



**Friends of
the Earth
International**

Wolf in Sheep s Clothing?¹

**An analysis of the
sustainable
intensification of
agriculture**

Summary

October 2012

¹ See the full version of 'A Wolf in Sheep's clothing at www.foei.org/en/wolf-in-sheeps-clothing

Introduction

In recent years, a new concept has started to gain popularity in some high-level political and scientific circles, as a solution to global food security and the environmental damage caused by industrial agriculture. The so-called sustainable intensification of agriculture has been adopted as an approach by national governments, the United Nations Food and Agriculture Organization (FAO), agricultural research organisations, agribusinesses and high-level funders.

Sustainable intensification is an answer to the statement of the FAO in 2008 that global food production must be doubled to feed a world population currently standing at 6 billion and expected to rise to 9 billion by 2050.¹ The FAO has since clarified that we have enough resources to feed the global population now and in four decades time. The FAO and many others have also stressed the importance of measures to redistribute food and reduce waste rather than increase production. Nevertheless, many especially agribusinesses have leapt on the idea of intensifying production.

A definition that means no technologies or techniques should be left out

The Royal Society defined sustainable intensification as a process whereby yields are increased without adverse environmental impact and without the cultivation of more land but it includes a range of farming practices, from specific agro-ecological methods, to practices used in commercial agriculture, to biotechnology. This is because a key idea in the concept is that no techniques or technologies should be left out.² As nothing is excluded, organisations representing the biotechnology, fertiliser and pesticides industries, responsible for environmental destruction in the first place have all used sustainable intensification to promote their products.³

Spreading influence in policy and funding

The influence of the sustainable intensification approach can be seen in policies from the Gates Foundation to the World Economic Forum's New Vision for Agriculture.⁴ It has also been incorporated into climate smart agriculture, which is being promoted by the World Bank at climate negotiations.⁵ Yet many of these international agencies are green-washing conventional intensive agriculture approaches by defining them as sustainable intensification.

For example, the US Government's Feed the Future programme defines sustainable intensification as research (such as technologies and best management practices) and non-research inputs (such as fertiliser, quality seed, water, energy, market information, and others) come together with improved access to markets to increase productivity,

enhance environmental sustainability, reduce risk, and encourage producers to increase investments to agricultural production.⁶ Aside from environmental sustainability, this could be a definition of commercial, intensive agriculture. Large fertilizer companies and confined animal feeding operations, both key culprits in climate emissions, loss of wildlife and pollution from farming are also rebranding themselves as sustainable through sustainable intensification. Sustainable intensification in practice

To understand what sustainable intensification means in practice, we need to look beyond policies, to the agricultural research and development projects being funded by the organisations using sustainable intensification and its related concepts.

Sustainable intensification as defined in the UK's Royal Society² report calls for several measures to attain food security, one of which is new science and technology to increase food production, including long-term high-risk research, such as GM crops with altered photosynthesis.⁷ Since the report there has been a dramatic increase in science and research funding in the UK and other global research bodies such as the Consultative Group on International Agricultural Research (CGIAR). However in practice it is the biotechnology part of sustainable intensification that is getting much of the increase in funding. Since adopting it as policy, the UK government has directed hundreds of millions of pounds to scientific research institutions working on agricultural biosciences, as well as extra funding to provide farmers in developing countries with access to technologies.⁸ The UK Government and the Bill and Melinda Gates Foundation jointly set up a £70 million fund for research on sustainable intensification, including biotechnology projects.⁹

The Gates Foundation devotes a significant proportion of its funding to biotechnology and spent, 162 million dollars between 2005 and 2011 on these projects.¹⁰ In 2010, it became one of the largest individual donors to the international agricultural research consortium, the CGIAR, ring fencing money for its own favoured approach. In fact, since the advent of sustainable intensification, the CGIAR's funding has leapt to US\$696 million. Its top five donors are now the US Government, the Gates Foundation, the World Bank, the UK Government and the European Commission, all of which support sustainable intensification or related concepts.¹¹ The CGIAR has some programs on agro-forestry and ecosystems, but about one third of its budget still goes to developing improved varieties of maize, rice and wheat a significant part of which

