



Draft initial design report

17th April 2013

This report sets out the initial design of Future Earth, comprising a research framework and governance structure, preliminary reflections on communication and engagement, and capacity building and education strategies, and implementation guidelines.

This report was developed by the Future Earth Transition Team, a group of more than 30 researchers and experts from many countries and representative of the natural sciences, social sciences, and humanities, as well as from international organisations, research funders and business. Earlier drafts of its main sections have been circulated and presented for consultation in the process of designing Future Earth. Future Earth is expected to develop and evolve through a wider consultation process as the transition is made to its fully operational phase.

These recommendations suggest a direction for the Alliance of sponsors and the initial governance bodies of Future Earth to take the design and implementation forward.

*The following document is an excerpt of the Future Earth Draft initial design report
Pages 33 to 36*

Theme 2: Global Development

Knowledge for the pressing needs of humanity for sustainable, secure and fair stewardship of food, water, energy, materials, biodiversity and other ecosystem functions and services.

The research theme on Global Development will provide the knowledge needed to understand the links between global environmental changes and human well-being and development. In proposing this major research theme, Future Earth recognises a new ‘social contract’ between science and society that focuses global environmental change knowledge on the most pressing problems of human development – providing safe and adequate food, water, energy, health, settlements and other ecosystem services for all without degrading the environment, losing biodiversity or destabilizing the earth system.

This theme focuses on the more immediate challenges of sustainable development and meeting basic needs in contrast to theme 3, which addresses more fundamental and long-term transformations that are needed for global sustainability. It is important to emphasize that Future Earth focuses, here, on the intersection of human development with global and regional environmental change and the ways in which environmental research can help address development goals. Future Earth also recognizes the distinctive contributions of researchers who are already part of networks that address development issues at the local and regional scale and that development priorities and research needs vary by region and country. This is reflected in the missions of partners such as UNEP and UNESCO within the Alliance sponsoring Future Earth. In the consultations on Future Earth in the Asian, African, Latin American and Caribbean regions, a range of regional research priorities were highlighted that included coastal ecosystems and urban problems in Asia, food and water security in Africa, and biodiversity and disaster risks in Latin America and the Caribbean. The regional workshops also highlighted the challenges that Future Earth faces in responding to multiple goals, a variety of decision makers and diverse types of knowledge needs within an international research programme.

Global environmental change affects human well-being and social and economic development, just as development strongly influences the global environment. Human development in the Anthropocene is closely linked to the management of land, water, energy, materials, and natural resources; agricultural, forest and marine ecosystems; and the atmosphere and ocean. The international community has called for science to contribute to sustainable development agendas and most development institutions now recognize the importance of basic and applied environmental research. There is also a need, strongly emphasised in the Future Earth conceptual framework, to link sustainability in regions with changes at the global scale. These cross-scale interactions among complex social and environmental dynamics need to be understood in the pursuit of human development, reflected e.g., in the regional environmental change research of the Inter-American Institute for Global Change Research (IAI), the IRDR (Integrated Research on Disaster Risk) programme and PECS (the Programme on Ecosystem Change and Society) which focus on how local, regional and global changes interact. Future Earth will add value with research that shows how global environmental changes (e.g. in climate, air quality, biodiversity, oceans or soils) link to and underpin development, how development efforts can in turn add to global environmental

problems, and how global environmental change relates to issues of human security, gender equity, indigenous cultures and justice.

In combining international expertise, data and insights from both the global change and development communities, this theme will be particularly responsive to societal needs; it will contribute to a better understanding of the human dimensions of environmental change, and it will contribute to solutions in areas such as agriculture, water, and economic and technological innovation.

The Global Development theme builds on some of the efforts of the GEC Earth System Science Partnership (ESSP with its projects that include food, water, and health) and of other organizations in the Future Earth Alliance such as UNEP, UNU and UNESCO. For example, research on climate change risks to food systems has revealed many opportunities for reducing the vulnerabilities of tropical and temperate agriculture to climate change and for mitigating greenhouse gas emissions in the food system (e.g. Ingram et al 2010; ccafs.cgiar.org). Research-based innovations in governance and technology have shown how to increase water supplies across society through water reuse, markets, legal rights, behavioural change and social support systems (e.g. Bogardi et al 2011, UNESCO 2012). Knowledge about the environmental impacts and distributional effects of different energy sources can inform decision making about investments, locations and policies for providing safe and secure energy (e.g. GEA, 2012). Research shows that air pollution and the incidence of vector-borne diseases are influenced by interactions between climate variability, health interventions, infrastructure, and poverty, and that numerous points for intervention exist (Kovats and Butler 2012; Ramanathan and Feng 2009).

