



1.1 Sharing or sparing?

KOEN KUSTERS

In recent years a fierce debate has unfolded among scientists on how to best combine the goals of biodiversity conservation, rural development and global food security. Some argue for investments in high-tech industrial agriculture. This would lead to more efficient land use, allowing for increased food production while sparing land for wild nature. Others argue that agriculture and nature need to share the same space, stressing the need to invest in smallholder, environmentally friendly farming. This article reveals that the so-called sparing-sharing debate is a discussion that is heavily laden with values, and that the landscape approach may offer a practical solution.

One objective, two approaches

One approach to meeting the rapidly increasing global demand for agricultural products without causing biodiversity loss is to further intensify and mechanize agricultural production. It is claimed that this will not only raise production but also protect biodiversity, as it ensures more efficient use of scarce lands. It implies setting aside and giving protected status to as many intact ecosystems as possible, while intensively growing crops in industrial agricultural systems on the remaining land. Crop diversity in these farming systems is usually low, individual fields are large, and there is heavy reliance on external inputs.

But this industrial agriculture has its critics. They point at the negative consequences, such as the heavy use of agrochemicals and farmers' dependency on large corporations. They also emphasize that much of the world's biodiversity is found outside of nature reserves and that the habitats of several species extend over large areas, including both reserves and agricultural land. Moreover, promoting intensification does not necessarily increase the amount of land spared for nature; when intensification attracts a growing number of migrants and creates new business opportunities it may have the opposite effect. The



A LANDSCAPE APPROACH HELPS TO UNDERSTAND THE MULTI-FACETED SERVICES PROVIDED BY NATURAL FORESTS, PLANTED TREE-BASED SYSTEMS AND AGRICULTURAL FIELDS.

critics of industrial agriculture call for an alternative model of agricultural development, based on environmentally friendly smallholder farming and on integrating rather than segregating agricultural production and biodiversity conservation. Such environmentally friendly agricultural landscapes are heterogeneous and typically include native vegetation. Agricultural fields are relatively small, the diversity of planted crops is large, and the use of agrochemicals is limited.

Food security

With the world's population expected to reach 9.6 billion in 2050 (United Nations 2013), the security of people's access to food is a major global challenge. This has given rise to the idea that the further development of high-tech intensified agriculture is indispensable to achieve the necessary increase in agricultural yield. There are, however, several arguments against industrial agriculture as a means of achieving global food security:

- Hunger is not a result of too little production or yield. Although about one billion people are classified as "hungry," an equal number of people are overweight (FAO 2009; Pinstrup-Andersen 2006, cited in Sunderland 2011). Food insecurity is first and foremost a problem of unequal distribution. Moreover, there is widespread and unnecessary loss of food. The Institution of Mechanical Engineers, for example, estimates that 30–50% of all food produced on the planet is lost before reaching a human stomach (Imeche 2013).
- When farmers no longer produce a variety of products for local trade and subsistence purposes they become increasingly dependent on purchased food products. An increasing number of people in the world suffer from deficiencies in micronutrients due to high consumption of cereals and simplification of diets (Frison et al. 2006, cited in Sunderland 2011).
- Much of the current expansion of large-scale industrial agriculture is uncontrolled, due to a lack of appropriate legislation and spatial planning to safeguard the interests of local communities and the local environment. It favours land concentration in the hands of a few large-scale corporations that produce crops for export, and negatively affects local food sovereignty.
- Conventional intensification depends heavily on the use of pesticides and chemical fertilizers, which have a range of side effects on agro-biodiversity. These include negative effects on natural pollinators and the natural enemies of pests. The biodiversity in agricultural landscapes is also important as a pool of genetic material.
- Industrial agriculture depends on fossil fuels, which compromises its viability in the longer term. Producing food for more than nine billion people with conventional agriculture will quickly exhaust global oil reserves (Tittonell 2013). In addition, the high costs of external inputs make local farmers dependent on retailers, money-lenders or state subsidies (United Nations 2011).

The productivity question

A frequent argument against small-scale, environmentally friendly agriculture is that it yields less than industrial agriculture, and is therefore not able to feed the growing world population. It has been claimed that efforts to make agricultural practices more environmentally friendly will ultimately compromise yields and global food security (Godfray 2011). Sir David King, President of the British Association for the Advancement of Science, even claimed that by supporting indigenous and organic agriculture and rejecting modern technologies (such as genetic technologies), Western NGOs are effectively hampering the improvement of the lives of millions of people in Africa (Henderson 2008). According to such critics, the rich and well-fed consumers of the developed world are blinded by romantic nostalgia for the traditional farming lifestyle of the past.