² The Royal Society, based in the UK is a self-governing fellowship of scientists from across the world. It publishes journals, provides funds and is linked in with other scientific bodies around the world. In 2009 it published 'Reaping the Benefits' a study examining the contribution of biological sciences to food crop production which was highly influential in furthering international recognition of the term sustainable intensification. The Royal Society study was criticized by civil society for replicating the International Assessment of Agricultural Science and Technology for Development UN backed study which found a minimal role for GM crops in feeding the world.

uses GM technology.¹² For example, one-third of funding in the maize program is for developing stress-tolerant, yield-doubling or bio-fortified varieties, all of which make reference to some level of transgenic technology. Great claims are made about the value of this type of research, but the CGIAR admits it has not collected much evidence about whether it reduces poverty, or the effect on the environment.¹³

In 2009, the US Government launched Feed the Future, a \$3.5 billion agricultural aid project. Targeting 20 developing countries, it is underpinned by the philosophy of sustainable intensification.¹⁴ In 2011, its own research forum called on Feed the Future to look at the problems first, rather than pursuing pre-determined solutions.¹⁵ However, Feed the Future's resulting research strategy emphasises using GM crops, and 28 per cent of its research funding will go on climate resistant cereals.¹⁶

Free trade and corporate agriculture: the other arm of sustainable intensification?

Sustainable intensification also promotes the integration of small farmers into commercial markets and global food chains but it is not certain that small-scale farmers will benefit from this. In 2012, Feed the Future met with multinational agribusiness corporations including Monsanto, Bunge and Nestle to talk about private-public partnerships in agriculture in its target countries. The companies commented that it offered clear benefits such as lowering the barriers for entry into new markets.¹⁷ Both Dupont and Syngenta aim to grow their business in Africa to \$1 billion in the next decade.¹⁸

The New Vision for Agriculture is working to increase private sector investment in African agriculture.¹⁹ One example is the Southern Agricultural Corridor of Tanzania (SAGCOT), which also involves Unilever, DuPont, Syngenta and Monsanto, the FAO, and Feed the Future. The project aims to bring 350,000 hectares of Tanzanian land into profitable production, including land not currently used for agriculture.²⁰ While the project claims to help small farmers, early wins promoted to investors include a 40,000-hectare government ranch.²¹ One of the first investments was a new \$20 million fertiliser terminal at Dar es Salaam.

In fact, nearly all the proponents of sustainable intensification also heavily promote liberalised trade, opening up markets of smallholder farmers and export agriculture. However, several experts including the High Level Panel of Experts on Food Security and Nutrition, the UN Special Rapporteur on the Right to Food, and the International Assessment of Agricultural Science and Technology for Development (IAASTD) have raised concerns that export agriculture and current trade terms are contributing to food insecurity for the world's small farmers and those most hungry and vulnerable.^{22 23}

A closer look at sustainable intensification technologies: the case of genetically modified organisms (GMOs)

Do GM crops improve yield?

Current GM crops were not developed to increase yield. The only traits being used in commercial GM crops – herbicide-tolerance and insect-resistance – aim to simplify pest or weed control.²⁴ Yield improvements in GM seeds continue to be developed mainly by conventional breeding, and the IAASTD found the evidence of yield gains from GM crops was anecdotal, with gains in some places, and losses in others.²⁵

Sustainable intensification promotes the idea that new types of GM crops will increase yields, especially for resource-poor farmers in areas such as Sub Saharan Africa²⁶. Yet despite more than twenty-five years of GM research none of the promised benefits of these second-generation GM crops have been realised.

Climate ready crops

GM crops are being promoted for climate change adaptation, with suggestions that crops could be modified to withstand drought, high temperatures, floods or saline soil. Such crops may be decades away, if they are achieved at all. The UK Government has concluded some of these GM crops may take at least 40 years to develop.²⁷ Still, more than 1600 patent documents have been published for climate ready GM crops, and the global market for drought-tolerant maize alone is thought to be \$2.7 billion.²⁸

In 2011, the USA approved Monsanto's GM drought tolerant maize MON87460. But the government report showed the GM maize only reduced yield losses by 6 per cent, and only in moderate dry conditions.²⁹ In fact, the GM maize coped no better than existing maize varieties grown in the drier parts of the USA.³⁰

Is GM an affordable technology?

