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Good practices in funding transdisciplinary and participatory research for sustainable development in Africa: Learning lessons from German public funding programmes on sustainable land management and agricultural development in Africa

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Good practices in funding transdisciplinary and participatory research for sustainable development in Africa

Learning lessons from German public funding programmes on sustainable land management and agricultural development in Africa

Eefje Aarnoudse, Tina Beuchelt, Berenice Fischer, Hannah Jaenicke, Wiltrud Terlau



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Abstract

This working paper explores how funding requirements enable transdisciplinary research (TDR) for sustainable development in Africa, focusing on German public funders and their TDR programmes in sustainable land management and agricultural development. It consolidates experiences from Global North-South collaborations to identify good practices in funding TDR, particularly during the initial phase of defining research problems and objectives. Key findings suggest that funders should combine research and development funding for long-term TDR processes, explicitly define TDR expectations in selection processes, create TDR-friendly budget structures, and support a collaborative problem definition phase by funding joint proposal writing and facilitating joint learning. The paper aims to foster a dialogue on good practices in funding TDR between funders, researchers, and practice organizations in Germany and Africa, facilitated by a series of workshops under the INTERFACES project. Insights are based on key expert interviews and the first workshop with funders and researchers in Germany.

Keywords: research funding, transdisciplinary research, Global North-South collaboration, Africa

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List of Abbreviations

AA	Auswärtiges Amt (Federal Foreign Office)
BLE	Bundesanstalt für Landwirtschaft und Ernährung (Federal Office for Agriculture and Food)
BMBF	Bundesministerium für Bildung und Forschung (Federal Ministry of Education and Research)
BMEL	Bundesministerium für Ernährung und Landwirtschaft (Federal Ministry of Food and Agriculture)
BMU	Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)
BMZ	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (Federal Ministry for Economic Cooperation and Development)
CGIAR	Consultative Group on International Agricultural Research
DFG	Deutsche Forschungsgemeinschaft (German Research Foundation)
FARA	Forum for Agricultural Research in Africa
FIA	Fund International Agricultural Research
FOFIFA	Centre National de la Recherche Appliquée au Développement Rural (National Center for Applied Research in Rural Development)
FONA	Forschung für Nachhaltige Entwicklung (Research for Sustainable Development)
GFAiR	Global Forum for Agricultural Research and Innovation
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
H-BRS	Hochschule Bonn-Rhein-Sieg (Bonn-Rhein-Sieg University of Applied Sciences)
SDGs	Sustainable Development Goals
SES	Social-ecological system
SLM	Sustainable Land Management
TDR	Transdisciplinary Research
ZALF	Leibniz-Zentrum für Agrarlandschaftsforschung (Leibniz Centre for Agricultural Landscape Research)

1. Introduction

Research has always played a pivotal role in societal change. Often in unexpected ways. Currently our globalised world needs to reorient itself and find new paths to a sustainable future. The Sustainable Development Goals (SDGs) have been formulated to lead the way. The global commitment to the SDGs has increased the desire to actively shape research so that it becomes a driver of transformative change. This requires a different way of doing research. The inclusion of non-academic societal actors or stakeholders (i.e. those actors who have a stake in the real-world issues) in the research process has been put forward as a crucial element to address increasingly complex societal problems. A *transdisciplinary research* (TDR) process is characterized by defining the research objectives and executing the research with non-academic societal actors (Lawrence et al. 2022) (see Textbox 1). This aspect of including stakeholders in the research process is also spearheaded under other terms, such as *participatory action research* and *research-practice collaboration*.

TDR and related concepts are pushed from different angles. A growing number of research funders have embraced the concept, as an answer to their commitment to contribute to the SDGs. Also, more and more researchers have dedicated themselves to TDR approaches, recognising that the societal impact of research results is strengthened when research objectives are defined in collaboration with a diverse set of societal actors. Moreover, among the so-called beneficiaries of research and development projects, the phenomenon coined ‘research fatigue’, which signifies tiredness to engage in yet another survey without direct benefit, can also be interpreted as a plea for solution-oriented research that actively informs the problem situations being assessed. Although the call for change comes from multiple sides, the implementation of transdisciplinary research progresses slowly. It has become clear that obstacles in different arenas need to be tackled to institutionalise transdisciplinary research, including education, academic structures, readiness of societal actors to collaborate in research and research *funding frameworks* that accommodate this (Schneider et al. 2023; Paulavets et al. 2023) (see Textbox 2).

Additional challenges appear when research is conducted in the context of Global North-South collaborations. These collaborations are often characterised by research in the Global South being funded by the Global North. This automatically brings in a discrepancy between the political interest of the funder and the local interests. Although the commitment to the SDGs introduces an aspect of global responsibility, the dimension of Global North-South collaboration adds additional hurdles to steering research to respond to problems on the ground, including the consolidation of financial dependencies and gaps between different science systems.

This working paper aims to bring together experiences of research funders, researchers and practitioners who are committed to advance transdisciplinary research in order to propose good practices for funding transdisciplinary research in Global North-South collaborative contexts and to create the institutional structure needed to implemented TDR. It zooms in on public funders in Germany who fund TDR in the realm of sustainable land management (SLM) and agricultural development research in Africa. Despite this thematic focus on SLM and agriculture the good practices for funding are expected to be applicable more generally to funding TDR for sustainable development in Africa. The paper seeks to understand how funding requirements have enabled or constrained the implementation of a transdisciplinary approach in the past. The focus is on the first phase of the TDR process – the definition of the research problem and objectives – because this phase is so critically different from conventional research approaches. By discussing experiences across different funders and their funding frameworks we tease out lessons on good practices which are tailor-made to support transdisciplinary research. Although the practices that can be implemented will always depend on the funding context - the mission of the funder, the availability of funds, etc. - our final overview of good practices outlines possible actions that funders can take to meet the specific needs of transdisciplinary research. The paper is both a product of and input to an ongoing dialogue between actors involved in TDR research in Germany and Africa, which is facilitated by a series of expert interviews and workshops under the INTERFACES project (2023-2026). The dialogue should result in the formulation and dissemination of recommendations to German funders who are interested in funding TDR for sustainable development in Africa.