Others argue that high yields and high biodiversity may very well coexist in smallholder systems, and that smallholder systems may even be more productive than large-scale industrial systems. Several studies suggest that technologies with low external inputs in diverse agricultural systems improve productivity (Pretty et al. 2006; Badgley et al. 2007; Foley et al. 2011). It has also been stated, however, that these studies do not compare alternative technologies against appropriate control systems, i.e., organic best practices versus conventional best practices (Phalan et al. 2011).

A religious discussion?

The debate about rural development in forested landscapes is polarized. The range of opinions is partly explained by differences in criteria and levels of analysis. This in turn is related to professional backgrounds and conceptual models. Fischer et al. (2008) convincingly argue that the land-sparing view is based on a binary view of landscapes, with little concern for ecological interactions between nature and agriculture, while the sharing argument is based on a conceptual model that emphasizes the interactions between people and nature in complex social-ecological systems.

Values and world views also affect the discussion. For example, the sharing view is based not only on factual arguments (e.g., about functional biodiversity), but also on the intrinsic value that its proponents attribute to diversity in landscapes and the idea that people need to be reconnected to their food and natural surroundings. Furthermore, many proponents of environmentally friendly farming, implicitly or explicitly, criticize the growing influence of corporate entities and reliance on modern technologies, while the advocates of further intensification of agriculture place much greater trust in markets and technological progress.

Ideas about urbanization also differ. During interviews with international experts conducted as part of a study for the Rich Forests initiative, Louise Fresco¹ noted that “we should not forget that there is a huge exodus going on – young people are leaving the rural areas in great numbers...These people are looking for livelihood security outside of agriculture” (Kusters and Lammers 2013: 16).

Referring to the same phenomenon of rural-urban migration, Ivette Perfecto² said: “...the majority of the poor are still living in rural areas and... many of the people who live in cities have been pushed out of the countryside because of agricultural policies that favour large-scale agriculture” (Kusters and Lammers 2013: 17). Fresco and Perfecto have different interpretations of what is happening on the ground and where things are (or should be) heading. Where Fresco envisions specialized rural areas producing products for growing urban populations, Perfecto envisions multifunctional landscapes that include human settlements, agricultural fields and natural vegetation, producing food for local and regional markets.

Notions about what development should look like are influencing the sharing-sparing discussion. In some ways the debate resembles a religious discussion, with believers and non-believers. In any scientific debate on the future of rural development the underlying conceptual models, values and world views should be made explicit. Only then can scholars, policymakers, practitioners and activists have a constructive discussion that allows them to express their ideals while distinguishing these ideals from scientific facts. At the same time there is a need for a more practical perspective – one that does not ignore the great variety of landscapes, ideals and interests that exist in the real world, but instead regards this diversity as a starting point. The landscape approach might provide that perspective.

Looking at the landscape

The sharing-sparing dichotomy simplifies a complex reality of diverse landscapes and landscape dynamics. Moreover, many of the world’s agricultural landscapes are somewhere in between the two ends of the spectrum. The future of rural development is not a matter of either/or. The appropriateness of various land-use options (large-scale or small-scale, high-input or low-input, polyculture or monoculture, etc.) depends first and foremost on the features of the landscape: the local ecology, socio-cultural context and history (Fischer et al. 2008). This includes the area’s topography, historical land ownership patterns, current land uses, presence of endangered species and vicinity of urban areas, as well as societal preferences and governance arrangements. When considering the options for rural development, costs and benefits should therefore be assessed at the level of the regional landscape.

The term *landscape approach* refers to interventions in rural areas that are aimed at optimizing relations among the various land-cover types, institutions and human activities at the spatial scale of the landscape. It is meant to identify – for instance, through multi-stakeholder negotiations – the interventions and policies that best reconcile the often conflicting goals of different stakeholders. The navigation of trade-offs at the landscape level is not merely a technical issue, but a long-term multi-stakeholder process that is likely to require social and institutional changes (Sayer 2009).

Working at the landscape level means that there is a need to step away from any blueprint for agricultural development. A landscape approach helps to understand the multiple and multi-faceted services provided by natural forests, planted tree-based systems and

agrarian systems. It also helps to recognize the interactions of these systems, and how they relate to local livelihoods and development aspirations. It is at this spatial scale that the implications of various land-use options can best be understood and the trade-offs between conservation and development objectives can best be negotiated.

For more information

This article is based on a study conducted for the Rich Forests initiative, which is a partnership between the Amsterdam-based NGO Both ENDS and two international NGO networks: the Non-Timber Forest Products Exchange Programme for South and South-East Asia (NTFP-EP) and the International Analog Forestry Network (IAFN). Rich Forests aims to contribute to the conservation and restoration of forest resources and the promotion of sustainable rural livelihoods. The study's full report (Kusters and Lammers 2013) is available at www.richforests.org.

