BELMONT FORUM

TRANSDISCIPLINARY RESEARCH FOR PATHWAYS TO SUSTAINABILITY

THE 2020 COLLABORATIVE RESEARCH ACTION: TRANSDISCIPLINARY RESEARCH FOR PATHWAYS TO SUSTAINABILITY

To move towards the achievement of the Sustainable Development Goals (SDGs), clear pathways need to be identified, which have to account for a broad range of factors such as environmental boundaries, critical drivers of human capacity, demographic changes, transformative governance capabilities, sustainable diets, etc. Progress has been made in the understanding on how some specific goals can be achieved, but a holistic and integrated understanding on how to achieve the whole range of the SDGs at global and regional levels is lacking. This is the starting point for the Belmont Forum's Collaborative Research Action on "Transdisciplinary Research for Pathways to Sustainability", which aims to support transdisciplinary networks to produce the necessary knowledge on interlinkages between SDGs and propose innovative options to help underpin sustainable development. The Belmont Forum is an international partnership that mobilizes funding of environmental change research and accelerates its delivery to remove critical barriers to sustainability. The Collaborative Research Action is in line with the Belmont Challenge, which supports international transdisciplinary research providing knowledge for understanding, mitigating and adapting to global environmental change.

The 13 selected research networks presented in this brochure are transdisciplinary consortiums working on the co-creation and transmission of knowledge on integrated transformation pathways. By engaging with societal actors, they ensure ownership of the outcomes and policy-relevance of the research. The funding amounts to approximately 2.5M€ of monetary and in-kind resources and supports 13 research networks, which involve 136 people from 37 different countries. 28% of personnel supported by this call are from African Nations due to the support and partnership from Future Earth Africa, AllEnvi, GEO, NIMR, and NRF.

A GLOBAL AND DIVERSE SET OF RESEARCH NETWORKS

13 research networks

136 personnel

39% women

37 different countries

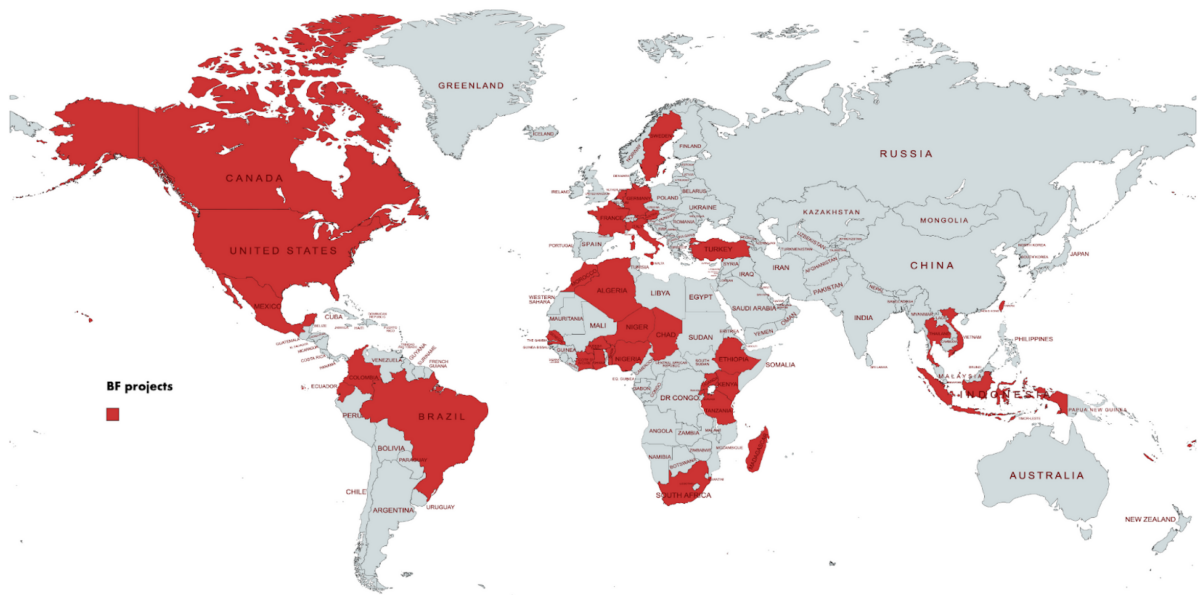**48.5% of participants from the Global South**

28% of participants from Africa

1-2 years project duration

2.5M€ of monetary and in-kind resources

Geographic representation of the participants

RESEARCH THEMES

- Urban, informal settlements, slums
- Agriculture
- Hydropower
- Small-scale fisheries
- Air quality

- Zoonoses
- Extreme floods
- Pacific ocean islands
- Human/nature interdependencies
- Governance
- Transdisciplinary tools