Transdisciplinary research (TDR) has been loaded with different meanings by different research communities (Pohl 2010). Currently, however, there seems to be a broad common understanding of TDR as a concept within the German science system. The core element of TDR is understood to be the *participation of societal actors in the research process*. For those who engage more intensively with the concept, *participation in the phase of defining the research problem and objectives* (i.e. co-design) is seen as a crucial element of TDR. This takes TDR beyond mere participatory research, which may involve stakeholders once the research objectives have been set. There seems to be less consensus on the aspect of interdisciplinarity as a core element of transdisciplinarity. Some see it included in the term, while others see opportunities to stay within their scientific discipline and still do transdisciplinary research. To emphasize the complementarity of the two concepts the combined term inter- and transdisciplinary research has been introduced.

In this paper, we stick to the term *transdisciplinary research* and use the definition from the BMBF Participation Strategy (BMBF 2023, p. 10). TDR is:

„Joint learning between researchers from different disciplines and non-scientific partners throughout the research process in order to increase the relevance, practicality and effectiveness of the social and scientific solutions developed in research projects ‘.

TDR is an overarching research principle, while different tools and methods can be applied to bring together relevant perspectives from different scientific disciplines and non-academic actors (Brandt et al. 2013). However, there is an overall understanding on the research process that should entail collaboration between researchers and societal actors during three phases: 1) the problem framing and building of a research team; 2) the co-creation of solution-oriented knowledge through research; and 3) the application of co-created knowledge in practice (Lang et al. 2012).

Public research funding is embedded in organisational and institutional structures which are shaped by the funding organisation as well as political process in the background. In this paper we refer to those structures as the **funding framework**. The funding framework defines *who* gets, *how much* funding for *what activities*.

Since TDR involves different actors and activities compared to research where societal actors are not involved, it requires a distinct funding framework. We argue that developing funding frameworks tailored for TDR is essential, as existing frameworks may be more suitable for disciplinary or interdisciplinary research without a co-design process. This aligns with the understanding that TDR complements rather than replaces disciplinary research and can only exist at the premise of disciplinary research knowledge and methods (Lawrence et al. 2022).

2. Methodology

To draw lessons on good practices in funding TDR for sustainable development in Africa, we review German public funding programmes on SLM and agricultural development in Africa. The German research funding landscape is spread over several Ministries and their implementing agencies¹. The largest bulk of research funding is allocated through the Federal Ministry of Education and Research (BMBF: Bundesministerium für Bildung und Forschung). In the area of SLM and agricultural development in Africa research is also funded by the Federal Ministry of Economic Cooperation and Development (BMZ: Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung), both through a fund dedicated to promoting international agriculture research and through research as a component of development projects implemented by GIZ (GIZ: Deutsche Gesellschaft für Internationale Zusammenarbeit). In addition, the Federal Ministry of Food and Agriculture (BMEL: Bundesministerium für Ernährung und Landwirtschaft) has a funding line investing in research in Africa and Asia to contribute to the challenge of global food and nutrition security. Other public funders also have funding initiatives which are committed to contributing to the SDGs in the Global South (such as the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU: Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit), the Federal Foreign

¹ In this paper we will refer to the Ministries as the *funders* and to the implementing or executing agencies (often called *Projektträger*) as the *funding agencies*.

Office (AA: Auswärtiges Amt) and the German Research Foundation (DFG: Deutsche Forschungsgemeinschaft)). However, their funding initiatives focus more on capacity building or (inter-)disciplinary research. This paper intends to look at funders who actively call for *transdisciplinary* research hence we focus on the funding programmes of the BMBF, BMZ and BMEL.

The different Ministries and their funding agencies have developed strategies to encourage research to engage stakeholders and conduct TDR. Although progress is not always apparent from the outside, a closer look reveals that each of these funders has embraced the concept of TDR and gained experience over the last two decades in finding appropriate funding frameworks to accommodate TDR. The political mandate of the supervising ministry plays an important role in defining this development. As a result, there is a wide variety of funding frameworks through which transdisciplinary research in Africa is funded by the German government.

For each of the three ministries (BMBF, BMEL, and BMZ), different funding frameworks have been identified that support transdisciplinary research in the fields of SLM and agricultural development in Africa. A brief overview of these funding frameworks is provided for each ministry, highlighting the ministry's commitment to transdisciplinary research and how it is integrated into their long-term funding strategies. Additionally, a specific project is presented as case study to extract valuable insights from real-world experiences. The selection criteria for these cases included: 1) relevance to the thematic focus of SLM and agricultural development in Africa, 2) implementation within the past five years, and 3) led by researchers with a proven track record in TDR.

The description of the funding frameworks and the case studies highlights decisions made along the main stages of the TDR funding framework from the inception of the research funding to support of the co-design and knowledge co-creation process (see Textbox 3). The data collection is based on 22 semi-structured interviews with three key parties: project managers at funding agencies, researchers affiliated with German institutes, and African research partners (see ANNEX for an anonymised list of interviewees). For some projects it was not possible to conduct interviews with all three key parties. Drawing from this content, an initial list of innovative approaches to adapt the funding framework to TDR was identified. The list was further elaborated and validated during an expert workshop in Germany in June 2024 (see ANNEX for an anonymised participant list) as presented in Table 3. The conclusions will be further discussed during a second expert workshop in Ghana in October 2024 and an online joint workshop in 2025. Final recommendations will be published in a policy brief directed to the funders after concluding the workshop series.