Since the introduction of GM crops in the USA, the price of maize seed has more than doubled, the price of soybean seeds has almost tripled, and the price of cotton seeds has quadrupled.³¹ In comparison, the price of seed wheat, which is not genetically modified, has remained largely stable. In India cotton seeds can be almost three times the price of non-GM seeds, and according to one Indian seed company – much of this price goes towards paying royalty to Monsanto.³² In South Africa the price of GM seeds recently went up by 8 to 14 per cent in one year.³³ Sustainable intensification promotes GM seeds as a solution for small farmers but the royalty-free projects of the biotechnology companies are very limited and when they end, small farmers could be left facing spiralling seed prices.

On the transgenic treadmill

Herbicide-tolerant crops dominate global GM crop production. The main herbicide used is glyphosate, but weeds resistant to it now affect 12 million acres in the USA alone.³⁴ To control them, many farmers have to use multiple herbicides and in some cases hand weeding.³⁵ These problems are being repeated in other countries where GM crops are grown.³⁶ The response of biotechnology companies has been to start making GM crops resistant to other herbicides, including older, more toxic ones like 2,4-D. But the fact that many weed species are already resistant to these older chemicals means that the problem only seems likely to get worse, while at the same time increasing chemical use in farming.³⁷

Power and participation in sustainable intensification

Proponents of sustainable intensification talk about including small farmers, but Feed the Future did not include any small farmer organisations in its research forum, the CGIAR didn't mention consulting with any farmers about its overall research strategy, and the Gates Foundation doesn't even have an office in Africa.³⁸ When they *are* asked, small farmers don't support the approach of sustainable intensification. In 2010, small farmers from countries in West Africa attended citizen juries, and set out their priorities for research and agricultural development, including:

- sustainable agriculture that builds on farmers' own expertise and knowledge, rather than seeking to replace it;
- clear land rights, and rights for women, including agrarian reforms;
- agricultural research that starts by asking farmers what they need;
- knowledge and technologies that are based on agro-ecological principles, including compost, integrated pest management and mixed cropping;
- seed development based on traditional varieties; and
- mechanisms to protect them from unfair competition from imported products.³⁹

Small farmers practise sustainable agriculture

Small farmers using traditional seed varieties without the use of industrial inputs grow most of the world's food, especially the food that feeds the rural poor. In Africa, peasant farmers grow almost all domestically consumed food. In Latin America, 60 per cent of agricultural production (including meat) comes from family farms.⁴⁰ In Asia, almost all rice is grown on farms of less than 2 hectares.⁴¹

In fact, most of the world's food is grown by small farmers, without

the use of industrial inputs, and using traditional seed varieties.⁴² Sustainable intensification characterises small farmers as having low yields, and being in need of new technologies, such as high yielding varieties.

However, if small holders are feeding much of the world, how unproductive are they really? In fact, if total output rather than just the yield of one crop is measured, small farmers can be more productive than commercial operations.⁴³

The UN Special Rapporteur on the Right to Food has proposed using agro-ecological practices, which he says have the potential to double small farmers food production in 10 years. An agro-ecological approach would build on farmers own knowledge, rather than imposing new technologies, because traditional agriculture often includes agro-ecological practices such as high levels of biodiversity; complex landscape management; resilient agro-ecosystems (e.g. using a wide range of crops to spread risk); innovations developed by farmers; and agricultural management that is also part of the culture (e.g. sharing rights to the use of common resources).

In 2008, the UN Conference on Trade and Development (UNCTAD) and the UN Environment Programme (UNEP) published a report examining organic agriculture and food security in Africa.⁴⁴ The study found average yield increases of 116 per cent, as well as increased access to food and reduced financial risk. A range of environmental benefits included carbon sequestration in soil organic matter, and improved soil condition leading to better crop yields over time.