AIRGEO – CITIZEN'S EMPOWERMENT THROUGH BIOMONITORING OF AIR QUALITY IN RESPONSE TO MINING, RECYCLING AND USING GEORESOURCES

Location of the project members

Mining, using, and recycling georesources all emit particles, which are known to induce health problems and to play a role in climate change. AirGeo will propose participatory processes to assess air quality, which will enable citizens to become actors in the evaluation of their environment. The goal of the project is to develop a passive sensor with low environmental impact which will allow for a large number of inhabitants to play a role in assessing air pollution. The major stake is to develop a sensor combining technical performance with user-friendliness. The sensor's design and implementation must hence facilitate its appropriation by the inhabitants by taking into account cultural diversity and representations of the measurement. To ensure the diversity of points of view and the consideration of the subject in its globality, the consortium will be based on the synergy of partners involving organized civil societies, artists, designers and researchers in anthropology, sociology, atmospheric sciences, geology, biology, epidemiology and geophysics.

COVPATH – COVIABILITY PATH, A NEW FRAMEWORK TO SUSTAINABLY LINK MANKIND AND BIOSPHERE

Coviability describes human/nature interdependencies resulting from interactions between human and non-human systems based on mutual sustainability. CovPath aims at grounding this concept in concrete contexts in order to enable an empirical understanding of coviability and the development of an implementation framework. Adopting a bottom-up approach CovPath will work with six UNESCO designated biosphere reserves from Africa, South America, South-East Asia, Indian ocean, Europe, and North America to reflect upon, discuss and co-construct the concept-paradigm

Location of the project members

of socio-ecological coviability in an empirical and concrete way. The originality of the approach is to work with local actors to move from the scientific ownership of the concept to its appropriation by local actors within the framework of stewardship governance. The coviability trajectories emerging from this project will not only benefit case study communities, but are also meant to serve decision-making at national and international levels.

DREAMS - DEVELOPING RESILIENT AFRICAN CITIES AND THEIR URBAN ENVIRONMENT FACING THE PROVISION OF ESSENTIAL URBAN SDGS

Location of the project members

Facing rapid urbanization and the growth of informal settlements, African agglomerations and urban areas struggle to achieve the SDGs. DREAMS seeks to create new sustainability pathways for African cities, to contribute to building partnerships for achieving the UN SDGs, and to address this through a strong, cross-continental partnership (SDG 17). Its regional focus will be on Ghana, Uganda, and South Africa. The consortium combines expertise from natural and social sciences and consists of researchers from Africa, Germany and the US who bring experience on urban planning processes and methods that embrace Charrettes as a key participatory approach for addressing particular local hotspots, where the cooperation between communities and planners is especially needed. DREAMS will develop an integrated approach for participatory scenario modelling, impact assessment and integrated strategic urban planning. It will use a mixed-methods approach combining remote sensing data on urban pattern development, and participatory scenario development and planning, to better understand why current instruments, strategies and participation mechanisms fail to coordinate informal settlements.

ECO2HEALTH - HEALTH AND AGRICULTURE SUSTAINABILITY THROUGH INTERDISCIPLINARY SURVEILLANCE AND RISK ASSESSMENT PLATFORM OF GLOBAL EMERGING ZOONOTIC DISEASES

Data and knowledge on the emergence, circulation, diversity and transmission of zoonotic pathogens such as highly pathogenic avian influenza viruses (HPAI), Zika virus and SARS-related coronaviruses (SARS-CoVs) is scattered and incomplete, hindering the advancement of capacities to forecast transmission dynamics. Eco2Health aims at effectively integrating different databases and monitoring the potential of an escalating risk of disease transmission. The project will develop an integrated platform combining satellite remote sensing techniques and data modeling/visualize approaches to

Location of the project members

analyze transmission dynamicsdynamics of emerging infectious diseases. This will allow for generating risk maps adaptable to avian influenza outbreaks from individual countries within the consortium. The project will make a modeling scheme and environmental data available to interdisciplinary users and deliver transmission risk assessments to project stakeholders. Each participating country within the consortium will incorporate local communities of practice and will develop disease models for risk maps to address the pathway for sustainability in public health.