1. Long-term funding strategies

In this stage decisions are made which frame the research funding beyond the lifecycle of one funding programme. It defines the interconnectedness and evolution of funding programmes.

2. Programme preparation

In this stage, the general guidelines for the research project(s) within the funding programme are developed. This is usually announced to potential applicants in a call-for-proposals.

3. Budget allocation

The allocation of the budget follows criteria which are set at programme preparation. However, budget reallocation decisions are made during the implementation of the research.

4. Project proposal elaboration

Following the announcement of the funding opportunity, the research consortium proceeds to formulate and submit their project proposals, outlining their research objectives and research methods.

5. Project selection

In this stage, the funding agency reviews the proposals, selects projects for funding, and decides on the amount of funding to be allocated.

6. Joint learning on TDR

The research consortium establishes a common understanding of the project's TDR approach and related methods. This stage includes elements of joint learning and capacity building. It carries on beyond project proposal elaboration.

We adapted the key stages in the 'Definition of Problems and Objectives' phase developed by Schneider et al. (2019). Project evaluation, which is also an important element of the funding framework linked to the last phase of a project, is not further discussed in this paper. See Kny et al. (2023) for a discussion on how evaluation could be made suitable for transdisciplinary research. We differentiate between *research funding programmes* and *research projects*. Research funding programmes are overarching initiatives that often encompass multiple research projects, which consist of specific research consortiums and their activities.

3. Research funding through the Ministry of Education and Research (BMBF)

There are different policy strategies within BMBF which have been influencing the funding and management of TDR projects on SLM and agricultural development in Africa over the last two decades. The most influential strategies in this regard are the Research for Sustainability Strategy (BMBF 2020) and the Africa Strategy (BMBF 2018). In addition, the Participation Strategy (BMBF 2023) adopted in 2023 may have a growing impact on the interpretation and operationalisation of TDR in the coming years.

3.1 Research for Sustainability (FONA) Strategy

The overall goal of the BMBF is to promote excellence in German research and innovation. However, BMBF-funded research is also expected to contribute to other policy objectives, such as the government's commitment to sustainable development. This is particularly promoted by the BMBF Research for Sustainability Strategy or FONA Strategy (FONA: Forschung für Nachhaltigkeit), which aims to fund research and innovation that contributes to the Sustainable Development Goals (SDGs). The BMBF developed its first FONA framework programme in 2005, which has been transformed into a long-term funding strategy since 2021. The involvement of social actors in the research process has been a central element of the FONA programme since its inception. The current FONA Strategy includes transdisciplinarity as one of its ten key principles. TDR is understood as 'the involvement of stakeholders such as local governments, companies or NGOs already in the design of research projects' in order to 'ensure that research results are put into practice' (BMBF 2020, p. 7).

Two large research funding programmes, implemented under FONA, had a specific focus on Sustainable Land Management (SLM) and included research projects in Africa. The first SLM programme (2010-2016) funded 12 projects which ran across four continents and included two projects in Africa (Liniger et al. 2017). The current SLM funding programme (2022-2026) has a focus on sub-Saharan Africa and all five projects conduct research in African countries. The first SLM programme had a total budget of 115 million euros, while the second SLM programme has a total budget of 15 million euros. Both funding programmes had a specific focus on SLM, but they can hardly be understood as follow-up programmes due to the long time-lapse between them (the one ending in 2016, the next starting in 2022).

Also, other programmes under FONA have funded related research projects in Africa, as aspects of SLM and agricultural development may, for example, come in under programmes focusing on climate change or water management. Even without a direct connection to the FONA strategy, some

programmes allow for related research. For example, the GlobE programme (GlobE: Forschung für die globalen Ernährungsicherung) (2013-2018), which was implemented under the German Government's Bioeconomy Strategy, centred on agriculture and food security research in Africa. The programme funded six projects with a total budget of 45 million euros. In this programme sustainable land use was part of the thematic focus. However, although this programme aimed to fund *solution-oriented* research, with components co-funded by BMZ, it did not explicitly call for *transdisciplinary* research (see Textbox 4).

All in all, BMBF has funded numerous TDR projects on SLM and agricultural development in Africa over the last two decades. Although the FONA Strategy provides a framework for structuring projects in the area of sustainable development, researchers may also find related funding opportunities that fall outside of the FONA Strategy, but these may not have the explicit call for TDR as framed in the FONA Strategy.

All funding programmes under BMBF are implemented by German funding agencies (so-called *Projekträger*) which are assigned through a competitive procedure. The experience of these funding agencies and the Ministry in managing TDR in Africa is growing, with some programmes having well-developed measures to enable TDR (see Textbox 5). As summarized in Table 1, funding opportunities for TDR research on SLM and agricultural development in Africa can be found in various programmes with different thematic and regional focuses. While the call for solution-oriented research involving local stakeholders is common across these programmes, there is no clear progressive trend in the measures taken by the funder to facilitate the transdisciplinary research process. This is also observed by researchers who have received BMBF funding for TDR in different programmes over time. Some adjustments have been made to accommodate large TDR projects. However, positive developments in one programme, e.g. a separate proposal writing phase, may be lost again in the next. Also, in many of these funding programmes the understanding of transdisciplinarity is biased towards the implementation of technical innovations. As promoting German research and innovation is the core business of BMBF, social science disciplines and the inclusion of non-academic actors risk being framed by the funder as service disciplines to support the implementation of technical innovations (Schwachula 2019).