La Via Campesina, which represents about 200 million peasant farmers worldwide, coined the term food sovereignty in 1996. Food sovereignty is the right of all peoples to produce and consume healthy and culturally appropriate food that has been produced through ecologically sound and sustainable methods. It enshrines people s right to define, and own, their own food and agriculture systems and demands that those who produce, distribute and consume food be at the heart of food systems and policies, rather than markets or corporations. If this framework was followed we would have a completely different form of sustainable agriculture.

Conclusion

Sustainable intensification is an ideology that adheres to a productivist view of feeding the world. It fails to take into account power, profit, politics and participation in the food system. As this report shows, in practise it can mean business as usual intensive farming with slight modifications to try and tackle the growing environmental crises caused by industrial agriculture. Through its philosophy of including all possible solutions and technologies, sustainable intensification is providing a cover for environmentally destructive practices as well as corporate concentration of food production, inputs and distribution. Therefore the term must be used with caution.

Before the Royal Society report made this term fashionable, the International Assessment of Agricultural Science and Technology for Development (IAASTD) report had already provided a coherent and inclusive roadmap for solving global hunger. The IAASTD recognised the importance of participatory public research that can genuinely work for peasant farmers and for far greater funding and support for agro-ecological farming methods.⁴⁵

In addition to the recommendations of IAASTD, several measures can be taken now to significantly lessen pressure on land and resources. These measures will also ensure more equitable distribution of resources, food and land among the global community. They include:

Stopping the large amounts of crops and land diverted from food to agrofuels production;

Introducing measures to reduce high levels of consumption of livestock products in the West that are sucking up global grain supplies;

Reducing high levels of retail and household waste in the West and post-harvest loss in the developing world;

Providing access to land, water and other resources that is vital for communities to be able to feed themselves;

Stopping land grabbing and instead implementing genuine agrarian reform programmes in particular, the actions agreed at the 2006 International Conference on Agrarian Reform and Rural Development.