FISH2SUSTAINABILITY - ENHANCING THE CONTRIBUTION OF SMALL-SCALE FISHERIES TO THE SUSTAINABLE DEVELOPMENT GOAL

Location of the project members

Small-scale fisheries and their complex social-spatial structures are the backbone of the economy and society in many coastal countries, providing income and food security to millions of people. Although often simply considered as a resource use problem, the sustainability of small-scale fishery extends well beyond SDG 14, related to community livelihoods, markets, and political economy. Fish2Sustainability will create and strengthen national-level small-scale fisheries communities of practice in six countries: Colombia, Ecuador, Kenya, Madagascar, Mexico, and Nigeria. The project aims to develop a rapid appraisal frame work based on key indicators and descriptions of interdependencies to characterize the interactions between small-scale fisheries and the SDGs. The project will then use this approach to engage with stakeholders to create a community of practice, which will help assess evidence-informed synergies and trade-offs between SDGs. Based on this assessment, one of the aims of Fish2Sustainability is to identify data, knowledge, and policy gaps. Findings will be shared with stakeholders from the participating countries as well as with international organizations in order to better identify potential pathways for sustainability at national level and to inform international policies.

PACPATH - PACIFIC OCEAN PATHWAYS IN SUPPORT OF SUSTAINABLE DEVELOPMENT: AN INTEGRATED APPROACH

Stakeholders need sound science, targeted expertise, and reliable data-based information to make informed decisions at the right time and for the right timescale. The current scientific knowledge in support of the SDGs needs to be better shared and the research questions need to be better co-constructed with local communities, the diversity of the knowledge-holders and the decision makers. PACPATH aims at drawing up a stakeholder network for the Pacific Island Countries and Territories to reinforce a common understanding of the state, variability, and change of the marine environment. The goal is

Location of the project members

to co-design a robust strategy for ocean stewardship, to prototype innovative coastal sustainability initiatives and pathways and more generally to develop empowering loops. Starting with two pilot sites, Fiji and New Caledonia, the transdisciplinary consortium will engage with local socioeconomic actors, civil society organizations, customary authorities, and policymakers along the course of the project. Particularly, a specific governance structure including local representatives at all stages will be established to enable their engagement.

PREMISS – PARTNERSHIP FOR RESEARCH TO ENHANCE METHODOLOGIES IN SUSTAINABILITY SCIENCE

Location of the project members

Many technological innovations based on Artificial Intelligence have the potential to change the way we think about interdisciplinary and participatory approaches to sustainability issues. Among them, agent-based modeling and crowdsourcing methods seem to be promising, allowing scientists and stakeholders to explore the relevance and sustainability of different pathways for the management of socio-environmental systems, and giving stakeholders the possibility to monitor the progress of the chosen pathways. Based on three case studies (on the sustainable management of irrigation systems through participatory modeling in Vietnam, on citizen science and participatory environmental mapping in Taiwan, and on the adoption and impact of sensor networks on precision agriculture in Turkey), PREMISS aims to show and document the extent to which a combination of these two technologies can effectively support transdisciplinarity in addressing complex socio-environmental issues.
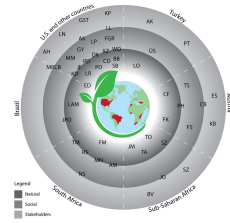

RREFLOOD - THE RESIDUAL RISKS OF EXTREME FLOODS: A CHALLENGE FOR ACHIEVING THE SUSTAINABLE DEVELOPMENT GOALS

Physical exposure to flood risks has dramatically increased during the second half of the 20th century, primarily because of the occupation of flood-prone land, which increases the exposure of human populations to devastating floods. People who live behind protective dikes are considered to be 'out of the official floodplain' and may assume they are safe from flooding, even though they are still at risk in case of extreme events. Low-probability, high-consequence floods can wipe out many years of progress towards the SDGs. RREFlood will deal with questions of how societies manage those floods, how resi-

Location of the project members

dual flood risks can be communicated to the public, and how addressing these issues can foster the achievement of the SDGs. The project will create a network of experts focusing on the interplay between SDGs and residual risk and its management. It aims at collaboratively designing a framework to integrate residual flood risks into local planning procedures and at creating a platform to facilitate advances in knowledge and tools in support of SDG-centered residual flood risk management.

SAM CONSORTIUM - GUIDING THE PURSUIT FOR SUSTAINABILITY BY CO-DEVELOPING A SUSTAINABLE AGRICULTURE MATRIX

Location of the project members

The SAM consortium is a transdisciplinary and transnational network to guide pathways for sustainable agriculture by co-developing an indicator system and associated products. SAM will measure agricultural sustainability and can thus improve the accountability of countries' commitments to sustainable agriculture. The project will also engage in conversations and coordination among stakeholders and countries to identify the interlinkages between the SAM indicators and the Sustainable Development Goals, and to improve the understanding of the socioeconomic and ecological dynamics in agricultural systems and beyond. The project will furthermore identify strategies for advancing sustainable agriculture and informing policies. The SAM consortium builds upon an existing transdisciplinary collaboration led by the University of Maryland Center for Environmental Science and Oxfam, which developed a first-of-its-kind global SAM indicator system and database. The project now aims at extending the collaboration to include more stakeholders from both public and private sectors. More importantly, it will provide a unique opportunity to apply the global SAM indicator system to countries or regions with diverse profiles of development stages and natural resources, including USA, Austria, Brazil, Turkey, South Africa, and Sub-Saharan Africa (Morocco, Kenya, and Côte d'Ivoire).