Textbox 4 TDR elements in BMBF calls-for-proposals

Funding Programme	Sustainable Land Management	GlobE	BioTip	Sustainable Land Management in SSA
Year	2008	2011	2015	2021
FONA Strategy	✓		✓	✓
Afrika Focus		✓		✓
Socio-ecological research priority			✓	
TDR terminology	✓		✓	✓
Selection criteria	✓		✓	✓
Funded proposal writing phase			✓	

Table 1 Selected calls-for-proposals BMBF 2008-2021

Table 1 provides a summary of TDR aspects integrated in the call-for-proposals of four BMBF funded research programmes open for projects in Africa. The comparison shows that the calls differ significantly on the use of TDR language and enabling funding conditions. The importance attached to TDR cannot be understood as a continuous progressive development over time, but rather as linked to different funding priorities and policy strategies within BMBF. As such, the call-for-proposals of the BioTip programme, which falls under the socio-ecological research priority, stands out for its attention to the transdisciplinary nature of research as reflected in the FONA and Participation Strategy. On the other hand, the call for proposals of the GlobE programme, which falls outside the FONA Strategy, has the weakest reference to TDR aspects.

3.2 Africa Strategy

BMBF has consolidated its collaboration with African countries under the Africa Strategy which has been developed in cooperation with African partners. An updated Strategy was published in 2019. One major objective of the Strategy is to assure that research cooperation with African partners contributes to the implementation of the SDGs (BMBF 2018). However, within the Strategy this is not explicitly linked to a TDR approach.

In order to promote research cooperation with African research and higher education institutes on issues of climate change and land use, the BMBF has initiated the Southern African Science Service Centre on Climate Change and Adapted Land Use (SASSCAL) and the West African Science Service Centre on Climate Change and Adapted Land Use (WASCAL) in 2010 and 2012 respectively. These centres have a strong focus on sustainable development and advocate a transdisciplinary approach, although many of the research projects implemented by WASCAL and SASSCAL focus on the collection of biophysical data and its modelling.

A recent flagship achievement which unites the FONA and Africa Strategy is the current Water Security in Africa (WASA) programme. The programme is funded by BMBF and South Africa's Water Research Commission as co-funder. Inter-ministerial cooperation on the German side (including BMBF, BMZ, AA and others) enabled a co-design process with African stakeholders to identify research areas and research needs in the programme preparation stage. This co-design process laid the foundation for implementation-oriented research. For programmes which fall outside such a broad inter-ministerial cooperation and co-funding framework such a co-design process is not easy to achieve.

3.3 Participation Strategy

Finally, the recently published Participation Strategy (BMBF 2023) of the BMBF is of particular relevance for the promotion of participatory and transdisciplinary research funding. The strategy is the result of an initiative within the BMBF to bundle capacities with regard to the participation of societal actors in research and research policy and has been developed through a collaborative process since 2016. It has been recognised that participation of societal actors in research is being adopted by scientists across sectors and disciplines. However, institutional changes in higher education, research institutions and research funding are needed to make it a systematic, widespread and viable research approach. The aim of the Strategy is to make sure that participation of non-academic actors in research is recognised as a valuable scientific approach, which receives tailor-made support from the Ministry. The Strategy understands TDR as one of several concepts that

promote participation in research, mainly in the field of social-ecological systems (SES) research (other concepts mentioned are e.g. citizen science and user-centred design).

The Strategy has been driven primarily by BMBF departments funding SES and health research. Funders and researchers active in these research sectors have teamed up to push for wider acceptance of participatory and transdisciplinary research approaches within the German science system. One outcome of this effort has been the establishment of an independent association for participatory and transdisciplinary research in German speaking countries (GPTF: Fachgesellschaft für Partizipative und Transdisziplinäre Forschung) in November 2023. Funding programmes under the SES research priority do also stand out in facilitating TDR (see Textbox 4 and Textbox 6).

The BMBF departments which have primarily been funding research on SLM and agricultural development in Africa have not been at the cradle of this new Participation Strategy. As such, they have not been intensively involved in the Ministry's engagement with the concept of TDR and participatory research. This does have implication for the interpretation of TDR and the extent to which TDR is understood to be essentially different from (inter)disciplinary research approaches and requires different funding conditions. For example, the selection procedure of sustainable development programmes which do not fall under the SES research priority still seems to be biased towards disciplinary research excellence, highly depending on academic reviewers without specific TDR experience. The bundling of experiences through the Participation Strategy at ministerial level may provide an opportunity to incorporate innovative approaches to funding TDR from BMBF funded programmes in other research areas. As the Strategy has only been published recently, work still needs to be done to get it disseminated across all BMBF departments.

The **NamTip project** is funded through the BioTip and follow-up GlobalTip programmes (2017-2025) which has been developed under the FONA Strategy and the socio-ecological system (SES) research priority of the BMBF. The programmes included six projects and a total budget of 33 million euros. The NamTip project is implemented by a large consortium of German universities and research institutes as well as Namibian universities and conservation organisations. The main objective of the project is to understand the tipping points of desertification in Namibia and the underlying social and ecological factors. The results should contribute to the early detection of desertification processes and the development of measures to avoid desertification. The project started in 2020 with a one-year funded proposal writing phase, followed by a three-year research implementation phase and a two-year research synthesis and transfer phase.

Programme preparation: The SES research priority plays an important role in promoting TDR research and has initiated several projects to advance TDR (e.g. the tdAcademy). This consolidation of TDR as the main approach for SES research is reflected in the call for proposals and the structure of the funding programme, which is characterised by an emphasis on transdisciplinarity (see Textbox). The BioTip programme does not have a specific focus on SLM or Africa, so it was a coincidence that a project related to SLM in Africa was included in the funding programme through the application of the NamTip project.

Project proposal elaboration: There was a twelve-months pre-phase of the project to develop the full proposal. This phase was used to intensify the collaboration between the German and Namibian research partners. Namibian researchers visited Germany for a one-week writing workshop. Also, German researchers travelled to Namibia to get to know the research location and local societal actors. Agreeing on a common TDR approach played an important role in developing the full proposal as required by the funder in the call-for-proposals.

