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FOR INTERNATIONAL DEVELOPMENT

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Briefing
From the Development&EnvironmentGroup

Sustainable agriculture for poverty reduction and food security

By 2050, the demand for food could increase by 70 per cent. Together with increased natural resource scarcity, climate change, environmental degradation and persistent hunger, this means that 'business as usual' in the agricultural sector is not an option. Small-scale farming produces more than 50 per cent of the world's food, and provides a livelihood for 70 per cent of the world's poor people; urgent action is needed to place sustainability and poverty reduction at the heart of the global food system.

The rationale for sustainable agriculture

Agriculture provides humans with food, fuel and fibre. Nature is the platform for agricultural production, supplying the genetic material for crops and livestock, and performing vital ecosystem services such as pollination, water regulation, pest control and soil fertility.

But agriculture is also a driver of environmental degradation. It erodes soils, pollutes and overexploits water, and converts natural habitats into farmland. Land-use change and agriculture together account for about a third of the world's greenhouse gas emissions. Without radical change, the global food system will continue to contribute to climate change, destroy biodiversity and consume natural resources at an unsustainable rate. "Nothing less is required than a redesign of the whole food system to bring sustainability to the fore".[1]

Most of the world's poor people depend on agriculture and related activities for their livelihoods. Communities who rely directly on natural resources are at the front line of climate change impacts. Almost one billion people are already hungry or malnourished and this number will grow as the impacts of climate change increase.

The sustainable management of natural assets is a key strategy to escape poverty. But weak governance, inappropriate policies and insecure land tenure all contribute to the vulnerability of small-scale farmers.

What is sustainable agriculture?

Agriculture is sustainable if resources are used at a rate that does not exceed the capacity of the earth to replace them.

Sustainable agriculture involves developing farming systems that are environmentally sound, profitable and productive, and that support social and economic development. Typically this includes:

- enhanced internal nutrient cycling, minimising the need for chemical inputs;
- improved soil quality through the addition of organic matter and reduced soil erosion;
- increased biodiversity to promote natural systems of pest control and fertility enhancement; and
- alternative ways of marketing that increase profits and minimise overhead costs.

In practice, sustainable agriculture relies on a number of techniques to increase resilience,

Key issues:

The current global food system is unsustainable and failing poor people.

The debate on its future suffers from two critical myths — chemical intensification is the only way to enhance productivity as the global population rises, and sustainable agriculture cannot achieve the productivity improvements required.

Increasing evidence on the performance and resilience of sustainable agriculture demonstrates the need to fundamentally re-orient agriculture, both strategically and technically.

This evidence highlights the need to change from an input-intensive approach to one that is knowledge-intensive.

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productivity and profitability. These include integrated pest management, conservation agriculture, agroforestry, organic agriculture and enterprise diversification. Research increasingly demonstrates the superiority of these practices compared with their chemical equivalents. For example, organic agriculture can be more productive than conventional systems, producing an average 80 per cent increase in yield in developing countries.[2]

Implications for development

Achieving sustainable agriculture is challenging and there are trade-offs and difficult decisions.

Strategic issues

Investing in agriculture to reduce poverty. Agriculture forms the basis of rural economies throughout the developing world. About 70 per cent of the world's poor people live in rural areas, where small-scale farming is the mainstay of livelihoods.

Investing in agriculture can have an enormous poverty reduction pay-off, owing to agriculture's importance in food security and poor countries' economic dependence on agriculture. The World Development Report[3] states that "agriculture continues to be a fundamental instrument for sustainable development and poverty reduction … and improving the productivity, profitability and sustainability of smallholder farming is the main pathway out of poverty".

Agriculture can also stimulate growth in other areas[4] making investment excellent 'value for money'. The International Assessment of Agricultural Knowledge, Science and Technology for Development[5] stresses that low-input, agroecological approaches should be a particular priority for poverty reduction.

