transdisciplinary work) (Patterson et al., 2013). Developing transdisciplinary capacities requires interactions with other researchers (junior and senior) and societal actors to be exposed to new perspectives and insights, and to thus generate a better understanding of complexity, ideas and learning (Patterson et al., 2013). Consortia can provide an ideal platform for this to happen.

In many ways, these findings exemplify some of the key challenges of transdisciplinary work, which seeks to foster innovative collaborative knowledge production processes within what remain traditional institutional structures, which leads to high transaction costs (Thompson et al., 2017). For example, while transdisciplinary approaches call for adaptive, reflexive and participatory processes (Lang et al., 2012), these clash with limits on time and resources, as well as structured logframes and lists of deliverables (Thompson et al., 2017). While on one hand there is a desire to produce applied solutions, on the other, researchers are called to produce high impact disciplinary findings. In ASSAR, these tensions were evident. While transdisciplinarity calls for egalitarian and inclusive collaboration (Thompson et al., 2017), competing interests, priorities, agendas and expectations challenged this notion, along with the problematic logistics and practicalities of working collaboratively and comparatively across multiple countries. While transdisciplinary values revolve around building trusting relationships, ASSAR respondents referred to failed teamwork and working remotely as some of their greatest difficulties. While transdisciplinary collaboration requires ongoing and intensive teamwork, the time investment required, and what can feel like never-ending project management demands were among the most challenging experiences ASSAR members faced. Yet, it is these same characteristics of transdisciplinary collaboration which yielded the most learning and valued experiences among respondents (see Figure 5).

All of these interactions and processes built new skills, knowledge and lessons that ASSAR respondents are taking forward in the next stages of their careers. The challenge is therefore to explore ways to minimise some of these transaction costs and increase levels of personal and professional satisfaction among consortium members.

### 4.1. Transaction costs are the biggest barrier: how can they be minimised?

Throughout a project, different strategies are required to manage the transactions costs that arise from the complexity of a large dispersed team of colleagues from different disciplines, countries and academic and non-academic sectors (Stokols et al., 2008). As our findings show, the initial phase of a project is particularly critical, especially where partners have not worked together before. During this time, appropriate investments are needed to build trust, relationships and mutual understanding between partners. In line with the recommendations of others (e.g. vom Brocke and Lippe, 2015), ASSAR participants recommended face-to-face time to clarify expectations and get everyone on the same page. A key part of this early work is about defining governance arrangements with clear leadership and demarcated roles and responsibilities, and developing shared research frameworks, methodologies and work plans (see **Table 1**). Although not mentioned explicitly by ASSAR participants, others (e.g. Hall et al., 2012) have highlighted the importance of these early project phases in providing psychological safety for group members to acknowledge, understand and value the differences among their disciplinary perspectives.

On the importance of building trust and relationships, we would go further and posit that along with the formal face-to-face or other dedicated sessions early on in a programme outlined above, the informal moments shared on a bus on the way to a fieldtrip, around a breakfast buffet or at the end of the day, are just as critical for building a rapport and finding common ground. Trust is built through working together, openness, democratic discussions, understanding others' disciplines, clarity on roles, and socialising (Harris and Lyon, 2013). Over time, the process of working together leads to the creation of shared norms and values, but this does not happen overnight (Harris and Lyon, 2013). We would argue that these relationships later can act as a glue that enables the collaboration to continue despite the challenges posed by the numerous transaction costs.

Maintaining transparent communications across the entire team and setting up adequate communication channels that ensure that the dispersed team is updated and informed is important to encourage feelings of trust and safety, as well as "to better manage issues of size, compatibility and cohesion" (Stokols et al., 2008, p. S101). In ASSAR this was sought through the dissemination of a weekly digest that included the

latest information about project activities and documents. Yet even with such regular communications, a number of ASSAR respondents still faced uncertainty and a feeling of overwhelm likely tied to the sheer volume of activities happening in such a large consortium. It should also be noted that while frequent communications may clarify issues, increase consensus and build trust (Stokols et al., 2008) on one hand, they can also contribute to the overload ("too much" in **Figure 6**) and transaction costs associated with working in a consortium on the other.