Budget allocation: During project implementation the opportunities to meet face-to-face were limited by the availability of funds. The funding agency requested researchers to combine activities in order to spend less on the travel budget. Whereas this may seem to increase the efficiency of the research implementation, it is not beneficial for the integration of different perspectives from Global North-South actors. Since the research takes place on the African continent, trips from Germany to Namibia are prioritized. Even though trips from Namibian researchers to Germany could also be beneficial for the quality of the TDR approach and the North-South collaboration. These inequalities and differences in access to funding are a barrier to collaborate on equal footing.

Long-term funding strategies: The NamTip project runs over an exceptional long funding period of eight years. Since 2023 the NamTip project is in its research synthesis and transfer phase, during which research results are integrated across disciplines and shared with the communities on experiment plots. Although this phase had been thoroughly planned and the previous research phase was positively evaluated, the final funding commitment was threatened due to a change in the management of the Ministry. Only after all involved parties filed complaints the funds were still made available. This exemplifies, that public funders may be willing to extent projects beyond the conventional two- to four-year project cycle, but it brings in certain risks and uncertainties. When budget cycles are decoupled from political cycles, the funding may be interrupted not only based on project evaluation outcomes but also based on unrelated political reorientation.

4. Research funding through the Ministry of Food and Agriculture (BMEL)

The Federal Ministry of Food and Agriculture (BMEL) is funding collaborative international agricultural research projects to contribute towards improving global food and nutrition security under a dedicated funding line (Internationale Forschungskooperationen zur Welternährung (BMEL 2023)). It specifically targets countries in Sub-Saharan Africa, South and Southeast Asia that are severely affected by hunger and malnutrition. Besides improving food and nutrition security, the goal of the programme is to establish long-term partnerships between German agriculture and food research institutes and their counterparts in the partner countries. As such, BMEL has made an effort to encourage collaborative research projects that are practice-oriented and align with inter- and transdisciplinary research approaches to develop practical and sustainable solutions adapted to the local context. The Federal Office for Agriculture and Nutrition (BLE: Bundesanstalt für Landwirtschaft und Ernährung) acts as the funding agency. BMEL together with its funding agency has gained experience in paving the way for transdisciplinary research approaches through a series of research calls for three-year projects (2013, 2016, 2019, 2022, 2024). Per call, BMEL has been funding seven to nine projects with a total budget of approximately 5 million euros per year.

FUNDING PROGRAMME		INTERNATIONAL RESEARCH COOPERATION FOR GLOBAL FOOD AND NUTRITION SECURITY				
YEAR	2013	2016	2019	2022	2024	
TDR TERMINOLOGY		✓	✓	✓	✓	
SELECTION CRITERIA			✓	✓	✓	
FUNDED PROPOSAL WRITING PHASE				✓	✓	

Table 2 Calls-for-proposals funding line International Research Cooperation for Global Food and Nutrition Security, BMEL 2013-2024

Table 2 provides an overview of TDR aspects integrated in four successive call-for-proposals under the BMEL funding line on international research collaboration for global food security. The programme demonstrates ongoing advancement, with an increased emphasis on solution-oriented, transdisciplinary research approaches. This is evident not only in the language used in the calls but also in the structure of the funding programme, which since 2022 includes a funded proposal writing phase.

The elaboration of transdisciplinarity as selection criteria in the past call-for-proposals illustrates that the aspect of transdisciplinarity has gained importance over time (see Table 2). The concept has not only gained prominence in the programme preparation stage, but also in the selection procedure and management of the projects. Both internal and external reviewers are responsible for the ranking of research proposals. External reviewers from both research and practice are involved. Also, in-house expertise in TDR is available from desk officers with relevant experience. Beyond this, BMEL frames several sequencing call-for-proposals under one thematic umbrella, e.g. research along the value chain or sustainable food systems, to allow research projects to build on one another. Even when the projects themselves start off with new research questions, this process allows to establish long-term relationships between the funder, German research institutes, and African and Asian research

partners as well as between the researchers and local communities (as illustrated by the case description in Textbox 7).

Recognising that good collaboration during proposal elaboration is crucial to the progress of TDR research projects, BMEL has introduced a seed grant for the proposal writing phase. Since the call in 2022 research consortiums could apply for a seed grant of 40.000 euros over a period of five months to meet with partners and write the full proposal through a collaborative process².

Textbox 7 Case II: ProciNut – a TDR project on edible insects in Madagascar

The **ProciNut project** was a BMEL funded research project between researchers at the Centre for Development Research (University of Bonn) and the Hochschule Bonn-Rhein-Sieg (H-BRS) in Germany and the Centre National de Recherche Appliquées au Développement Rural (FOFIFA), the University of Antananarivo in Madagascar and other partners in Myanmar and Thailand. In Madagascar, the main aim of the project was to explore the production of edible insects for human consumption and to assess means of processing of insects for a longer shelf life. The researchers worked closely together with potential producers of edible insects. The project ran from 2018-2022. In ProciNut, the University of Bonn was able to benefit from and continuously build on its cooperation with FOFIFA from Madagascar and other partners in Ethiopia as part of the previous research project, NutriHAF (2015-2019), which was funded under the same BMEL funding line.

Project proposal elaboration: The ProciNut project was conducted in collaboration with a local research partner, FOFIFA, which has considerable expertise in the field of participatory research in Madagascar. In the context of Myanmar, the local research partners were less familiar with participatory and/or transdisciplinary research approaches and hence the level of integration of local producers was lower than in Madagascar. The ProciNut research consortium in Madagascar could leap-frog critical steps and benefit from the successful collaboration during the previous NutriHAF project under the same BMEL funding line. This underlines that finding suitable research and/or practice partners during the proposal elaboration phase as well as developing relevant capacities is a crucial element in conducting TDR.

