

How will Humanity Survive and Flourish on Future Planet Earth?

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In the past half century the world has changed in an unprecedented way. For the first time ever humans observed their planet from outer space. Our species also has become a geologic factor while beginning to interfere with natural forces in the Earth to a scale which can no longer be ignored. These caused geographic modifications at the Earth's surface and geographic maps begin to show more and more distinct human imprints. Simultaneously, our knowledge about the Earth has increased to a level that the Earth crust's anatomy and composition is increasingly known and that we begin to understand how our planet works. Knowing the basic principles of the Earth processes paves the way to forward modelling and more and more accurately predicting the impacts of human interaction with planet Earth. That, in turn, provides tools to anticipate on both assets and threats for an increasingly large and complex human population. As long as we remain dependent on our home planet societies should benefit more from such rapidly increasing knowledge to balance development with the Earth's bearing capacity. Here, we describe recent progress in our knowledge of the Earth and some trends in human development. In combination, these may point to knowledge-based options on how human societies may cope with potentials and limitations posed by planet Earth in view with the ambitions expressed by the Future Earth science initiative.

Planet Earth by itself is not in danger and humans will never threaten its existence for another 5 billion years. But human activities will continue and possibly aggravate impacting the biosphere, the hydrosphere, and to a lesser degree, also the geosphere. Dimensions of such changes will be determined by physical factors in the first place but ability of human societies to cope with such changes also depends on cultural diversity.

Five global trends in human development are discussed: population, urbanisation, living standard, environmental awareness and science & technology. Together these trends point to a growing need for physical space to accommodate future human ambitions. Science and technology trends demonstrate accelerating potential abilities of human society to address such needs. As we proceed in the Anthropocene the need to integrate humanity issues and the geosciences will further increase while reconfirming the growing relevance of the discipline of the Human Geosciences.

So far, the Earth sciences play a modest role in the Future Earth initiative. That is in sharp contrast with global ambitions to arrive at a Green Economy, as expressed in Rio+20, to be developed in balance with the Earth's bearing capacities. Recent progress in geoscientific and technological research demonstrate the potential of such development. This has been widely exposed during the International Year of Planet Earth (IYPE, 2007-2009). This global initiative was proclaimed by the UN and was particularly successful in its outreach programme. In turn, the IYPE served as a model for developing the International Year of Global Understanding, spearheaded by the IGU, and for the UN Year of the Soil (2015).

Human ingenuity spurred discovery of larger natural resources than ever before to drive our economies to unprecedented heights. Future Earth might mobilize the brain powers accumulated in the heads of 400,000 Earth scientists around the world towards a sustainable economy.