Extreme events pose significant threats to development, especially as the risks shift as a result of climate, land use and other global environmental changes. By better connecting global environmental change research to the disaster risk reduction research community and their stakeholders, Future Earth can inform efforts to reduce disaster vulnerabilities and damages and plan for safer settlements. The climate community has much to contribute in terms of forecasting extreme events and providing climate services, and ecologists, social scientists and engineers have knowledge essential to understanding changing patterns of vulnerability and options for reducing it (e.g. Asrar et al 2012; Schipper 2009; Thompson et al 2011).

An increasingly globalized trading system means that products are consumed in complex supply chains that transfer embodied carbon, water, genes, species, mineral resources and waste around the world, with implications for the global environment, well-being and human security that can be addressed through, for example, policies and governance interventions (e.g. Bradley et al 2011; Canadell et al 2010; Cordell et al 2009). Global commodity chains and price volatility also can translate climate or disaster impacts in one region to many others, contributing to new types of vulnerability (e.g., wheat price shocks in the global food supply chain following regional or local drought) that call for more innovative approaches to enhancing resilience to shock (Vermeulen et al 2012). The political and social driving forces for land use change also can have distant origins in commodity trade and conservation policies that have, for example, moved deforestation from one region to another or resulted in new demand for biofuels (e.g. Banse et al 2011; Foley et al 2011; Meyfroid and Lambin 2011; LUCC/GLP).

Biodiversity is a key to development, in that it provides the basis for fully functioning ecological and evolutionary systems, important for human well-being and economies, with the loss of biodiversity shown to undermine development (e.g. Cardinale et al 2012; Perrings et al 2011; and the freshwaterBIODIVERSITY and agroBIODIVERSITY projects). Increasing scientific evidence shows that stewardship of the atmosphere, biosphere, land and water is central to avoiding disastrous risks from global environmental change.

What types of research questions and projects can contribute to the Global Development research theme? The Future Earth transition team identified the following over-arching questions to illustrate potential research priorities that can be addressed by current, updated or new collaborative international efforts:

- What insights and innovations in basic earth, biological and social sciences are most important to the environmental bases of sustainable development?
- What are the patterns, trade-offs and options for equitable and sustainable use of resources and land, and how can we ensure sustainable access to food, water, clean air, land, energy, genetic resources and materials for current and future populations?
- What are the implications of global environmental change including climate change for food, water, health, human settlements, biodiversity and ecosystems? How can climate services, ecosystem management and disaster risk assessment reduce these impacts and build resilience?
- What are the links between biodiversity, ecosystems, human well-being and sustainable development?
- How socially and environmentally effective, efficient and equitable are alternative approaches for conceiving, measuring and implementing development projects and initiatives?
- How should Sustainable Development Goals be defined in order to enable the twin-goals of world development and global sustainability?
- What options are available to provide energy for all with reduced environmental impacts, and what are the social implications of these energy choices?
- How can the business and industrial sector contribute to development, prosperity and environmental stewardship through the management of their production and supply chains?
- How does global environmental change affect distinct groups in society such as Indigenous people, women, children, subsistence farmers, business, the poor or the elderly? How does their environmental knowledge contribute to solutions for sustainable development?
- What options are available in terms of ecosystem restoration to restore the environmental bases of sustainable development?

Although there are several global environmental change projects already focused on issues such as food and water security, ecosystem services, disaster reduction, health, and energy, Future Earth provides the opportunity to connect these projects to broader efforts within the Science and Technology Alliance for Global Sustainability and for projects that have not yet considered the sustainable development implications of their research to do so. Existing and new projects might come together to address the challenges of disaster risk reduction through climate services, ecosystem based adaptation and social vulnerability; to examine the interactions and trade-offs between land, biodiversity, energy, and water in ensuring food security; to provide the integrated knowledge required for major assessments and intergovernmental processes such as IPBES and CBD; and to create scientifically credible indicators of sustainable development. Other example areas where projects could cluster include a focus on the needs of particularly vulnerable populations in the context of the multiple environmental stresses or on methods and models for rigorous comparison, evaluation and systemic analysis of the environmental basis of development.

The Global Development theme will have the principle of co-design at its core with extensive discussions with international development organizations as well as regional and local groups to ensure a research agenda that is focused and solution oriented and that respects the knowledge that already exists in these communities. Cooperation with development agencies and communities can bring benefits to Future Earth that include international networks of field research and practitioners and experience with participatory approaches, vulnerable populations, local innovation, and project evaluation.

In summary, the Global Development theme brings together global environmental change researchers in existing and new partnerships with the development community and other stakeholders to identify and solve the basic needs for human development and security.