² Due to the COVID-19 pandemic, projects were not able to make use of the seed grant in 2019 and it was waived for the projects of that call.

Budget allocation: According to the Malagasy research partners, the collaboration with the German research partners and the funding agency was remarkably flexible. Ideas that were brought along from the local communities were integrated in the research and budget was made available to implement those ideas. Two examples illustrate this flexibility. Within the forerunner project, NutriHAF, local communities requested to include the cultivation of fruit trees in the project activities. Although the research project was meant to focus on vegetable production, the Malagasy research partners successfully convinced the German research team and funding agency to broaden the subject of research and allocate money to the planting of fruit trees. Within the ProciNut project an even larger budget reallocation was possible due to cancelled travel costs related to COVID 19. During the engagement with local communities in the highlands of Madagascar it became clear that a drop in temperature during winter months inhibits the year-round production of insects. Hence, the construction of insulated sheds was proposed to make the production of insects for improved nutrition security attractive. With the re-allocation of travel funds, the project was able to construct nine sheds together with the communities. While applying for the re-allocation of funds the Malagasy researchers presented their ideas directly to the funding agency through a video call. This direct exchange between the funding agency and the African research partners served as an instrument to build the level of trust needed for flexible budget management.

Long-term funding strategy: The ProciNut project is embedded in a series of applications from the University of Bonn to receive BMEL research funding. The project was succeeded by the NutriHAF project (2015-2019) which was implemented in Ethiopia and Madagascar and followed by the NIFAM project (2022-2026) implemented in Vietnam and Myanmar. In the latest proposal targeted interventions and beneficiaries were less narrowly defined than in previous proposals to allow for adjustments to be made during the research process. While BMEL did not explicitly encourage this in the calls-for proposal (e.g. by requesting less detail in recent calls), a positive trend towards more transdisciplinarity has been identified since the start of the funding line. This could be ascribed to the growth of a network with research institutes that has become familiar with the funding line and particularly adept at building transdisciplinary partnerships. By focusing on a single overarching theme across multiple funding rounds, the funder has actively enhanced this network, with the expectation of increasing the impact-oriented nature of the research.

5. Research and development funding through the Ministry for Economic Cooperation and Development (BMZ)

The German Federal Ministry for Economic Cooperation and Development (BMZ) is not primarily funding research. However, there are two important ways in which it complements its investment in the development of countries in the Global South through research on related topics. On the one hand, BMZ is funding international agricultural research as part of their investment in sustainable agricultural development. The funding is administered by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) under the Fund International Agricultural Research (FIA). On the other hand, BMZ is funding research as a component of development projects.

5.1 Fund International Agricultural Research (FIA)

The allocation of funds for international agricultural research has recently been restructured. Previously, bilateral grants were awarded to projects that CGIAR (Consultative Group on International Agricultural Research) research centres applied for in collaboration with German research institutions or other partners. The funding programme was known as the small and large grants programme of BEAF (BEAF: Beratungsgruppe Entwicklungsorientierte Agrarforschung) (predecessor of FIA) under GIZ. The small and large grants funding option is currently phasing out, with the last projects finishing in 2024.

In response to the consolidation of all CGIAR centres under the CGIAR partnership, the BMZ is transitioning to providing funds for international agricultural research directly to CGIAR in pooled portfolios. One could argue that with the CGIAR partnership the research agenda setting emancipated away from classical North-South collaborative research constellations towards more multilateral collaboration. However, a large part of the funding is still coming from the Global North.

FIA is no longer funding bilateral research projects, instead it concentrates on providing strategic and policy advisory support to BMZ and CGIAR. In addition, FIA is supporting the placement of *Integrated Experts* across different CGIAR centres. The Integrated Experts take up the role of mediating research and practice collaboration within CGIAR research programmes. While the Integrated Expert positions supported by FIA are phasing out in 2024, the GIZ Fund for strengthening human capacities of partners in agriculture, rural development, and food security (PeOPLE, 2023-2027) will continue the placement of Integrated Expert positions in CGIAR centres and beyond.

Achieving societal impact with research has always been an important requirement of international agricultural research funded through the BMZ. However, the concept of TDR had only been gradually

integrated and was open to interpretation by implementers of research projects. The former BEAF funding framework rather concentrated on the concept of scaling (i.e. transfer of research outputs to end-users across a larger region) than on transdisciplinarity to achieve societal impact. Currently BMZ increasingly encourages the involvement of societal actors in the research process, although transdisciplinarity is not the primary term used to describe this strategic orientation, the focus is on demand-driven research through multi-stakeholder processes and user-centred design.

The management of funds for international agricultural research is independent from the development projects implemented by GIZ. To address this, the FIA project team has recently started a process to actively link GIZ development projects with CGIAR programmes, but this initiative is still in its infancy.

5.2 Research as a component of development projects

Funding development cooperation projects, many of which are implemented by GIZ, is a core business of the BMZ. These development projects are based on bilateral agreements between the German government and the government of the receiving country. Some of these development projects entail a research component implemented by universities or research institutes in Germany and/or Africa. How this is organised differs from case to case. There is no central administration of research funded through development projects at GIZ. Hence, knowledge is spread across the organisation.

The main interest of the Ministry to fund research in this context is to strengthen the evidence-based implementation of development projects. Whereas the inclusion of monitoring and evaluation frameworks is standardised for all GIZ projects (including dedicated staff and reporting requirements), the inclusion of a research component conducted by independent researchers often depends on the engagement of individual staff members involved in the design of the project (either at GIZ or at BMZ). This underlines the importance of people who combine research and practice experience and can be understood as mediators.