The role of leadership in helping to minimise transaction costs also needs to be recognised. As stated by Gray (2008), a leader "with the skills to manage collaboratively may make the difference between success and failure in transdisciplinary efforts" (p. S125). Leaders are needed for their cognitive role of sensemaking; visioning, including on the process of working collaboratively; framing, and reframing of mindsets and assumptions to allow transdisciplinary work to be successful (Gray, 2008). Judgement (e.g. on the scope, size and partnership composition of the project, the balance between depth and breadth, or the use of resources) is also considered an important ability of leaders, as is their brokering role of ameliorating power differences and conflict, enabling coordination and information exchange (Gray, 2008). ASSAR respondents' recommendations concur, calling for strong leadership that demands accountability and punctuality, but also seeks to maintain flexibility, an appropriate balance between quality and quantity, and the team's wellbeing; while paying adequate attention to co-developing workplans, ensuring adequate team sizes and appropriate delegation. This is a tall order for any leader to meet, and in this regard, Gray (2008) and Stokols et al. (2008) suggest that for larger, dispersed teams working in several locations, multiple leaders with different skills may be needed.

Researchers working in a consortium setting for the first time, in particular, may find themselves overwhelmed by the multi-faceted demands of a collaborative research project. Many of the tasks required of researchers in large-scale collaborations are time-intensive and not academically rewarding. Such tasks include frequent meetings for different working groups, technical and financial reporting requirements, planning for capacity building, or addressing challenges related to co-authorship.

### 4.2 Personal and professional satisfaction are the key benefits: how can they be maximised?

Ultimately, the ways in which ASSAR respondents referred to their levels of satisfaction reflect three dimensions of project success identified by others, namely: external components such as project results that have an impact in either the academic or policy and practice domains; internal components such as team members feeling valued and respected; and personal components such as career advancement opportunities (Mallaband et al., 2017). While external success was reflected in the project's contribution

to knowledge and its research uptake achievements on the ground, personal success was exemplified through ASSAR respondents' professional growth and increased knowledge and skills. Disappointments, however, also reflected these different dimensions: for example, delays in the start of research, which affected the synthesis work and number of publications, reflected negatively on external success. Team challenges and dissatisfaction about not having been able to interact and learn more from the diverse team reduced both personal and internal project success. The latter relies on having good, supportive working relationships, valuing and respecting each other, and working towards integrated results (Mallaband et al., 2017) – dimensions that ASSAR respondents referred to extensively in their recommendations for future projects. Increasing these dimensions of satisfaction can therefore help to make being part of a consortium, and all the transaction costs involved, worth it for participants.

Doing so, however, will require purposeful interventions and investments by consortium leaders. For example, mentorship programs to support researchers to have maximum impacts with their research, ensuring that skills development opportunities are integral to project design, and building a culture of mutual support that values contributions from all members of the consortium. None of these are easy to achieve, and they must be sustained throughout the lifespan of a consortium. This requires a great deal of investment from consortium leads, and this strain can be felt by these leaders as a high transaction cost, as seen in ASSAR. Thus, there may be a trade-off here where senior members of a consortium should expect higher transaction costs so that more junior members can find greater personal and professional satisfaction. This trade-off will not appeal to everyone, and should be weighed carefully before entering a consortium.

This study raises questions about how much complexity is adequate to yield the benefits that ASSAR respondents reported (i.e. some degree of diversity in geography, levels of seniority, disciplines), yet not so much that the enterprise becomes unruly and too costly from a management point of view. Here, issues pertaining to the size of the consortium, choice of partners and extent to which they have a prior history of collaboration, number of time zones involved, proportion of full-time versus part-time staff all become important concerns that can increase or reduce complexity and costs. These factors also have a bearing on how much the project manages to achieve by its end, and whether the monetary investment by the donors yields adequate results in both the research and research uptake and impact realms.

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