Increasing resilience. Sustainable agricultural systems have demonstrated increased resilience in adverse climates, as well as increases in productivity and profitability. In Central America studies found that after Hurricane Mitch in 1998 organic farms lost less topsoil, suffered less from gullying and erosion, and experienced lower economic losses than conventional farmers.[6]

Sustainable agricultural approaches can facilitate better integration of risk management, particularly climate risks. For example in Indonesia and the Philippines, climate field schools give farmers access to seasonal climate forecasts, increasing their capacity to interpret and make decisions based on these. 78 per cent of farmers involved felt that their ability to integrate climate information into their cropping strategies had increased significantly.[7]

Land tenure. Secure land tenure is fundamental if farmers and herders are to make long-term investments in the sustainability of their production systems. Land tenure systems vary widely across developing countries, from individual titles to common property management. Insecure common property land tenure can lead to unsustainable management, over-exploitation of resources and degradation. Studies in Ethiopia show that communities with more secure land tenure tend to invest more in their land.[8] The lack of formal recording of common property land rights, and weak recognition in many national legal systems, mean communal land can be more vulnerable to land seizures.

Agricultural research and advisory systems. Research and advice are an important 'input' for farmers. Agricultural research and advisory systems have historically been very top-down, with research activities being designed by scientists and then extended to small-scale farmers through training. The emphasis has often been on high-input agriculture, stressing chemical inputs and credit.

Farmers' priorities have not informed research; for example in Africa, cassava, sorghum and millet — the main food staples — have received relatively little research attention, and other indigenous crops virtually none.

Participatory approaches to agricultural extension, such as farmer field schools and farmer-to-farmer dissemination, challenge this model. They treat farmers as clients and focus on their priorities. Research and advisory services need to be transformed through these approaches if they are to promote sustainability in the agricultural sector.

Technical issues

Biodiversity loss. The conversion of natural habitats for agriculture has been a main driver of biodiversity loss.[9] This decline in biodiversity and the degradation of natural systems threaten the sustainability and resilience of agricultural systems and food supply. For example, it is estimated that about three-quarters of the genetic diversity found in agricultural crops has been lost in the last century.

Water security. Agriculture uses approximately 70 per cent of global water supplies and the world's demand for freshwater is projected to increase by more than 30 per cent by 2030.[9] In developing countries 85 per cent of freshwater withdrawals are for agriculture,

mainly for irrigation.[5] The Green Revolution of the 1970s, which doubled the production of many food crops, was accompanied by a trebling of water consumption — a pattern that cannot be replicated in future efforts to increase food production.

Climate change is further exacerbating pressure on water resources by changing rainfall patterns. Poor communities are frequently left most exposed to these increasing water problems.

Agrochemical use. The need to reduce the dependence on fossil fuel-based inputs, such as chemical fertilisers and pesticides, is a central feature of sustainable agriculture. Relying on these finite and increasingly expensive inputs has economic implications.

Chemical fertiliser use is associated with high emissions of nitrous oxide (which has a global warming potential 296 times that of carbon dioxide), soil degradation, and eutrophication of freshwater and marine environments. Pesticides have been identified as a significant cause of ill health, increased pest resistance and environmental degradation. They have also been implicated in the phenomenon of bee colony collapse disorder, which has compromised the productivity of a third of the global food crops that rely on bees for pollination services — a service estimated to be worth US$141 billion per annum.[11]

The threat of unsustainable 'solutions' to climate change

A number of initiatives have been proposed as responses to climate change and the challenges it poses to global food security. These include wider application of genetically modified crops, replacing fossil fuels with biofuels and including soils in carbon trading mechanisms.

There are important science-based concerns with all these responses. Genetic modification can have hard to predict unintended consequences, which threaten biosafety, and it has failed to generate the yield increases anticipated. Biofuels have caused food price rises and driven rainforest destruction.[12]

Without satisfactory monitoring, reporting and verification systems, current proposals to extend carbon trading to include soils threatens to further marginalise the small-scale sustainable and organic producers.