The integration of research in a development project offers a unique opportunity to conduct TDR in a Global South context. First, funding earmarked for research exists next to funding earmarked for implementation. Second, the link to local stakeholders and implementation is assured through the development project conducted by the GIZ team. However, it is also a challenge to streamline the development project activities with research outcomes, as illustrated by the case highlighted in Textbox 8.

The **Accord-M project** was a research project accompanying the ProSAR development project in Madagascar, which is part of the Global Programme on Food and Nutrition Security, Enhanced Resilience implemented in 12 countries. The research project was conducted by the Humboldt Universität zu Berlin (HU Berlin) and the Leibniz Centre for Agricultural Landscape Research (ZALF) in collaboration with the University of Antananarivo in Madagascar and ran from 2020-2024. The project was funded with 400.000 euros. The main aim of the project was to study the nutrition-sensitive agriculture interventions under the ProSAR project and enhance its impact on the beneficiaries' food and nutrition security situation.

Programme preparation: The research project was funded through a finance contract between the Global Programme at GIZ headquarters and the HU Berlin and as such a component of the Global Programme. The researchers developed a proposal in close collaboration with the Global Programme team at headquarters to set the terms of reference for the contract. The financing construction (as opposed to direct funding through an in-country project) was deliberately chosen to ensure the independency of the researchers and allow for critical feed-back based on research results.

Project proposal elaboration: The research proposal was elaborated after the ProSAR project proposal. Part of the research objectives was aligned with the development project and the expertise of the researchers, while part of the research objectives was left undefined to respond to questions arising from interactions with beneficiaries during project implementation. The close collaboration between the funder and the research team during the proposal elaboration phase allowed for a high level of flexibility. The selection of the Malagasy research partner was facilitated by GIZ staff in Madagascar. The in-country connection allowed the German researchers to interact with several local researchers before deciding on the most suitable research partner.

Joint learning on TDR: The Accord-M research project aimed at providing evidence-based advice to increase the nutrition impact of the ProSAR development project. The research team learned over time how to best present results and engage different actors (e.g. giving oral presentations rather than sharing papers, targeting implementing NGOs rather than GIZ project staff). Nevertheless, two obstacles were encountered that constrained the integration of research outcomes into the implementation of the development project. First, the accompanying research project ran parallel to the development project. Hence decisions on the development project often had to be made before research results were out. Second, the development project was bound to its own logical framework and deliverables. Responsiveness to the research results was not integrated in this framework. The researchers conclude that the project could have benefited from a better framing of the collaboration between all project partners (Konzack and Steinke 2022). Other research projects accompanying development projects circumvent a direct feedback loop and concentrate on presenting research outcomes to inform follow-up development projects. This, however, undermines the transdisciplinary character of the research.

6. TDR targeted measures

The overview of the different funding frameworks and case studies shows that all examined funders and their funding agencies have gained experience in funding and managing TDR projects through the various funding programmes. To some extent, this has led to new practices on the part of funders at different stages of the research funding cycle. Table 3 provides an overview of TDR targeted measures, i.e. measures taken by funders and funding agencies to enable and/or promote transdisciplinary research approaches in a North-South collaborative context.

The measures were identified through interviews with staff from research funding agencies and German and African researchers and validated and expanded through a workshop with German research funding agencies and researchers. As this is a snapshot of the collaborative learning process and the workshop with African actors has not yet taken place, the list is biased towards the German perspective. The measures will be further elaborated in two upcoming workshops involving African science network representatives, researchers and practitioners.

Table 3 Good practices in funding TDR research

	TDR targeted measures	Description
1. Long-term funding strategies	Develop programme series	Funders could design long term series of programmes which build up topic-wise. New calls for proposals can integrate lessons from previous projects.
	Assure long-term funding	Funders could secure funding beyond the typical three-year period by spreading funding cycles over different phases of the TDR process e.g. problem definition; research; implementation of research results.
	Initiate co-funding by multiple ministries	Funders could collaborate to bundle funding earmarked for different purposes within one programme e.g. combine research funds and development cooperation funds.
	Connect research and development projects	Funders could collaborate to link existing research and development projects which deal with similar topics e.g. provide funds for exchange.
	Couple project funding with other long-term funding instruments	TDR project funding can be coupled to other funding instruments promoting TDR e.g. funding of ,integration experts ‘as permanent staff in research institutes.
	Strengthen networks for TDR partners	Funders can strengthen international networks of TDR partners e.g. Forum for Agricultural Research in Africa (FARA) and Global Forum for Agricultural Research and Innovation (GFAiR), to enable future collaboration within funded projects.
2. Programme preparation	Include TDR experts in expert consultations	TDR experts should be involved in expert consultations so that the funding conditions reflect the needs of TDR.
	Include African stakeholders in expert consultations	African stakeholders should be involved in expert consultations to make sure that the thematic focus of the funding programme addresses real-world issues.
	Formulate explicit TDR criteria:	The call for proposals should include specific criteria based on which the TDR approach of the applicants can be assessed.
	Request elaboration of TDR approach/co-design method	TDR proposals should describe the chosen TDR approach or co-design method to feed into the assessment.
	Consider experience from previous TDR projects	TDR proposals should include a description of experience with previous TDR projects of the applicants to feed into the assessment.
	Request ,situation analysis of project location ‘in TDR proposals	TDR proposals should include a standard section on the research location which provides context and justification for the relevance of the proposed research in practice, like a ,state of the art ‘section which situates the work in the research field.
	Request Theory of Change (ToC) in TDR proposals	TDR proposals should include a ToC which clarifies the pathway to impact and enhances planning, implementation, and evaluation of the TDR approach.

