

First Call for Large-scale project Water and Development Partnership Programme (DUPC 3)

Date: 22 November 2021

About the Water and Development Partnership Programme

Since 2008, IHE Delft has established a partnership programme for water and development with DGIS, the development cooperation agency of the Dutch Ministry of Foreign Affairs. Recently, the programme entered its third phase, which will run for six and a half years (mid 2021 till end 2027) and has a budget of 46 million euro. The overall objective of the programme is to support and catalyze meaningful and lasting transformations to socially inclusive and ecologically sustainable water management practices by strengthening capacities in low- and middle-income countries through joint research, education, and knowledge sharing on water. The envisioned longer-term outcomes of the programme are:

- The knowledgebase on water management is improved and enriched to support ecologically sustainable and socially inclusive practices.
- A broad range of water sector organizations have the knowledge, experiences and capacity to facilitate and fulfill their roles and responsibilities for sustainable and inclusive water management practices.

To achieve these outcomes, the programme aims to foreground challenges related to equity and ecological sustainability in its activities and contribute to meaningful and viable solutions that overcome these challenges within three thematic areas: 1) water and health; 2) water for food; and 3) river basins and deltas. Activities that will be supported by the programme will be identified mainly through open calls for proposals within each of these themes.

Working in diverse partnerships in genuinely inclusive ways is an essential approach within the programme (see Textbox 1). In particular, collaborations are stimulated between academia, government agencies, grassroots organizations, and/or private sector organizations and between different disciplines, such as natural sciences, social sciences, and engineering. These partnerships are expected to carry out projects based on actual challenges faced and expressed by actors in the targeted low- and middle-income countries that lead to tangible outputs and meaningful impacts. Preferably these actors are also actively involved in designing and implementing the project as partner(s).

In line with the geographical focus of DGIS, the programme will mainly concentrate its activities in three focus regions, namely the Middle-East, the Sahel and the Horn of Africa (also see Annex 1). Nevertheless, partners from other low- and middle-income countries, especially those with whom IHE has long-standing collaborations, are also eligible to participate and are encouraged to team up with organizations from the above-mentioned focus regions. Special efforts will be made by the programme to support the careers of women and other marginalized and/or underrepresented groups¹ in the water sector, especially those in the early stages of their career.

¹ See Annex 1 for more details about these groups and the process of identification.

To further enrich and pluralize knowledge on water and stimulate learning, the different project-based partnerships will be brought together in broader learning networks centered around the three themes. These networks will focus on joint learning by sharing approaches, experiences and (preliminary) research findings from the different projects as well as interacting with external stakeholders. In this way, the programme aims to foster 'coalitions of the willing' who work together towards achieving impacts that contribute to sustainable and equitable transformations within and among their particular field(s).

Programme website for access to the programme document, Frequently Asked Questions (FAQ) and template and guidelines (under section 'Documents for project leaders'): <https://www.un-ihe.org/dupc3-ihe-delft-partnership-programme-water-and-development>.

Aim and Focus of the Call

This call aims to identify promising large-scale projects that align with the philosophy, approach and focus of the Water and Development Partnership Programme. In particular, this call solicits inter- and transdisciplinary projects that combine research and education as well as capacity strengthening activities and proactively share knowledge and engage in advocacy efforts to facilitate the dissemination and uptake of research findings in the water sector. The projects should implement their activities mainly in, and collaborate primarily with organizations from, the focus regions (see Annex 1). The anticipated budget of successful projects range from 1 to 1.5 million euro for a three to five year period.

This call is open for project proposals that aim to redress issues related to inequities and ecological degradation in water-related developments² in one or more of the following thematic areas:

Water and Health

This theme focuses on developing viable pathways to improve and upscale the provision of adequate, affordable, and inclusive water and sanitation services, particularly to marginalized groups and/or underprivileged areas.

Water for Food

This theme focuses on developing viable pathways to more sustainable, equitable, and climate-change-resilient irrigation practices and agro-ecosystems to support the livelihoods of actors involved in small- and medium-scale agriculture as well as to conserve biodiversity and ecosystem services.

River Basins and Deltas

This theme focuses on developing viable pathways to more secure, equitable, and ecologically sustainable governance and management of (transboundary) river basins and delta regions, including coastal areas and aquifers.

A more detailed description of the themes and the challenges that the call aims to address is presented in Annex 2.

Assessment Criteria

Successful applications should demonstrate that they:

² The different ways in which projects can contribute to redressing inequities and ecological degradation are described in more detail in the introduction text of Annex 2.