Endnotes

1. Professor Louise O. Fresco is University Professor at the University of Amsterdam. She was appointed President of the Executive Board of Wageningen University & Research Centre as of 1 July 2014.
2. Ivette Perfecto is Professor of Ecology and Natural Resources at the University of Michigan, Ann Arbor, Michigan.

References

- Badgley, C., J. Moghtader, E. Quintero, E. Zakem, M.J. Chappell, K. Aviles-Vazquez, A. Samulon and I. Perfecto. 2007. "Organic agriculture and the global food supply." *Renewable Agriculture and Food Systems* 22: 86–108.
- FAO (Food and Agriculture Organisation). 2009. *1.02 billion hungry: one sixth of humanity undernourished — more than ever before*. Rome: FAO. www.fao.org/news/story/0/item/20568/icode/en.
- Fischer, J., B. Brosi, G.C. Daily, P.R. Ehrlich, R. Goldman, J. Goldstein, D.B. Lindenmayer, A.D. Manning, H.A. Mooney, L. Pejchar, J. Ranganathan and H. Tallis. 2008. "Should agricultural policies encourage land sparing or wildlife-friendly farming?" *Frontiers in Ecology and the Environment* 6: 380–385. doi:10.1890/070019.
- Foley, J.A., N. Ramankutty, K.A. Brauman, E.S. Cassidy, J.S. Gerber, M. Johnston, N.D. Mueller, C. O'Connell, D.K. Ray, P.C. West, C. Balzer, E.M. Bennett, S.R. Carpenter, J. Hill, C. Monfreda, S. Polasky, J. Rockstrom, J. Sheehan, S. Siebert, G.D. Tilman and D.P.M. Zaks. 2011. "Solutions for a cultivated planet." *Nature* 478: 337–342.
- Frison, E.A., I.F. Smith, T. Johns, J. Chérfaş and P. Eyzaguirre. 2006. "Agricultural biodiversity, nutrition and health: making a difference to hunger and nutrition in the developing world." *Food and Nutrition Bulletin* 27(2): 167–179.
- Godfray, H.C.J. 2011. "Food for thought." *Proceedings of the National Academy of Sciences* 108 (50): 19845–19846.
- Henderson, M. 2008. "Green activists 'are keeping Africa poor.'" *The Times Online*, September 8, 2008. www.thetimes.co.uk/tto/environment/article2144020.ece.

- Imeche (Institution of Mechanical Engineers). 2013. *Global Food: Waste Not, Want Not*. London: Imeche.
- Kusters, K. and E. Lammers. 2013. *Rich Forests: The future of Forested Landscapes and Their Communities*. Amsterdam: Both ENDS. www.richforests.org/publications.
- Phalan, B., A. Balmford, R.E. Green and J.P.W. Scharlemann. 2011. "Minimising the harm to biodiversity of producing more food globally." *Food Policy* 36, Supplement 1: S62–S71.
- Pinstrup-Andersen, P. 2006. "Agricultural research and policy to achieve nutrition goals." *Poverty, Inequality and Development* 1: 353–370.
- Pretty, J.N., A.D. Noble, D. Bossio, J. Dixon, R.E. Hine, F.W.T. Penning de Vries and J.I.L. Morison. 2006. "Resource-conserving agriculture increases yields in developing countries." *Environmental Science & Technology* 40: 1114–1119.
- Sayer, J. 2009. "Can conservation and development really be integrated?" *Madagascar Conservation & Development* 4 (1): 9–12.
- Sunderland, T.C.H. 2011. "Food security: Why is biodiversity important?" *International Forestry Review* 13(3): 265–274.
- Tittonell, P.A. 2013. *Farming Systems Ecology: Towards ecological intensification of world agriculture*. Inaugural lecture upon taking up the position of Chair in Farming Systems Ecology at Wageningen University, 16 May 2013. www.wageningenur.nl/upload_mm/8/3/e/8b4f46f7-4656-4f68-bb11-905534c6946c_Inaugural%20lecture%20Pablo%20Tittonell.pdf.
- United Nations. 2013. *World Population Prospects: The 2012 Revision, Key Findings and Advance Tables*. United Nations, Department of Economic and Social Affairs, Population Division. Working Paper No. ESA/P/WP.227.
- United Nations. 2011. *Agroecology and the Right to Food*. UN General Assembly Human Rights Council. www.srfood.org/index.php/en/component/content/article/1-latest-news/1174-report-agroecology-and-the-right-to-food.