

# Scientists develop tool to help communities stay environ mentally and socially 'healthy'

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An example of subsistence farming in China. Credit: University of Southampton

Geographers at the University of Southampton have developed a new way to measure the 'health' of poor regional communities. They aim to improve the wellbeing of people by guiding sustainable development practices to help avoid social and environmental collapse.

The researchers have pioneered a methodology that examines the balance between factors such as; standards of living, natural resources, agriculture, industry and the economy. The results help identify critical limits, beyond which regions risk tipping into ecological and social downturn, or even collapse.

The project is supported by the UK Government through the Ecosystem Services for Poverty Alleviation (ESPA) research programme.

Professor John Dearing, who led the research, comments: "People living in a region need to consume some of its resources to satisfy basic needs, such as clean water, food, [health services](#) and education. However, if the balance tips too far and the impact of this consumption out-strips resources, people's welfare and wellbeing can be hindered rather than helped.

"We have found a way of defining a 'safe space' for communities to consume resources and operate within – particularly with regard to poor rural areas in developing nations. This 'safe space' has been theorised in the past on a global scale, but by downscaling it to a regional level, we have been able to shape it into a practical tool providing crucial data for decision makers."

Firstly, the scientists use local survey statistics to examine the state of a region's social foundation, covering factors like health, [clean water](#), income levels and education. They couple this information with environmental monitoring records to establish the health of its ecology and whether or not collapse is a risk. For example, a lake region suffering stagnation of its water might be one form of environmental collapse.

The information the researchers examine dates back over several decades to identify long-term trends. By combining all the data, they can

model scenarios for the future, which can help regional managers to make informed decisions.

Professor John Dearing says: "You could think of our 'safe operating space' as the hole in a doughnut, with everything operating in the middle maintaining a relatively healthy balance. However, anything pushing out beyond the ring might upset the balance and tip a community beyond sustainable levels."

The Southampton team trialled their technique in two rural agricultural communities in China; Shucheng County and Erhai Lake. They found that in both cases agricultural intensification had led to a reduction in poverty, but at the expense of the environment.

The results showed water quality is poor in both regions, along with inadequate sanitation and piped water. This underlines the link between agricultural and environmental markers (such as [water quality](#)) and social factors (such as sanitation) and how they are closely interrelated and affect one another. It also emphasises the value of a tool to bring together diverse data to give a clear, full picture of a region's [health](#).

**More information:** 'Safe and just operating spaces for regional social-ecological systems' is Open Access, published in *Global Environmental Change*: [www.sciencedirect.com/science/.../ii/S0959378014001174](http://www.sciencedirect.com/science/.../ii/S0959378014001174)

Provided by University of Southampton

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