- Carry out high-quality, impact-oriented, interdisciplinary research that explicitly contribute to redressing inequities and ecological degradation within one or more thematic areas of the programme (see Annex 2). Research projects that explicitly invest efforts in enriching and pluralizing knowledge on water beyond conventional subjects, insights, and approaches are especially welcomed (see also Textbox 1).
- Address actual challenges faced and expressed by actors in the low- and/or middle-income countries – in particular from the focus regions – and ensure the active involvement of these actors in the project activities (e.g. through action-oriented research, living labs, participatory methods). This also includes showing how these actors become (co-)owners of the project deliverables (e.g. scientific publications, software, databases, policy guidelines, protocols, and technologies) and ensuring that project outputs are freely and easily accessible for general public³.
- Translate research into high-quality open education products and combine with relevant and effective capacity strengthening activities and knowledge sharing and advocacy activities, including meaningful engagements with policy-makers and/or other relevant audiences as well as active participation in and contribution to the relevant learning networks established by the programme.
- Collaborate within promising partnerships of diverse partners⁴ that embrace genuinely inclusive ways of engagement with emphasis on joint learning and critical reflection (see Textbox 1) and provide opportunities⁵ especially for (early-career) female professionals and/or representatives from (other) marginalized groups in society (see Annex 1). This also includes demonstrating that the project team has the right expertise to carry out the proposed project activities and that budget is allocated according to main objectives of the project.
- Have added value for, build further on and/or engage with other (donor-funded) development programmes or grassroots initiatives within the targeted region.

Eligible costs

Eligible costs include reimbursement of time of staff members from organizations eligible for funding (see Annex 1) as well as costs for travel⁶, and the durables and consumables needed to carry out the project activities. Budgets can also include PostDoc positions and costs related to PhD and MSc studies⁷ for individuals who are citizens of low- or middle-income countries. For more details on eligible costs and general budgeting criteria, see the budgeting guidelines on the programme webpage.

Specific budget requirements

Specific budgeting requirements that apply for this call are:

- At least 40% of the project funds requested should go to organisations in low- and/or middle-income countries.

³ All outputs produced with funding from the programme require to be open access. Systems are in place at IHE Delft to share these outputs. Systems of partner organizations may also be used. The programme supports the principles of open science. Among others, this entails that the programme expects project teams to use open source (modelling) tools in their research to make it replicable elsewhere and share codes and (anonymised) data without restrictions.

⁴ Diversity, among others, in terms of academic disciplines, types of organizations, geographical locations, see also Annex 1. Preference is given to projects that include IHE staff members from several academic departments.

⁵ This may include among others education and training opportunities, possibilities for networking and/or taking up leadership roles.

⁶ The programme implements an active greening strategy, which among others include that air travel needs to be limited as much as possible within the projects.

⁷ In case of involving PhD and MSc students in the projects, a clear motivation needs to be provided how this contributes to the proposed research activities as well as how it strengthens the capacities of partner organizations. It is also possible to include in the proposal a more extensive capacity strengthening component that includes a cluster of fellowships for students from a particular region/country to strengthen the capacities related to the content of the proposed project and to foster collaboration through an alumni network. In this case, the MSc students need to be engaged in several project related activities throughout the duration of their studies. More information about this can be obtained from the DUPC3 management team (secretariat_DUPC3@un-ihe.org).

- At least 50% of the total time input funded by the programme should go female team members and/or members from (other) marginalized groups in society (see Annex 1).
- At least 60% of the project funds requested should go to early-career professionals⁸ (either to reimburse their time input and/or to invest in their education).
- At least 10% of the project funds requested needs to be dedicated to joint learning activities (including active participation in and contributions to the wider programme learning networks).
- At least 25% co-funding (cash or in-kind) is required for each large-scale project.

Textbox 1. Guiding principles for collaboration within the Water and Development Partnership Programme.

To increase the chances of achieving the envisioned impacts and contribute to wider transformations towards socially inclusive and ecological sustainable futures, the programme encourages empathy and reflexivity within partnerships to create inclusive and conducive working cultures and stimulate joint learning. Therefore, the programme has defined the following guiding principles for collaboration:

- Partnerships have a broad problem-orientation and aspire to help solve problems as experienced by those that they collaborate or otherwise engage with.
- Partnerships adopt a practice-based approach, implying that their research and activities are empirically anchored in the actions and doings of water actors.
- Partnerships actively encourage and nurture diversity by creating safe spaces for collaboration based on mutual trust and respect and by appreciating different ways of knowing – e.g. defining, interpreting, assessing, valuing and evaluating – water.
- Partnerships adopt a transdisciplinary process by actively engaging non-academic actors and in this way contribute to pluralizing water sciences by engaging with different water wisdoms, experiences and perspectives.
- Partnerships actively embrace inter- and multidisciplinary processes, methods and approaches, particularly encouraging collaborations and cross-fertilizations between social sciences, natural sciences and engineering.
- Partnerships encourage active involvement of scholars from low- and middle-income countries and give space to their ideas, perspectives and approaches as well as stimulate their ownership of project outputs to actively contribute to the decolonization of (water) science.
- Partnerships remain critical, which means that they explicitly interrogate existing societal orders and processes of change or development in terms of their equity, sustainability, inclusivity and peacefulness.