SCARIA - TOWARDS SUSTAINABLE COMMUNITY BASED MITIGATION OF RODENT ISSUES IN AFRICAN CITIES

Rapidly growing informal settlements in African cities provide a perfect environment for rodents to thrive, which leads to negative repercussions on infrastructure, food stocks, and health. Ecologically based rodent management (EBRM), which relies on a good knowledge of pest rodent biology and community-based sustainable modifications of the environment in order to decrease rodent population, has proven successful in rural agricultural contexts. However, large knowledge gaps in urban contexts remain, even though urban rodents are abundant and highly deleterious to millions of city dwellers, es-

Location of the project members

pecially in poor and rapidly expanding urban settings. SCARIA aims at building science-guided community-based strategies for EBRM in four African cities in Benin, Ethiopia, Niger and Madagascar. The project will set up local working groups consisting of academic experts, representatives of local communities, public services, local enterprises, and local NGOs, to discuss and formalize an urban EBRM adapted to each local socio-economic, cultural and environmental context, and to produce baseline socio-economic, ecological, and health data to provide socio-environmental proxies for future urban EBRM implementation and evaluation.

SUSTAINDAM - SUSTAINABLE MANAGEMENT AND PLANNING OF HYDROPOWER GENERATION IN WEST AFRICA UNDER CLIMATE CHANGE AND LAND USE/LAND COVER DYNAMICS

Location of the project members

Hydropower generation represents more than 50% of the total electricity generation in West Africa. However, climate change and variability, socio-economic development, and land use and land cover changes (LULCC) affect all key sectors such as water resources for agriculture and hydropower generation. A key barrier in developing sustainable pathways for hydropower in this region is that studies of this specific climate-water-energy nexus are nascent, climate projections are uncertain and the few studies on future changes of LULCC are not designed to address the issue of land, water and energy nexus. SUSTAINDAM aims to contribute tosustainably manage and plan hydropower generation in West Africa under climate uncertainties and LULCC dynamics. The project will build communities of practice with hydropower generation stakeholders such as dam managers, local policy makers, civil society representatives, or associations of women, to address challenges, synergies, and trade-offs concerning the climate-land-water-energy nexus for a sustainable management and planning of hydropower generation. The project will focus on dams in Ghana, Côte d'Ivoire, Burkina Faso, and Senegal and aims at sharing and common learning between these case studies.

SDG-PATHFINDING: CO-CREATING PATHWAYS FOR SUSTAINABLE DEVELOPMENT IN AFRICA

The materialization of the SDGs requires ending the prevailing silo approach and adapting technical and governance transformations to specific local contexts. One of such governance transformations involves the "localization" of the 2030 agenda, to facilitate the endorsement and the engagement of local and regional actors in the design and implementation of required sustainability transformations. SDG-pathfinding aims at developing novel tools and capacities to deal with SDG interlinkages and support sustainable development pathways adapted to local conditions in African countries. The project will

Location of the project members

analyse multi-level governance structures and path dependencies, will develop and test an innovative, online and participatory SDG scenario policy tool, and will foster exchange and collective learning experiences. The approach will be tested and implemented in two SDG-hotspots (Fimela district in Senegal, and Swartkops catchment in South Africa), which are regions where multiple SDG gaps intersect due to a number of drivers of different nature and different operating scales.

UCOMNETSUS- AFRICA - BUILDING URBAN COMMUNITY NETWORKS FOR SUSTAINABLE CITIES IN AFRICA

Location of the project members

Urbanization in Africa is increasing rapidly. This is leading to major challenges such as severe pressure on resources, amorphous growth of informal settlements, inadequate waste management, and an alarming level of air pollution. UComNetSus aims at starting bottom-up conversations with the citizens to establish transdisciplinary networks to understand perceptions, attitudes, behaviour, and actions against the challenges and opportunities faced in African urban areas. The project focuses on six African cities: Kumasi (Ghana), Lagos (Nigeria), Nairobi (Kenya), Mombasa (Kenya), Dar es Salaam (Tanzania), and Kigali (Rwanda). By engaging stakeholders in these six cities, the project will indeed foster cross-learning and the adoption of best practices as well as build synergies among them. UComNetSus will also conduct a situational analysis of the social, economic and ecological challenges and interdependencies for sustainable development in the respective cities. It will generate spatial maps of social, economic and ecological assets, and formulate voluntary guidelines for sustainable African cities.

CONSORTIUM LEAD ORGANISATIONS

FUNDING AGENCIES