References

- ¹ UN Food and Agriculture Organization (FAO), Report Of The High-Level Conference On World Food Security: the Challenges Of Climate Change And Bioenergy, Rome, 3–5 June 2008, HLC/08/REP.
- ² Royal Society, Reaping the Benefits: Science and the sustainable intensification of global agriculture, Policy document 11/09 (Royal Society: London, 2009).
- ³ Agricultural Biotechnology Council, Written evidence to the Environment Audit Committee Session 2010–11: Sustainable Food, <<http://www.publications.parliament.uk/pa/cm201011/cmselect/cmenvaud/writev/food/m15.htm>>; International Fertilizer Industry Association, ‘Green economy’, <<http://www.fertilizer.org/ifa/HomePage/SUSTAINABILITY/Green-Economy>>; and Croplife Australia, ‘Stark warning on future food security’, Press release, 25 Jan. 2011.
- ⁴ Bill and Melinda Gates Foundation, Agricultural Development: Strategy Overview (2011), <<http://www.gatesfoundation.org/agriculturaldevelopment/Documents/agricultural-development-strategy-overview.pdf>>, p. 5; and World Economic Forum, Putting the New Vision for Agriculture Into Action: A Transformation is Happening (World Economic Forum: Davos, 2012).
- ⁵ UN Food and Agriculture Organization (FAO), ‘Climate Smart Agriculture for Development’, <<http://www.fao.org/climatechange/climatesmart/en/>>.
- ⁶ US Government, Feed the Future: Global Food Security Research Strategy (2011), <<http://www.feedthefuture.gov>>.
- ⁷ Foresight Panel, The Future of Food and Farming: Final Project Report (Government Office for Science: London, 2011), section 3.2; and Royal Society (note 2).
- ⁸ UK Biotechnology and Biological Sciences Research Council (BBSRC), ‘Minister announces £250M strategic investment in UK bioscience,’ Press release, 24 May 2012; and UK Government, Office for Science, UK Cross-Government Strategy for Food Research and Innovation (2010).
- ⁹ UK Department for International Development, ‘DFID–Bill and Melinda Gates Foundation (BMGF) Strategic Collaboration Portfolio for Sustainable Intensification of Agriculture’, <<http://www.dfid.gov.uk/r4d/Project/60792/Default.aspx>>.
- ¹⁰ GM Freeze, ‘The Bill and Melinda Gates Foundation, biotechnology and intensive farming’, Oct. 2011, <http://www.gmfreeze.org/site_media/uploads/publications/Gates_summary_final.pdf>.
- ¹¹ The Consultative Group on International Agricultural Research (CGIAR)’s annual reports can be found online: <<http://www.cgiar.org/publications/finrep/index.html>>.
- ¹² CRPs 3.1, 3.2 and 3.3 account for \$1058.9 million of a total budget of \$3219 million over 3 years. Consultative Group on International Agricultural Research (CGIAR), ‘Fund update, March 2012’, <http://www.cgiarfund.org/news_cgiarfundupdate_march2012>.
- ¹³ CGIAR, ‘Improved food security’, <<http://www.impact.cgiar.org/improved-food-security>>; and CGIAR Independent Science And Partnership Council, Standing Panel on Impact Assessment, ‘Ex-post environmental impact assessment: lessons from four CGIAR case studies’, Briefing no. 39 (2012).
- ¹⁴ US Government, Feed the Future (note 6), p. 16.
- ¹⁵ Nicholson, S. (2011), Feeding 10 Billion: a Dialogue Between Feed the Future and the International Research Community, <<http://www.aplu.org/document.doc?id=3664>>, p. 55.
- ¹⁶ US Government, Feed the Future (note 6), p. 21; and Board for International Food and Agricultural Development (BIFAD), ‘Minutes from the public meeting on “The next generation: global food security through human and institutional capacity building”’, 11 Oct. 2011, Des Moines, Iowa, <<http://www.aplu.org/document.doc?id=3597>>.
- ¹⁷ US Government, Feed the Future, ‘Public-Private Partnership Technical Forum, final report’, 22 Feb. 2012, p. 2.
- ¹⁸ ‘U.S. agriculture companies set millions for Africa’, Reuters, 18 May 2012.
- ¹⁹ World Economic Forum (note 4).
- ²⁰ Southern Agricultural Growth Corridor of Tanzania (SAGCOT), ‘Appendix III: Land Development’, <http://www.sagcot.com/uploads/media/Appendix_III_Land_Development_04.pdf>.
- ²¹ Southern Agricultural Growth Corridor of Tanzania (SAGCOT), Investment Blueprint, Jan. 2011, <<http://www.sagcot.com/home>>, pp. 58–59.
- ²² High Level Panel of Experts on Food Security and Nutrition, ‘Price volatility and food security’ (2011), <http://www.fao.org/fileadmin/user_upload/hlpe/hlpe_documents/HLPE-price-volatility-and-food-security-report-July-2011.pdf>.
- ²³ Olivier De Schutter, UN Special Rapporteur on the right to food, Briefing note: “The World Trade Organization and the Post-Global Food Crisis Agenda: Putting Food Security First in the International Food System” (2009)
- ²⁴ ISAAA, Global Status of Commercialized Biotech/GM Crops, Brief no. 43-2011, Executive Summary.
- ²⁵ Fernandez-Cornejo, J. and Caswell, M, The First Generation of Genetically Engineered Crops in the United States, Economic Information Bulletin 11, USDA Economic Research Service (2006); and International Assessment of Agricultural Knowledge Science and Technology for Development (IAASTD), Agriculture at a Crossroads—Synthesis Report (2009), pp. 8, 40.
- ²⁶ See e.g. Royal Society, Reaping the Benefits (note 2).
- ²⁷ Foresight Panel (note 7), p. 18.
- ²⁸ ETC Group, ‘Capturing “climate genes”’, 22 Oct. 2010, <<http://www.etcgroup.org/content/gene-giants-stockpile-patents-%E2%80%9Cclimate-ready%E2%80%9D-crops-bid-become-biomasters-0>>; and ‘Monsanto, DuPont fight on parched Kansas battlefield’, Bloomberg News, 21 Apr. 2010.
- ²⁹ US Department of Agriculture (USDA), Animal and Plant Health Inspection Service Biotechnology Regulatory Services, ‘National Environmental Policy Act decision and finding of no significant impact: Monsanto Company Event Mon 87460 Corn’ (2011).
- ³⁰ US Department of Agriculture (USDA), Animal and Plant Health Inspection Services, Monsanto Company Petition (07-CR-191U) for Determination of Non-regulated Status of Event MON 87460 Draft Environmental Assessment, BRS document 09-055- 01p pea (2011).