Further details of the Call

This first call for proposals is launched in November 2021 with a deadline for submitting proposals on Monday 14th February at 17.00 CET. A maximum of 12 million euro is reserved for this call⁹, and we aim to fund 8 to 12 large-scale projects depending on the quality and focus of the submitted proposals. A second, and final, call for large-scale projects is expected to be published in November 2022. In addition, several rounds of calls for medium-scale and small-scale projects will be launched between 2022 and 2025 (for more details see the planning on the programme webpage).

⁸ The programme defines early-career professionals as professionals with zero to five years of experience after graduation of their highest educational level. Within the context of IHE Delft lecturers and colleagues who are less than three years in a senior lecturer position at the date of the proposal submission would qualify as early-career professionals.

⁹ In case not sufficient proposals are submitted that fulfil the criteria and objectives of this call - or in case proposals are not distributed among the different themes and/or regions - budget reserved for this call might be allocated to future calls.

Who can apply? A consortium between IHE Delft and about six to twelve organizations¹⁰ from low- and middle-income countries¹¹, preferably from the focus regions (see Annex X). The main applicant and coordinator of the consortium can come from IHE Delft as well as from a partner organization. We encourage the active participation of, and leading roles for, partner organizations from the countries in which the project take place as well as female lead applicants. Full proposals¹² can be sent before the deadline to secretariat_DUPC3@un-ihe.org.

The call is implemented by the executive committee of the Water and Development Partnership Programme¹³. Proposals and budgets will initially be screened whether they meet the basic criteria of this call as stipulated above, before sending out to independent external reviewers. Based on external reviews and deliberations in the committee¹⁴, this committee will rank the proposals based on their relevance for and alignment with the programme. The committee will ask endorsement from the IHE Rectorate on the projects that will be approved¹⁵. Themes or regions which are over-represented in the selected projects resulting from the first call, might be excluded in the second call.

After the Review Process

If a project proposal is (conditionally) approved, the team will enter in an inception phase of two months in which they have time to establish rapport, respond to feedback from the review process, and to further detail the planned activities and outputs to ensure the project is realistic and viable. Budget will be made available to organize a project workshop for this purpose and the partners will sign a consortium agreement to formalize their collaboration. Project teams are also expected to participate in programme-wide seminars and trainings during this period.

After the inception phase, project teams can start up the actual project activities. In case project teams have given a conditional approval of the proposal, the programme committee will first assess the changes made in the proposal based on the comments received during the review.

Towards the end of the project duration, top-up funding will be available for project teams that are specifically successful in making meaningful impact. This may for instance include project teams who have a proof of concept of approaches or technologies that they aim to further demonstrate and explore the marketability, support outreach activities – including policy engagement – to strengthen uptake of research findings or co-funding for project teams that have secured funding elsewhere to sustain the activities and collaborations.

¹⁰ This can include partners with whom IHE collaborated before as well as new partner organizations.

¹¹ According to OECD DAC country list. International organizations (including their regional/local subsidiaries) and organizations based in high-income countries can only participate in the activities if their added-value is sufficiently justified. Reimbursement of their time will not be possible and other expenditures can only be included in the budget to a limited extent (see also budgeting guidelines available on programme webpage).

¹² Formats for the proposal document and budget are available on the programme webpage. Incomplete proposals will not be considered.

¹³ For the composition of the committee, see the programme webpage.

¹⁴ In case a committee member is involved in a project, this person will not participate in the ranking of the proposals of this (sub)call.

¹⁵ If an applicant is of the opinion that there has been a shortcoming in the way a proposal has been evaluated, a request for redress could be raised within one month after the notice of rejection. A request for redress should be sent to the Rector of IHE via Secretariat.Rectorate@un-ihe.org. The outcome of the redress will be communicated via email to the applicant.

Timeline

Step	Activity	Expected dates
Step 1	Launch of the call	22 November 2021
Step 2	Submission of project proposals (template provided in call)	14 February 2022
Step 3	Start review of proposals by external reviewers	Mid-February 2022
Step 4	Approval of proposals	Mid-March 2022
Step 5	Inception workshops for approved projects	April-May 2022
Step 6	Expected start date of projects	June 2022

Questions and Information

For more information on the programme as well as a section Frequently Asked Questions (FAQ) and links to download formats and guidelines (under section 'Documents for project leaders'), please visit the programme webpage: <https://www.un-ihe.org/dupc3-ihe-delft-partnership-programme-water-and-development>.