3. Budget allocation	Assign a minimum budget share to TDR	Funders should prescribe a minimum percentage share of the budget for TDR related activities and personnel costs.
	Engage African partners in negotiations over budget reallocation	African partners should be part of negotiations over budget reallocations during project implementation independent from their contractual status (e.g. sub-contract with German universities).
	Fund of <i>integration expert</i> positions	Funders should prioritize the funding of specific job positions that can fill in the role of connecting research and practice partners.
	Include an action fund	The budget should contain an open budget line to implement innovative solutions which emerge during the research process in collaboration with local societal actors.
	Fund practise partners (e.g. local community organisations, NGOs)	The budget should contain a budget line for practice partners so that they can commit time and resources to collaborate in the project.
	Minimize financial dependencies between research partners	Funders should seek contractual arrangements that minimise financial dependency between German and African research partners to allow for a collaborative learning environment.
4. Project proposal elaboration	Include a funded proposal writing phase	A pre-phase to develop a concept paper into full proposal with African research and practice partners should be funded to facilitate the early integration of African partners in proposal writing.
	Provide an exchange platform for potential applicants	The funder could offer a digital platform to link up with potential collaboration partners during the application period.
	Allow for ,blanks ‘in the proposal	The requirements on the proposal should allow for a co-design process with local stakeholders. This would mean that the TDR approach is described in more detail, while other aspects (e.g. specific interventions) should be described in less detail.
5. Project selection	Include TDR expertise on the review panel	A TDR expert should be on the review panel to evaluate the TDR aspects. TDR expertise should be considered when engaging external reviewers and recruiting funding agency staff.
	Include practitioners on the review panel	Experts with practice experience should be on the review panel to evaluate the ToC and practice relevance.
	Set a substantial weighting on TDR criteria	A substantial weighting factor should be assigned to the transdisciplinary nature of the proposed research to signal the importance of a high-quality TDR approach to the reviewers.
	Assess time and resources assigned to TD process	It should be assessed whether sufficient time and resources are allocated for the TDR process. This should include both the management of the TDR process as well as the actual exchange activities between actors.
	Asses explicit TDR criteria	The TDR criteria formulated in the call-for-proposals should be assessed and considered in the selection.
	Assess TD approach/ co-design methods	The suitability of the chosen TD approach should be assessed for the given context.
	Assess TDR experience of consortium	The experience of the applicant in previous TDR project should be assessed

	Assess relevance for project location	There should be an assessment of whether the relevance of the project to the specific location is plausible.
	Assess the ToC	The extent to which the ToC is realistic should be assessed.
6. Joint learning on TDR	Include TDR training for all project members in the funding package	Despite a growing recognition of TDR, the concept is still interpreted differently across research communities and science systems. Funding agencies can facilitate the TDR process by investing time and resources in ensuring a common understanding on the design of the TDR process across the consortium.
	Include TDR career development in the funding package	Transdisciplinarity often comes on top of someone's discipline/expertise. The funding programme can include activities to foster TDR career development through dedicated study visits or summer schools.

7. Conclusions

This working paper shows that several research funders and funding agencies are increasingly interested in supporting transdisciplinary research and continue to be learning by doing. Their efforts could be enhanced through some of the measures we identified by examining various funding frameworks for TDR in Africa. While most of these measures have already been implemented by at least one of the examined funders, TDR could be more effectively implemented if these measures became common practice across the board. Further assessment would be needed to conclude how these measures enhance the involvement of *all* relevant stakeholders in TDR processes and the actual contribution to social justice.

The lessons drawn in this paper are based on experiences from three German Ministries—BMBF, BMZ, and BMEL—that have funding programmes explicitly calling for TDR for SLM and agricultural development in Africa. The extent to which these programmes support the explicit call for TDR through adaptations of the funding framework varies. Additionally, the importance placed on transdisciplinarity within these funding programmes has evolved over time.

The BMBF is the largest public research funder in Germany. Among all research programmes, transdisciplinarity is given a central focus in the context of the Research for Sustainability Strategy, especially in the field of social-ecological systems research. However, some of the funding programmes on SLM and agricultural development in Africa that have been implemented over the past two decades have fallen outside this scope, which is reflected by less attention to the TDR character of the funded research projects.

The BMEL has a small (but continuous) funding line that touches on agricultural development and food security in the context of Africa and Asia and places particular emphasis on transdisciplinarity. The funding line has evolved gradually over the past ten years with a growing importance attached to TDR and measures taken to enable it.

The BMZ funds research on SLM and agricultural development through two different funding frameworks. The funding channelled through the CGIAR centres has shifted from a global North-South collaborative approach to a focus on the regional programmes of CGIAR centres. Strategically, BMZ is increasingly promoting transdisciplinary research approaches within the CGIAR centres, based on concepts such as demand driven research and multi-stakeholder platforms. In parallel, BMZ funds research as a component of development projects. Although this provides a unique opportunity for transdisciplinary research, such initiatives are scattered and not centrally administered.

Overall, the discussion on concrete measures to enable TDR shows that:

1. Beyond short-term project cycles, funders can make strategic decisions to support the long-term commitment required for TDR processes. Collaboration between research and development funders is crucial in this respect.
2. Programme preparation and project selection is an important phase in setting the stage for transdisciplinary research. Funders can be specific about what they expect from TDR and make TDR criteria an explicit part of the selection process. To realise this the integration of TDR expertise is needed.
3. When it comes to budget allocation, funders can outline a TDR structure by offering alternative budget categories beyond those that are common in disciplinary or interdisciplinary research projects. Although a truly 'flexible budget' which adapts to the TDR process is constrained by accounting rules, the allocation of more funds to specific TDR activities and positions can buffer this without creating fluctuating budget lines.
4. Funders can play an active role in shaping the collaborative problem definition phase of a TDR project by providing funding for the proposal writing phase and allocate resources to collaborative learning on TDR processes.

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