- ³¹ United States Department of Agriculture, Economic Research Service, 'Commodity costs and returns: data', <<http://www.ers.usda.gov/Data/CostsAndReturns/testpick.htm>>. Seed prices are taken from historical data sets for corn, soybeans, cotton and wheat.
- ³² 'Seed companies reap rich harvest on Bt cotton wave', Business Standard, 23 Feb. 2012.
- ³³ www.senwes.co.za/files/main_articles/2011/10/7/mielie_mosanto.jpg accessed 16 May 2012; www.senwes.co.za/files/main_articles/2011/10/7/mielie_pioneer.jpg; and www.senwes.co.za/files/main_articles/2011/10/7/soja_pioneer.jpg
- ³⁴ 'Super weeds no easy fix for US agriculture—experts', Reuters, 10 May 2010.
- ³⁵ BASF, 'Farmers plan to update weed control management in 2012', Press release, 24 Apr. 2012, <<http://www.basf.com/group/corporate/en/news-and-media-relations/news-releases/news-releases-usa/P-12-087>>; Hart, M. and Speller, P., 'GM crops farmer to farmer', YouTube, 14 June 2011, <<http://www.youtube.com/watch?v=jEX654gN3c4>>.
- ³⁶ Meyer, D. E. and Cederberg, C., 'Pesticide use and glyphosate-resistant weeds: a case study of Brazilian soybean production', SIK-Rapport no. 809 (2010), Appendix 1.
- ³⁷ Mortensen, D. A. et al., 'Navigating a critical juncture for sustainable weed management', Bioscience, vol. 62 (2012), pp. 75–84.
- ³⁸ Foresight Panel (note 7); Nicholson (note 15), Appendix IV: list of research forum registrants; A Strategy and Results Framework for the CGIAR, submission to the CGIAR Funders Forum, 7 June 2010, <http://www.cgiarfund.org/sites/cgiarfund.org/files/Documents/PDF/CGIAR_SRF_june7_2010.pdf>; and Bill and Melinda Gates Foundation, 'Office Locations', <<http://www.gatesfoundation.org/jobs/pages/office-locations.aspx>>.
- ³⁹ Pimbert, M., 'Putting farmers first: reshaping agricultural research in West Africa', International Institute for Environment and Development Briefing (2012).
- ⁴⁰ UN Food and Agriculture Organization (FAO), 'Boletín de Agricultura Familiar en América Latina y el Caribe, Julio–Septiembre', Observatorio de la Agricultura Familiar (2012), <http://www.rlc.fao.org/uploads/media/baf_201209.pdf>
- ⁴¹ ETC Group, 'Who will feed us? Questions for the food and climate crises', 1 Nov. 2009, <<http://www.etcgroup.org/content/who-will-feed-us>>
- ⁴² Altieri, M. A., Funes-Monzote, F. R. and Petersen, P., 'Agroecologically efficient agricultural systems for smallholder farmers: contributions to food sovereignty' Agronomy for Sustainable Development (2011)
- ⁴³ For example, a study in Mexico found that 1.73 hectares of mono-cropped maize was required to produce the same food output (in terms of calories) as 1 hectare of the traditional maize, beans and squash system Gliessman, S. R., Agroecology: ecological process in sustainable agriculture (Ann Arbor Press: Michigan, 1998)
- ⁴⁴ UN Conference on Trade and Development (UNCTAD) and UN Environment Programme (UNEP), Organic Agriculture and Food Security in Africa (United Nations: New York/Geneva, 2008)
- ⁴⁵ UK food Group, The 22 findings of IAASTD at a glance <http://www.ukfg.org.uk/docs/IAASTDFEC%2B22FindingsAtaGlance.pdf> (2008)