For questions and inquiries, you can consult the frequently asked questions section on the above-mentioned webpage.

If you have any further questions, please contact the management team of the programme via: secretariat_DUPC3@un-ihe.org.

Privacy statement

By submitting your proposal in this call for large-scale projects under the Water and Development Partnership Programme you have taken note of the following privacy statement:

The personal details you shared through project proposal templates and/or other means, will be used when needed by IHE Delft for the purpose of (communication related to) the selection process, the implementation of the awarded proposal(s), reporting, and end-evaluation. IHE Delft will process your personal details in accordance with the EU General Data Protection Regulation of 25 May 2018. For more information we refer you to the privacy statement of IHE Delft: <https://www.un-ihe.org/privacy-statement>.

Without your prior consent or other legal bases, no information will be shared with persons, companies or organisations outside the context of this call. For further questions please contact our Data Protection Officer at dpo@un-ihe.org.

Annex 1. Focus regions and eligible partners

(source: [Water and Development Partnership Programme document](#)¹⁶)

In line with the objective to strengthen the water sector in low- and middle-income countries¹⁷, the Water and Development Partnership Programme mainly aims to engage a wide range of organizations involved in managing water in these countries. These organizations may include organizations such as water utilities, river basin organizations, irrigation boards, water-dependent industries, relevant government agencies, NGOs and CSOs representing grassroots initiatives, and universities working on water related topics.

Geographically the programme will focus on water organizations in regions that are prioritized by the Dutch Ministry of Foreign Affairs, namely:

- The Middle-East (*priority countries*: Egypt, Iraq, Jordan, Palestine, Yemen)
- The Sahel (*initial priority countries*: Burkina Faso, Mali, Niger, Nigeria)
- The Horn of Africa (*priority countries*: Ethiopia, Kenya, Somali, South Sudan, Sudan, Uganda)

As such, the majority of the partners involved in the projects are expected to come from water sector organizations in countries from these regions. Water sector organizations from other low- and middle-income countries can also participate in the activities in case they can contribute to and/or benefit from such participation. These partners will preferably come from other low- and/or middle-income countries and regions with whom IHE Delft has long-standing collaborations, in particular southern Africa, south-east Asia, the small island states and Colombia. Partners can be partners with whom IHE Delft has worked before, yet the programme also welcomes new partners, especially when they contribute to diversifying the collaborations.

International organizations – including their local or regional subsidiaries – and partners from high-income countries other than IHE Delft can only participate in the projects in case their added-value can be made explicit and they will not be eligible for funding from the programme. By limiting the involvement of such organizations the programme aims to directly redress geographical inequities in knowledge production and ownership as well as in educational and capacity strengthening opportunities.

At the individual level, the programme will encourage especially the involvement of early-career staff members of the partner organizations to participate in – and benefit from – the activities of the programme and associated projects. In particular, the programme will focus on providing opportunities to well-qualified (early-career) female staff members to redress gender imbalances in the water sector that are still prevalent. By supporting their careers the programme aims in the longer term to contribute to a less masculine and more inclusive working cultures within water sector organizations. Moreover, supporting women to be prominently involved in and/or lead the research and education within the programme may contribute to invigorating new approaches, insights and solutions needed to achieve the envisioned transformations and/or that might be particularly focus on addressing the challenges that women face in relation to water. In addition, the programme will encourage the participation of well-qualified individuals from (other) marginalized groups in the low- and middle-income countries to participate in and benefit from the programme's activities. These may include people who are marginalized or discriminated in society and/or underrepresented in the water sector based on their race, ethnicity, religion, class, caste, sexual orientation, gender identity, (dis)ability and/or other forms of social differentiation. Also their involvement is aimed at redressing structural inequities in society through affirmative action as well as with the hope that this will contribute to

¹⁶[https://www.un-ihe.org/sites/default/files/full_proposal_dupc3 - final updated cover 20212202 0.pdf](https://www.un-ihe.org/sites/default/files/full_proposal_dupc3_-_final_updated_cover_20212202_0.pdf).

¹⁷ According to the OECD DAC list.

developing knowledge on water that is particularly relevant for addressing their specific needs. Moreover, special attention will be given to include and protect researcher-at-risk, which are scientists who as a result of political marginalization in their home countries are constrained in carrying out independent, critical research on controversial water-related topics.

