

## **Title**

What are the resources required to fulfil human needs? Analysis of past trends and future research agenda

## **Summary**

All human societies require environmental resources, in the form of energy, materials and land, to survive and flourish. However, the exact level of resource requirements may be difficult to estimate, since it can depend on many factors: local biophysical conditions, such as climate or available crops for food; technological options and efficiencies for delivering key services; but also socio-economic parameters, including consumption levels and inequality in distribution. This talk will present recent advances in the international study of resource and energy requirements for human needs. An agenda for analysing the resource requirements to fulfil universal basic human needs will then be presented. This agenda must take into account socio-economic as well as technological choices, since the decoupling required to fulfil human needs within planetary boundaries most likely requires a fundamental re-organisation and re-orientation of many socio-economic activities.

## **Extended Abstract**

All human societies require environmental resources, in the form of energy and materials, to survive and flourish. However, the exact level of resource requirements may be difficult to estimate, since it can depend on many factors. These factors include: local biophysical conditions, such as climate or available crops for food; technological options and efficiencies for delivering key services; but also socio-economic parameters, including consumption patterns, levels and inequality in distribution. This talk will present recent advances in the international study of resource and energy requirements for human needs. An agenda for analysing the resource requirements to fulfil universal basic human needs will then be presented. This agenda must take into account socio-economic as well as technological choices, since the decoupling required to fulfil human needs within planetary boundaries most likely requires a fundamental re-organisation and re-orientation of many socio-economic activities.

The review part of this work will summarise different strands of relevant research. The first of these encompasses the types of human well-being (subjective and objective) generally considered in social science research and applied in ecological economics. Several indicators for environmental efficiency of well-being delivery have been proposed in the literature, and I will discuss these: the Happy Planet Index, based on Happy Life Years and the Ecological Footprint, (nef 2012); Environmental Intensity of Human Well-Being (Dietz, Rosa et al. 2009, Jorgenson 2014) and its variants (Knight and Rosa 2011), the Human Sustainable Development Index (Togtokh 2011). Beyond indicators, research into the links between environmental resource use and human well-being has revealed some interesting results to date, regarding the types and trends of relationships between wellbeing, economic growth and resource use, and I will summarise this briefly (Steinberger and Roberts 2010, Knight

and Rosa 2011, Steinberger, Roberts et al. 2012, Dietz and Jorgenson 2014, Jorgenson 2014, Lamb, Steinberger et al. 2014).

Building on this overview of past findings, I will then propose elements of a new research agenda for ecological economics focussing on well-being. The ultimate goal of this research is the robust understanding of links between environmental resource use and delivery of human well-being, as well as the possibilities of decoupling. This research should encompass the role of social organisations, political structures and economic institutions in mediating between levels of resource use and well-being, thus building on the work of Max-Neef and colleagues on satisfiers of human needs (Cruz, Stahel et al. 2009), as well as Gough & Doyal on the social mechanisms and economic institutions in addressing human needs (Doyal and Gough 1991, Gough 1994, Gough 2013).

This research should also consider the role of technology choices and harnessing efficiency and productivity in the satisfaction of human well-being. The analysis of supply chains (primary, final and energy services, for instance (Cullen, Allwood et al. 2011)), material, energy and carbon footprinting (Lenzen, Wier et al. 2006, Peters 2010, Wiedmann, Schandl et al. 2013) and household consumption patterns (Rao and Baer 2012) will thus be of considerable importance. The inequality of distribution of environmental resource use, as determined by these supply chain analyses, will be of particular interest, since (in)equity is likely to play a large role in the effectiveness with which a society can enable its inhabitants to achieve sufficient well-being. Alongside the inequality analysis, 'floors' and 'ceilings' of resource use for well-being deliveries should be determined: how much is enough, and how much is too much (Chakravarty, Chikkatur et al. 2009)? Despite being difficult, ecological economics should seek to elucidate these levels. The potential conflict between the right to development and the necessary access to sufficient levels of modern energy use, on the one hand, and climate change mitigation and resource scarcity, on the other, should become an active area of research (Chakravarty and Tavoni 2013, Edenhofer, Steckel et al. 2014, Jakob, Steckel et al. 2014, Pachauri 2014, Rao, Riahi et al. 2014).

This research agenda is truly interdisciplinary, since it seeks to combine the economic, social and political bases of well-being delivery, alongside technical and supply chain (footprinting) efficiency potentials. The necessary decoupling of the satisfying human needs from environmental resource requirements is likely to require a major restructuring of our economic activities and political structures, and ecological economics has a key role to play in this.

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