

## Global change, rural development and diminishing resources: how to feed 10 billion people?

Hans Hurni, National Centre of Competence in Research (NCCR) North-South,  
University of Bern

**Global change is intimately linked to rural development:** While climate change dominates the discourse on global change at the international level and is mainly led by industrial countries, there are many more processes of global change that appear to be local in nature and impact, but have accumulated to global threats particularly since the 1950s. Most prominent among these processes are: economic development, demographic development, land use and cover change, changes in ecosystems and biodiversity, soil and water processes with effects on agricultural production and ecosystems, including desertification in dryland areas as well as soil and water degradation in all climate zones. About a third of the earth's land is responsible for the production of food, feed, fibre and fuel ('the 4 Fs') for humankind and its livestock, apart from forest and fishery products to be mentioned as well.

**Rural development needs more attention:** While urban areas are characterised by high rates of economic and infrastructural growth, about 40% of the human population is still living in agriculture and therefore in rural areas, and it is unlikely that this absolute number of currently half of the world's population, or 3.5 billion people living in rural areas, will become less in numbers in the coming 40 years, while most population increases will be observed in the urban areas. The rural population is mainly employed in farming, which is the single most important occupational sector world-wide. More than 99% of all farmers are living on small-scale farms, while only 1% lives on large-scale, mechanised farms, although the latter cultivate about 50% of all cropland and produce about 75% of all cereals globally. Relating to climate change, more than 25% of all greenhouse gas emissions originate from deforestation and land conversions, this being the single most important sector contributing to global warming, more than the energy or mobility sectors. On the other hand, agriculture offers a very high potential for carbon sequestration and could become carbon neutral at the global scale, provided that innovation and investment is made in the coming decades. More innovation is needed in rural development in general and in the agricultural production sector in particular, in order to transform rural systems and to sustainably manage natural resources.

**Agriculture can feed 10 billion people:** Most of the rural territory is occupied by agriculture, be it grazing land, cultivated land, tree plantation land or other land uses associated with the production of 'the 4 Fs' mentioned above. It has been recognised that the most critical, but also the most potential component of agriculture is small-scale farming. The basic questions in relation to agricultural development by 2050 that were raised during the International Assessment of Agricultural Science and Technology for Development (IAASTD), which took place from 2003-2008 and involved over 400 specialists world-wide, were:

- How will sustainable agriculture look like in 2050?
- What will be the development of biofuel production?
- How will be the development of biotechnology in relation to agriculture?
- What is the relationship between agriculture and climate change?
- What health problems are associated to human well-being, plants and animals?

- How will natural resources be used and their quality and extent maintained?
- How will the small-scale farm sector transform?
- Will local knowledge maintain its importance?
- What is the role of women in agriculture, and how can gender-balance be reached?
- What options for action exist at the different levels of decision-taking?

It appeared in the assessment that agricultural transformation can be achieved in the framework of rural development only. Thereby, agricultural production will need to be enhanced particularly for small-scale farming, but this cannot go without improvement of infrastructure and market transaction, more agricultural research focused on small-scale farming, sustainable management of natural resources between agriculture, protected areas and forestry, and also not without improvements of rural settlements and transport systems. Agriculture in this interactive system will need to be multifunctional, serving not only the productive component, but equally fulfilling ecological and social services. In order to realise this, financial transactions will be needed from urban economic areas to rural areas, as the former largely depend on the latter.