Which groups are considered marginalized, underrepresented and/or at risk differ per society and per situation. For that reason project teams will be asked as part of the proposal development to identify such groups within the context of their project. In addition, project teams will be asked (in the budget template) which members of their team belong to (one of the) identified groups in order to monitor how the project provides specific opportunities for these groups. Applicants need to ensure that personal information about individual team members is only shared on a voluntary basis. In case it is sensitive for socio-political reasons to identify which individual team members belong to marginalized groups, the applicant or the concerned individual(s) can contact the Diversity and Inclusiveness Policy Officer of the programme, Mrs. Nadine Sander (n.sander@un-ihe.org), to further discuss this matter. The Policy Officer can then advise how to account for this in the proposal, budget allocation and the project reporting.

Annex 2. Thematic areas¹⁸

(source: [Water and Development Partnership Programme document](#)¹⁹)

A distinctive feature of the Water and Development Partnership Programme, and in line with the programme's ambition to contribute to transformations to socially just and sustainable futures, is the strong emphasis on equity and ecological sustainability in water-related interventions. Foregrounding these two issues entails that the programme activities ultimately aim to solve the water-related challenges of (historically) marginalized groups in society and contribute to restoring degraded ecosystems on which these groups often depend for their livelihood. This can be through actions that directly benefit such groups and/or ecosystems or through water-related activities that aid society as a whole. It can also include activities that limit the water-related harm (e.g. over-abstraction, pollution) done by other parties or giving support to governments of low- and/or middle-income countries to strengthen their position to address water-related matters that play at larger spatial scales (e.g. transboundary, international). However, what it in all these cases entails is that the programme will carefully scrutinize the implications of its activities and not support actions that lead to (knowable) processes of (further) marginalization or unsustainable use of water in any form. As such, the two central elements - equity and ecological sustainability - will guide the programme activities within three thematic areas, namely water and health, water for food, and river basins and deltas.

In line with the programme's ambition to contribute to meaningful and lasting impacts, within each theme the focus will be on developing new ideas or understandings that contribute to viable pathways towards the envisioned transformations. For this reason, in each theme emphasis will be given to research that leads to integrated approaches and solutions that are considered appropriate and affordable in the local context. Moreover, those promising approaches and solutions need to be scalable to make wider uptake viable and resilient to future (climate) changes.

Water and health

Despite efforts of governments, water utilities and NGOs during the past decades, large parts of the world's population still lack access to sufficient water of good quality and have no, or very limited, access to sanitation services. This still causes millions of deaths annually of which the majority are children below the age of five years. Fast processes of urbanization pose further challenges as more and more people live in rapidly expanding urban and peri-urban areas in low-income countries where water supply networks are precarious, sewerage is often non-existent and spaces for toilets and safe disposal of waste are difficult to find. At the same time, in depopulated rural areas provision of reliable and affordable water and sanitation services becomes even more challenging in the absence of an 'economy of scale'. Moreover, poor drainage and improvised water storage both in urban and rural areas increase rates of water-borne diseases, while insufficient and intermitted water supply and inadequate sanitation can increase the spreading of other contagious diseases, such as COVID-19, as people cannot adhere to basic hygiene measures²⁰. In addition, the COVID-19 pandemic has emphasized again that human-livestock interactions increase the chance for zoonotic diseases like COVID-19, which puts especially densely populated (peri-urban) slum areas at risk as water sources are often shared²¹. At the same time, in rural areas geogenic sources of pollution (e.g. fluoride, arsenic contaminants) cause regularly health problems for people relying on groundwater sources in the absence of adequate treatment facilities²². Despite the overwhelming evidence for the urgent need

¹⁸ Full references to cite literature can be obtained from the programme document.

¹⁹ https://www.un-ihe.org/sites/default/files/full_proposal_dupc3_-_final_updated_cover_20212202_0.pdf.

²⁰ See among others Ekumah et al. (2020) and WHO (2020).

²¹ See among others Mazet (2009) and Alemayehu et al. (2021). These and other scholars call for an 'One Health' approach, which is an inter- and transdisciplinary approach that aims to achieve optimal health outcomes by recognizing the interconnection between people, animals, plants and their shared environment.

²² See among others Demelash et al. (2019) and Bretzler et al. (2019).

for adequate water and sanitation services, many governments in low- and middle-income countries have been urged to reduce public expenditures as part of neoliberal reforms, which has negatively affected the development and maintenance of water infrastructure especially in marginalized areas²³. On top of that, climate change causes in various regions prolonged droughts with as result that people face regular water shortages even for domestic purposes. This creates anxiety and tension in society, particular in view of pessimistic future scenarios²⁴. For instance, the still ongoing humanitarian crisis in the Middle East creates specific challenges of providing water and sanitation services in highly complex emergency situations to refugees, yet also causes anxiety among the citizens of the countries that take up refugees on how this might affect their access to already scarce water²⁵. These multiple and often interlinked issues led in many countries to huge inequities in terms of health risks that people are exposed, with especially already marginalized groups being most affected, including (female) slum dwellers, refugees and underprivileged households.