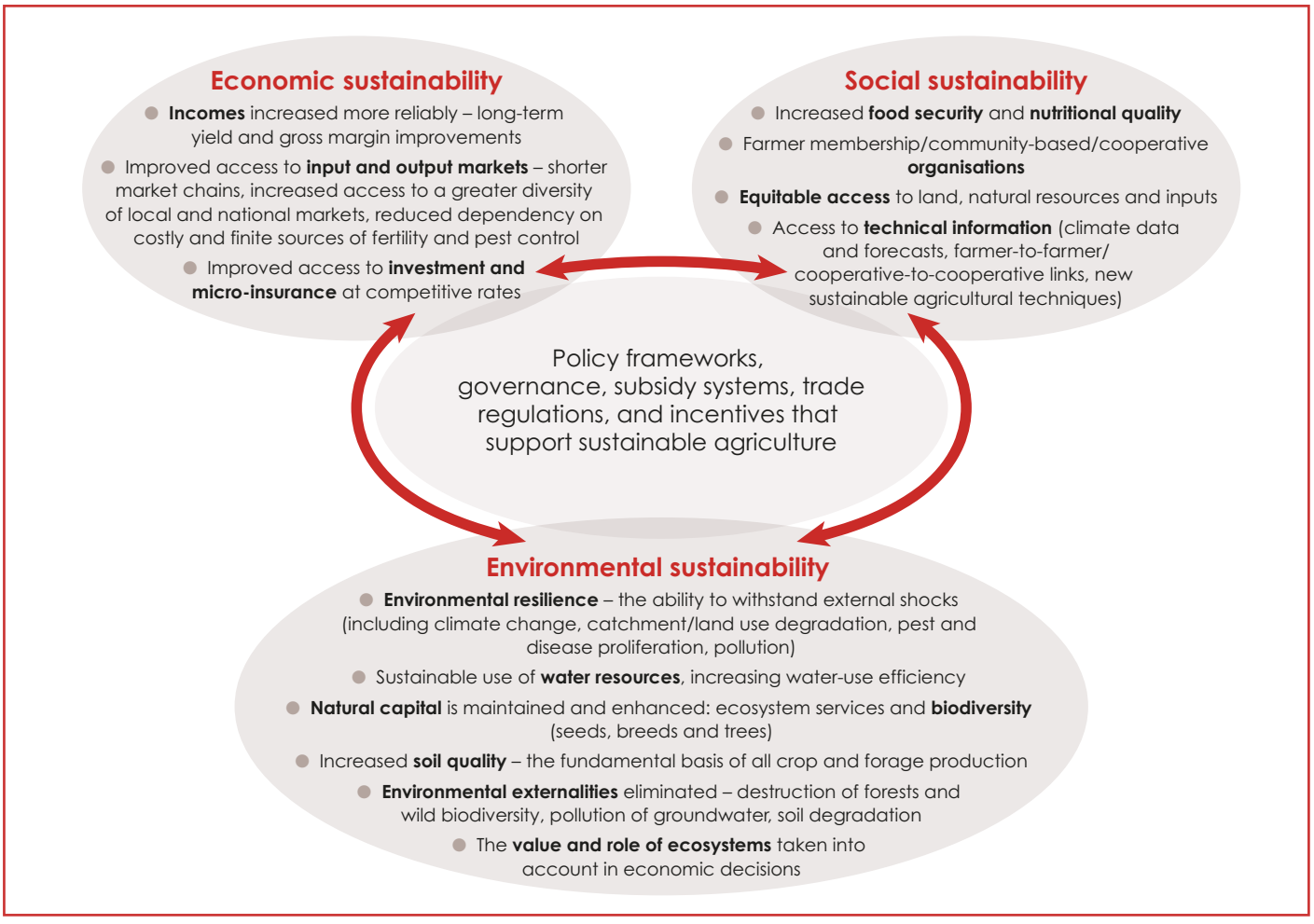

Figure 1. Social, environmental and economic aspects of sustainable agriculture

And as temperatures increase soils may become net emitters of carbon.

Conclusions and recommendations

Global limits to agricultural sustainability are already being breached, with unpredictable system-wide consequences. Proposed agricultural investments need to be informed by analysis of:

- ecological carrying capacities, including water resource availability;
- the potential impacts on ecosystem services;
- the potential impacts on human populations who use these services, particularly with respect to the gender dimensions of natural resource management; and
- the impacts of and on climate change.

