

**Concept Note: By the Luc Hoffmann Institute and the Water Institute at UNC
For the Academic and Practitioners network for the Water Energy Food and Climate Nexus**

Goal: Establish a global network of disciplinary and interdisciplinary experts, practitioners, and research thought leaders tasked with identifying and filling research gaps and needs, compiling and disseminating current Water Energy Food and Climate (WEFC) knowledge and best practices, and establishing a global clearinghouse of WEFC indicators for the WEFC Nexus framework.

Mission of the WEFC research network:

Support a WEFC community active in setting a *use-inspired research agenda, catalyzing and disseminating important research, and developing and sharing resources, knowledge, and tools for the WEFC nexus research and practice communities.*

Governance: The Network will be managed for the first two years by the Water Institute at the University of North Carolina and the Luc Hoffmann Institute.

Members of the Advisory Group will include: Stockholm Environment Institute, ZEF: Department of Economic and Technological Change, Future Earth, UNESCO: Division of Science Policy and Sustainable Development *plus others yet to be identified.*

Context, Threats and Opportunities:

Sustainable development, the growth of cities, poverty reduction, environmental protection, and global and regional economic progress: trajectories for all of these basic metrics will revolve around how we produce and consume food, energy and water. The complex systems the world relies on for food, water and energy are becoming more connected and increasingly strained, resulting in less stability, lower predictability and decreasing resilience; problems that are worsened by climate change. These problems also offer profound opportunities for new ideas, new partnerships and new solutions.

The urgency and severity of the problems is real:

- 1) **Consumption pressures are increasing:** population pressure and a growing global middle class is projected to increase food and energy demands by 80 to 100% by 2030¹
- 2) **System stability is decreasing:** the physical parameters controlling the stocks and flows of food, energy and water are becoming less stable due to changes in climate, and future changes in climate will significantly reduce resilience within each of these sectors²

¹ [Kharas, H. *The emerging middle class in developing countries*. Paris: OECD Development Centre, 2010; Tilman, D., et al. "Global food demand and the sustainable intensification of agriculture." *Proc. Nat. Academy of Sciences* 108.50 \(2011\): 20260-20264. Moriarty, P. and D. Honnery. "What is the global potential for renewable energy?." *Renewable and Sustainable Energy Reviews* 16.1 \(2012\): 244-252.](#)

² [Battisti, DS., and RL. Naylor. "Historical warnings of future food insecurity with unprecedented seasonal heat." *Science* 323.5911 \(2009\): 240-244. Immerzeel, WW, LPH van Beek and MFP Bierkens. "Climate change will affect the Asian water towers." *Science* 328.5984 \(2010\): 1382-1385.](#)

- 3) **Sector issues are cross-cutting:** Irrigated agriculture accounts for 80 to 90% of the world's fresh water consumption, limiting the availability of clean drinking water for a growing population. The need to transport, store, and protect ourselves from water accounts to more than 13% of total energy use in the United States.

There is an urgent need for developing a more unified research agenda leading to a set of linked, evidence-driven indicators, metrics and scenarios that are both predictive and prescriptive, providing the tools needed to track and integrate ecosystem goods and services and rapidly respond to this complex, dynamic system. These tools must be disseminated to the WEFC practice community along with already discovered WEFC knowledge and best practices.

A developed WEFC Nexus research and practice community allow for:

- 1) Increased productivity of resources
- 2) Use of waste as a resource
- 3) Stimulating development through economic incentives
- 4) Coherence between governance, institutions and policy

Our Vision:

The network will leverage the interest generated from the 2014 WEFC Nexus conference to establish a global network of disciplinary and interdisciplinary experts, practitioners and research thought leaders tasked with identifying research needs, compiling and disseminating WEFC knowledge and best practices, and establishing a global clearinghouse of Water - Energy - Food - Climate (WEFC) indicators for the WEFC Nexus framework.

Our Approach:

The Academic and Practitioners Network for the WEFC Nexus will start its work with two key components: three linked working groups and a vetted database of knowledge and best practices.

Working Groups: The network will develop three linked working groups that meet separately and jointly a total of 3 times a year for 2 years. Each working group will have a post-doctoral associate associated with the group, and all three groups will work with a small technical core group to develop shared, open-access research products and tools, including a global database of food-energy-water indicators.

The groups' objective is to produce a global gap analysis that will provide a high-level assessment of research and data needs, as well as linkage needs between existing toolkits. Our vision is the development of an integrated decision-support tool that is fully integrated across food, energy and water; is scalable; and can both project alternative futures and accurately represent uncertainty moving forward.

As stated, the working groups aim to

- a. Establish a platform for definition of key knowledge gaps,
- b. Catalyze and disseminate research efforts to fill these gaps,
- c. Develop an open-source global database of WEFC indicators that can inform an integrated planning process that speaks to decision makers.

Knowledge Hub: In addition to the shared, open-access research products and tools produced by the working groups, the WEFC Nexus Network will also compile practice notes, reports on effective interventions, briefing papers, thematic topic papers, relevant publications, and sector-specific and cross-sector statistics.