To counter these developments, this theme will focus on developing pathways to improve and scale-up the provision of adequate, affordable and inclusive water and sanitation services, particularly to marginalized groups and/or areas. Emphasis will be given to viable integrated approaches, nature-based solutions and/or inventive (digital) technologies that facilitate sustainable, reliable and safe provision of water and sanitation considering the specific institutional settings in the targeted areas. Where relevant, 'life-cycle'²⁶ approaches may be used to critically assess the implications of promising solutions for society and the environment. In the calls for proposals under this theme the programme will – among others – welcome projects that focus on advancing and supporting the implementing of nature-based solutions for water and wastewater treatment and explorer – and critically assess – the possibilities of stimulating circular economies of associated natural resources²⁷. Also, project initiatives that will further explore the possibilities for desalination technologies and how this technology can become a viable and environmentally sustainable solution for supplying water to low-income households in water scarce regions will fit under this theme. Other possible topics associated with this theme include the (further) development and implementation of smart approaches and (digital) technologies for inclusive, reliable supply of safe water and sanitation – in particular in complex environments such as slums and/or refugee camps – as well as developing and testing of approaches and measures to reduce pollution from human and animal excrement in densely populated areas. These themes may also include projects that will explore how water can serve as a low-cost proxy for spreading of COVID-19 and other (new) contagious diseases in low-income countries to inform remedial actions.

To support the transformations to more sustainable and inclusive provisions of water and sanitation services, the programme anticipates as part of this theme to also invest in identifying and studying innovative, realistic and progressive instruments for financing these innovations considering various service provision modalities (e.g. public/private, centralized/decentralized, on-site/off-site) and being inspired by the notion of circular economies. Also, project proposals are welcomed that focus on designing effective and integrated strategies for the development, operation and maintenance of water infrastructure, including exploring required legal and institutional arrangements and identifying implementation protocols (e.g. safety plans for water and sanitation) and/or engage with and critically reflect on hygiene initiatives. In particular, efforts will be made to support projects that stimulate effective knowledge exchange and collaboration between water service providers in low-

²³ See among others Ndikumana and Pickbourn (2017) and Galvin (2014).

²⁴ See among others IPCC (2019b).

²⁵ See among others Jaafar et al. (2019); Hussein (2020) and Baylouny and Klingseis (2018).

²⁶ Life-cycle approaches can be used to better insight in the impacts of a product – for instance a technology or a piece of infrastructure – during its entire life cycle to assess the various impacts and trade-offs of that product on a variety of environmental and social aspects, such as the quality of water, water consumption, livelihoods, public health, pollution emissions, and raw materials (Peña et al., 2020).

²⁷ See among others Voulvoulis (2018); Masi et al. (2018) and Malik et al. (2015).

and/or middle-income countries, for instance among water utilities (e.g. DUPC2 BEWOP – water operator partnerships) and among organizations involved in water supply and sanitation in humanitarian settings. The aim of these collaborations is to encourage joint learning – especially between organizations in the focus regions – and to strengthen the coordination among and the resilience of these organizations where needed.

Water for food

Farmers engaged in small- and medium-scale agriculture²⁸ in low- and/or middle-income countries are producing the largest part of food needed to feed the increasing population in the world. Moreover, these forms of agriculture provide vital income to millions of households²⁹, particularly in often marginalized rural areas and including large numbers of female-headed households. Past policy interventions have encouraged many of these farmers to start cultivating commercial crops for (inter)national markets, often shifting to monoculture. In many places these changes went hand in hand with overexploitation of water sources, land tenure insecurity, increased use of fertilizers and exposure to market volatility³⁰. In other parts of the world, smallholder farmers³¹ particularly have been largely neglected and/or land and water resources have been accumulated in the hands of a few larger (foreign-owned or state-supported) agribusinesses³². In both situations it causes insecurity for farming households and often lead to further degradation of biodiversity and vital ecosystems – such as wetlands and forests – through increased pollution from fertilizers and pesticides and/or encroachment on nature³³ in search for land and water in attempts to secure income from agriculture. This is despite the fact that these ecosystems are often crucial sources to complement the livelihoods of food-insecure households³⁴. Also, climate change poses further challenges for many farmers engaged in small- and medium-scale agriculture because they often lack access to adequate infrastructure and technologies for storing and controlling flows of water³⁵. This limits their possibilities to respond to prolonged droughts and irregular precipitation patterns and may lead to salinity of their soils, affecting crop yields and/or reliable supply of water for their cattle. As a consequence of all these uncertainties, especially smallholder farmers are extremely vulnerable for other disturbances, like the COVID-19 pandemic that led – among others – to the closure of the large majority of farmers markets worldwide³⁶.