The potential impacts on poor people demand a particular emphasis, as these people often depend directly on ecosystem services and natural resources to meet their basic needs and construct their livelihoods. It is essential that governments and donors recognise the value of ecosystems and biodiversity and take them into account in economic decision-making processes.

Any food and farming strategy should be based on securing the basic human right to adequate food and good health, and on reducing the global environmental impacts of the food we produce and consume. The underlying causes of inequalities in the food system, such as unfair trade and subsidy systems, need to be addressed to promote sustainable agriculture and ensure food security for poor people.

Support that maximises the potential for small-scale farmers to enhance their food security, protect the environment and adapt to climate change adaptation through knowledge-intensive sustainable agriculture should be prioritised. This implies a fundamental change in the way research and advisory services are designed and delivered. Transforming agricultural policies, research and extension systems so that they are driven by the priorities of sustainable farmers and herders, rather than global bureaucracies and corporate interests is a priority.

There is an urgent need for better land and water use planning at national and local levels. Agricultural land use should be planned according to water availability, incorporating analysis of potential climate impacts.

Land rights and sustainable access to land are key for improving food security for poor people. With the right policy and governance frameworks, smallholders and poorer farmers could benefit from the increasing global demand for agricultural products and energy. But safeguards need to be put in place to protect the rights of small-scale farmers, pastoralists and hunter gatherers in a future where land is increasingly valuable for energy and food crops.

The role of UK consumption in driving unsustainable agricultural production systems around the world should be assessed and addressed. It is important to ensure that policies that support sustainable agriculture are not undermined by policies in other areas, such as trade, procurement and energy security.

Written by Ruth Fuller, WWF-UK and Richard Ewbank, Christian Aid

Notes

[1] Foresight Report. 2011. *The Future of Food and Farming: Challenges and Choices for Global Sustainability*. The Government Office for Science. [2] Li Ching, L. 2008. *Is Ecological Agriculture Productive?* Oakland Institute, Oakland California. [3] World Development Report. 2008. *Agriculture for Development.* World Bank, Washington DC. [4] Fraser, A. 2009. *Harnessing Agriculture for Development.* Oxfam International. [5] IAASTD. 2009. *Agriculture at the cross roads.* International Assessment of Agricultural Knowledge, Science and Technology for Development. [6] Holt-Gimenez, E. 2000. Measuring farmers' agroecolocial resistance to Hurricane Mitch. *LEISA* 17, 18–20. [7] Boer, R., Tamkani, K. Subbiah, A.R. 2003. *Communicating Climate Forecasts to Farmers through Climate Field Schools: Indonesian Experience* [8] Gebremedhin, B., Pender, J., Ehui, S. 2003. Land tenure and land management in the highlands of northern Ethiopia. *Ethiopian Journal of Economics* VIII (2), 46–63. [9] Millennium Ecosystem Assessment. 2005. *Ecosystems and human well-being: synthesis.* Island Press, Washington DC. [10] All Party Parliamentary Group on Agriculture and Food for Development. 2010. *Why No Thought for Food?* A UK Parliamentary Inquiry into Global Food Security. [11] Mole, N. 2010 Bees and Pesticides. Paper presented to the London Bee Summit 2010. [12] Renewable Fuels Agency. 2008. *The Gallagher Review of the Indirect Effects of Biofuels Production.* RFA, St Leonards on Sea, UK.

About Bond DEG

The Bond Development and Environment Group (DEG) provides a forum where NGOs working at the interface of environmental and poverty issues can exchange information, enhance their analysis and coordinate their advocacy towards the UK Government and other relevant institutions.

Bond DEG is the main vehicle for NGO engagement with the UK Government on development and environment concerns. The group has a membership of over 70 organisations, representing a diverse range of agendas and a support base of millions. It also works more widely in the sector with other networks, organisations and individuals.

Contact us

Kate Munro
kate.munro@iied.org

International Institute for Environment and Development
3 Endsleigh Street
London WC1H 0DD

Tel: +44 (0)20 7388 2117
Fax: +44 (0)20 7388 2826

www.iied.org

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