Documents and practices will be crowd-sourced from experts in the network and vetted by the working groups and organized by the core technical team for easy access online. As the network grows, focus will be placed on developing a document base that includes geographical area-specific practices and knowledge in order to move beyond purely macro-level knowledge. Additionally, the WEFC Nexus Network will be linked and collaborate with other knowledge hubs in relevant fields and sectors.

Documents included in the knowledge hub include the following:

Practice Notes are designed to summarize and disseminate the knowledge and experiences of practitioners and academics working within WEFC Nexus community. Practice notes will focus on past interventions and initiatives, focusing on its aims, modes of delivery, monitoring and evaluation practices as well as the impact and sustainability of the initiative or project.

Effective Interventions Reports will summarize a local, national or international project or initiative that has, on the basis of a robust research methodology, been evidenced to advance a beneficial impact upon WEFC Nexus outcomes or processes (partnership, community engagement, etc.).

Briefing Papers will provide practitioners with succinct descriptions of emerging legislation, publications and key issues and topics in relation WEFC Nexus, giving timely and applicable information and advice with a focus on tangible, short and long-term impacts.

Thematic Topics will be chosen at the 2014 Nexus Conference for the Knowledge Hub and subsequently populated with relevant publications, statistics and other papers.

Nexus Steering Committee Members:

[Water Institute University of North Carolina:](#) The vision of the Water Institute at UNC is to bring together individuals and institutions from diverse disciplines and sectors and empower them to work together to solve the most critical global issues in water and health.

The unprecedented water crisis has created an extraordinary need for academic leadership in research, information, and education at the nexus of water and public health. The Gillings School of Global Public Health at the University of North Carolina at Chapel Hill recognizes that water is a linchpin of public health in the 21st century, and that we have both the unique opportunity and the responsibility to take our leadership role in water and health to a new level. The school's commitment is demonstrated by the creation and support of The Water Institute at UNC, one of the Gillings Gift strategic investments.

Research: we provide leadership and direction in tackling critical knowledge gaps that hamper progress in water, sanitation, health and development. We have developed a collaborative, forward-thinking research program built around the most urgent, important problems identified by our

partners, both in the US and across developing and developed nations. We proactively identify knowledge gaps and act early on emerging issues. Our research is not limited to technical solutions, but to innovations in policy, finance, and entrepreneurship that make business sense and lead to sustainable real-world progress.

Teaching: we leverage our ability for effective change. At UNC, and through innovative distance learning programs and hands-on learning, we help to fill the enormous global need for relevant, accessible training.

Knowledge Dissemination: we offer policy makers, practitioners, and the public and private sectors a place to turn for balanced, objective and relevant information on water, health and development. We work to ensure that funders and projects in the field benefit from the latest information on effectiveness and impact, and that scientific research is translated into cutting-edge work with the potential to transform the water and sanitation landscape in the US and the developing world.

Luc Hoffmann Institute: The work model brings together multi-disciplinary experts and thought leaders from academic institutions, think tanks, NGOs and the private sector; we then link these groups with policy and practice leaders from within and beyond the WWF network. This Collaborative Research Team structure, tied to a series of [Luc Hoffmann Institute Fellows](#) (globally advertised co-mentored research fellowships targeting elite post-doctoral researcher associates with deep roots in the places where our research is focused) provides a nimble mechanism for the rapid development of cross-disciplinary synthetic research products. We will use this model for a series of interlocking Collaborative Research Teams centred around a core team of Luc Hoffmann Fellows. This structure is ideally suited to take advantage of a wide range of partnerships that will need to come together to provide the capacity to work at scale, both in setting the global research agenda and in gathering the data needs.

The Luc Hoffmann Institute will lead the search for funding to support the three linked working groups, the associated with Luc Hoffmann Institute Fellows, and the Luc Hoffmann Institute post-doctoral Fellows associated with the project; all working with a technical hub to gather, assemble, translate and disseminate global WEFC indicators.

Stockholm Environment Institute: SEI is an independent international research institute. We have been engaged in environment and development issues at local, national, regional and global policy levels for more than 20 years.

SEI was formally established in 1989 by the Swedish Government and celebrated its 20th anniversary in October 2009. The Institute has established a reputation for rigorous and objective scientific analysis in the field of environment and development.

Our goal is to bring about change for sustainable development by bridging science and policy. We do this by providing integrated analysis that supports decision makers.

The Center for Development Research (ZEF): The Center for Development Research (University of Bonn) was founded in 1995 and started its actual research activities in 1997. ZEF's research aims at finding solutions to development-related issues. By covering three main research areas, which are interrelated through interdisciplinary research projects, ZEF offers a broad and integrated perspective on development. Since development is rarely constrained by a single problem within a single discipline, ZEF works on crosscutting themes of central importance for the developing world. The research programs build on the methods and analytical styles of the disciplinary research areas

and link and integrate knowledge and capacities from these different areas. ZEF's three research departments are:

- Political and Cultural Change (ZEF A)
- Economic and Technological Change (ZEF B)
- Ecology and Natural Resources Management (ZEF C)

Future Earth

UNESCO: Division of Science Policy and Sustainable Development