Having learnt from the negative impacts of unsustainable agricultural practices on society and ecosystems³⁷, this theme will focus on identifying, testing and implementing pathways to more sustainable and climate-change-resilient irrigation practices and agro-ecosystem for growing crops, herding livestock and conserving biodiversity and ecosystem services. In the calls for proposals under this theme the programme will – among others – welcome projects that aim to develop nature-based solutions to climate-proof smallholder agriculture (e.g. through sand storage dams, recharge of aquifers, rainwater harvesting) and further explore the possibilities for reuse of (nutrient-rich or saline)

²⁸ The programme recognizes that the size of the farms and their produce – and thus what qualifies as small- and/or medium-scale – might differ per country and per agricultural activity. Nevertheless, the programme finds it important to use these categories to distinguish these farms from large-scale agribusinesses.

²⁹ See among others Samberg et al. (2016) and Lowder et al. (2015).

³⁰ See among others Jongerden et al. (2019) and Mosely et al. (2014).

³¹ The programme uses the smallholder farmers to refer to actors involved in small-scale agriculture, which may include farmers who own small pieces of land for growing crops, herding livestock and/or aquaculture mainly for their own subsistence, but also might include small-scale agribusiness that supply their produce to markets, especially in years of surplus. It also may include pastoralists, tenants or agricultural labourers who do not own land themselves but are involved in the above-mentioned activities or people who rely for the livelihood primarily on other goods produced by ecosystems.

³² See among others farmlandgrab.org and Chandran (2021).

³³ See among others Tickner et al. (2020) and IPBES (2018).

³⁴ See among others Rebelo et al. (2010).

³⁵ See among others Kotir (2011) and Kemerink et al. (2016).

³⁶ See among others Nchanji et al. (2021) and Ceballos et al. (2020). See also <https://flows.hypotheses.org/5557>.

³⁷ See also <https://viceversaonline.nl/2021/02/23/bijt-niet-in-het-land-dat-je-voedt/>.

water for agriculture and critically assess how this affects human health³⁸ and receiving aquifers and ecosystems. The programme will also encourage project initiatives that study and stimulate regenerative – including re-appreciation of traditional³⁹ – agriculture practices to increase water storage in the root zones and improve soil fertility and therewith improve crop yields in the longer term and restore ecosystems. Moreover, the programme has the ambition to further develop, test and make available (remote-sensed) tools and technologies that will help small- and medium-scale agribusinesses to monitor and increase their on-farm water productivity (e.g. DUPC2 WaterPip, drip irrigation). The programme would like to explore how remote sensed technologies can be used as progressive tools to monitor and interrogate the water use and water pollution by larger scale agribusinesses as part of efforts to achieve fair and/or sustainable water management practices. Under this theme, the programme will also encourage partners to study and critically assess possible trade-offs and synergies between water for agriculture and low-carbon energy production (e.g. decentralized low-head hydropower, biofuels, resource recovery, solar panels) in attempts to secure both food production and energy supply to farming households.

To support the envisioned transformations in agriculture, the programme anticipates as part of this theme to also invest in identifying and studying innovative, progressive instruments for financing in order to make sustainable farming practices accessible and affordable for (collectives of) farmers engaged in small- to medium-scale agriculture. This may include studies on the relevance and applicability of including these types of farms in circular economies. Moreover, the programme welcomes projects that engage with farmer-led processes that stimulate inventive ways of establishing sustainable irrigation practices at grassroots level. The research done under this theme may also engage with developing viable integrated and inclusive implementation strategies, including identifying required institutional arrangements and policy interventions to support, protect and improve the water management of small- and medium-scale agriculture, particularly in the context of ongoing land and water grabs and globalized food chains. In this way the programme aims to achieve meaningful and lasting impacts for inclusive and sustainable agricultural practices.

Rivers basins and deltas

In river basins flows of water from different sources and qualities come together and are abstracted, used and returned for different purposes, such as for domestic use, agriculture, industries, and hydropower. It is at this level that synergies can be explored and strategic choices can be made to foster ecological sustainable and equitable practices of managing water and to ensure inclusive governance processes. Yet it is also where difficult trade-offs need to be negotiated, where historical uneven development has materialized⁴⁰, and where regularly conflicts over water are imminent⁴¹. As a result of climate change, governments need to be prepared to deal with climate extremes, which increasingly requires both infrastructure against flooding as well as infrastructure for water storage to cope with prolonged droughts⁴². Particularly in fast urbanizing deltas the pressures are felt to provide water, food and electricity to the growing population, yet also protect them against flooding due to sea-level rise, land subsidence⁴³ and/or coastal erosion⁴⁴. In most river basins over-abstraction and/or widespread water pollution by industries, settlements and agriculture affects the goods and services of aquatic ecosystems, including water retention and purification and the absorption of greenhouse gases. In coastal areas salinization of water regularly further deteriorates the quality of water and threatens the health of aquatic ecosystems, especially in places where aquifers are overexploited.

³⁸ For instance, assessing the increase of antibiotic resistance as result of wastewater reuse.

³⁹ See among others Singh and Singh (2017).

⁴⁰ See among others Swatuk (2008); Budds (2013); Budds and Sultana (2013).

⁴¹ See among others De Stefano et al. (2017).

⁴² See among others Güneralp et al. (2015); Brida et al. (2013) and Ward et al. (2020).

⁴³ See among others Bucx et al. (2015).

⁴⁴ See among others Hzami et al. (2021).

Many low- and middle-income countries have little data available on the status of their water resources and insufficient capacity to monitor withdrawals and water quality parameters, which makes it difficult to manage water⁴⁵. The invisibility of groundwater makes it notoriously difficult to monitor and regulate its abstractions⁴⁶. In places where water sources are shared between different countries additional challenges are often encountered to align policies, approaches and interests, sometimes resulting in disputes over water⁴⁷.

To respond to these multifaceted challenges, this theme will engage with identifying, testing and implementing pathways to more secure, equitable and ecologically sustainable governance and management of river basins and delta regions, including coastal areas. In the calls for proposals under this theme the programme will – among others – welcome projects that study the hydro-socio interactions, trade-offs and possible synergies between different flows of water in a river basin⁴⁸ with a specific focus on securing water *also* for domestic use, subsistence farming and ecosystems. This may also include collaborations with and/or measures for stimulating private sector organizations (e.g. industries, mining companies, agribusinesses) to increase their water efficiency, reduce their pollution of water sources and/or avoid degradation and destruction of natural ecosystems such as wetlands. Moreover, the programme aims invest in smart (remote sensed) ways of assessing, monitoring and forecasting the quantity and quality of water sources – particularly in data scarce regions (e.g. DUPC2 WA+) – and explore how these technologies and approaches can be used as progressive tools to redress injustices in and/or unsustainable uses of water. This theme will also support the further development and testing of smart ways of monitoring and assessing groundwater levels and the water quality of aquifers in collaboration with IGRAC (see Textbox 7), including interactions with other water bodies and in particular identify ways to reduce saltwater intrusion. As part of this theme, the programme also aims to focus on protecting people and infrastructure against climate extremes such as floods and droughts by investigating (mainly⁴⁹) nature-based solutions for storage and/or drainage of water, particularly in marginalized parts of urban environments, as well as smart technologies for forecasting such events and informed risk management. Moreover, the programme will encourage partners to initiate projects that study the possibilities for restoration of aquatic ecosystems – in particular based on promising grassroots initiatives for sharing and caring for water sources – to protect biodiversity as well as safeguard the goods and services that these ecosystems provide.

As part of this theme, the programme aims to make efforts to further develop the knowledge-base on root causes of different kinds of water conflicts in domestic as well as in transboundary basins and identify opportunities and approaches for managing these conflicts through collaborative action. In this, the programme would like to give specific attention to water quality issues, conflicts arising from competing demands for water for food and the production of hydropower and disputes on groundwater management. Based on initiatives started under the previous phase of the programme, this phase will encourage partners to develop, test and disseminate effective tools for water diplomacy. In particular, the programme will encourage diversity in the approaches for water conflict resolution for instance by engaging with existing promising approaches in target regions and developing methods for inclusive management of water conflicts. Moreover, the programme aims to invest in developing integrated and viable (adaptive) planning and implementation strategies for sustainable and equitable management and governance of river basins and delta areas, to achieve

⁴⁵ See among others Walker et al. (2016); Tourian et al. (2013) and World Bank (2018).

⁴⁶ See among others Molle and Closas (2020) and Taylor et al. (2009)

⁴⁷ See among others De Stefano et al. (2017) and Zeitoun et al. (2014).

⁴⁸ With this the programme refers to flows of water for different purposes (e.g. for urban development, industries, hydropower, agriculture) as well as flows of different types of water (e.g. surface run-off, shallow aquifers, deep groundwater, wastewater flows, sewer flows, river flows).

⁴⁹ Where these nature-based solutions are not feasible or not adequate, research and education on conventional infrastructures can also be considered within projects as long as the implications for ecosystems are made explicit and addressed as much as possible with nature-friendly adjustments to the infrastructure.

meaningful and lasting impacts. In this, the programme would like to focus on challenges, trade-offs and contingencies that come with implementing such complex, multifaceted strategies and work towards developing multi-policy approaches.