





Agriculture

Investing in natural capital



Acknowledgements

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Asad Naqvi and Nicolas Bertrand (in the initial stages of the project) of UNEP managed the chapter, including the handling of peer reviews, interacting with the coordinating author on revisions, conducting supplementary research and bringing the chapter to final production. Derek Eaton reviewed and edited the modelling section of the chapter. Sheng Fulai conducted preliminary editing of the chapter.

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Treyer (International Institute for Sustainable Development and International Relations).

Richard Piechocki (Rabobank Nederland), Lara Yacob (Robeco), and Daniel Wild (Sustainable Asset Management AG) provided information for some case studies and success stories. Annie Haakenstad, Waqas Rana, Zainab Soomar, Pratyancha Pardeshi and Marco Portugal provided valuable help in collecting data and evidence. Ivo Mulder (UNEP) facilitated the coordination with investment institutions.

We would like to thank the many colleagues and individuals who commented on various drafts and provided suggestions including Ana Lucia Iturriza (ILO), Charles Arden-Clarke (UNEP), Arab Hoballah (UNEP), Peter Gilruth (UNEP), Tessa Goverse (UNEP), Ann Herbert (ILO), Ulrich Hoffmann (UNCTAD), Anne-Marie Izac (CGIAR), Elwyn Grainger-Jones (IFAD), Harald Kaechele (Leibniz-Centre for Agricultural Landscape Research, ZALF), Alexander Kasterine (ITC), Rashid Kaukab (CUTS - Geneva), Kristen Kurczak (UNEP), James Lomax (UNEP), Robert McGowan (Independent Expert), Christian Nellemann (UNEP/GRID-Arendal), Rajendra Paratian (ILO), Michaela Pfeiffer (WHO), Philip Riddell (Independent Expert), Gunnar Rundgren (Independent Expert), Nadia El-Hage Scialabba (FAO), John D. Shilling (MI), Roland Sundström (IFAD), Naoufel Telahigue (IFAD), Sophia Twarog (UNCTAD), Justin Perrettson (Novozymes), Katja Bechtel (CropLife International), Dr. Babatunde Osotimehin (UNFPA), Mayumi Sakoh (World Society for the Protection of Animals), Morgane Danielou (International Fertiliser Industry Association) and Ylva Stiller (Syngenta).

Contents

List of acronyms	35
Key messages.....	36
1 Introduction.....	38
1.1 General background.....	38
1.2 Conventional/industrial agriculture	40
1.3 Traditional/small farm/subsistence agriculture	41
1.4 The greening of agriculture.....	42
2 Challenges and opportunities	44
2.1 Challenges.....	44
2.2 Opportunities.....	48
3 The case for greening agriculture	50
3.1 The cost of environmental degradation resulting from agriculture	50
3.2 Investment priorities for greening agriculture	51
3.3 The benefits of greening agriculture	57
3.4 Modelling: Future scenarios for green agriculture	61
4 Getting there: Enabling conditions.....	64
4.1 Global policies	64
4.2 National policies	65
4.3 Economic instruments.....	66
4.4 Capacity building and awareness-raising.....	66
5 Conclusions	68
References	70

List of figures

Figure 1: Total average contribution to poverty reduction from growth of agricultural, remittance and non-farm incomes in selected countries	39
Figure 2: Contribution of agriculture to GDP and public expenditure on agriculture as a proportion of agricultural GDP	39
Figure 3: Global trends in cereal and meat production, nitrogen and phosphorus fertiliser use, irrigation and pesticide production	40
Figure 4: Regional distribution of small farms	41
Figure 5: Distribution of population by age in more developed and less developed regions: 1950-2300	44
Figure 6: Urban and rural population trends in developing regions	45
Figure 7: Trends in food commodity prices, compared with trends in crude oil prices	45
Figure 8: Percentage of country populations that will be water stressed in the future	46
Figure 9a-b: The makeup of total food waste	47
Figure 10: Expected future food insecurity	48
Figure 11: Share of overseas development assistance for agriculture (1979–2007)	48
Figure 12: Global trade in organic food and drinks (1999-2007)	49
Figure 13: Estimated producer support by country (as a percentage of total farmer income)	65

List of tables

Table 1: Potential indicators for measuring progress towards green agriculture	43
Table 2: Selected evidence on benefits and costs of plant and animal health management	52
Table 3: Selected evidence on benefits and costs of soil management strategies	55
Table 4: Selected evidence on benefits and costs of water management strategies	56
Table 5: Selected evidence on benefits and costs of agricultural diversification	58
Table 6: Incremental annual agricultural investment figures by region needed to counteract climate-change impacts on child malnutrition	60
Table 7: Results from the simulation model	62

List of boxes

Box 1: Agriculture at a crossroads	41
Box 2: Opportunities for improved sanitation systems and organic nutrient recycling	46
Box 3: Innovations in the agricultural supply chain increase shareholder and societal value	49
Box 4: Cost of training smallholder farmers in green agriculture practices	52
Box 5: Simple storage: low investment, high returns	54
Box 6: Investment in sustainable agriculture: case study	57
Box 7: Innovative sustainable and social capital investment initiatives	59
Box 8: Organic versus conventional cotton production	59

List of acronyms

ADB	Asian Development Bank	IMF	International Monetary Fund
AKST	Agricultural knowledge, science and technology	IP	Intellectual Property
BAU	Business-as-usual	IPCC	Intergovernmental Panel on Climate Change
BCI	Better Cotton Initiative	IPM	Integrated Pest Management
BSI	Better Sugar Initiative	ITC	International Trade Centre
CAADP	Comprehensive Africa Agriculture Development Programme	LICs	Low Income Countries
CGIAR	Consultative Group on International Agricultural Research	LMICs	Lower Middle Income Countries
CSIRO	The Commonwealth Scientific and Industrial Research Organisation	MDG	Millennium Development Goal
DEFRA	Department for Environment, Food and Rural Affairs (UK)	MSCI	Morgan Stanley Capital International
EU	European Union	NCAR	National Centre for Atmospheric Research
FAO	Food and Agriculture Organisation of the United Nations	NGO	Non-governmental organisation
FAOSTAT	Food and Agriculture Organisation Statistical Databases	ODA	Oversees Development Assistance
FiBL	German Research Institute of Organic Agriculture	OECD	Organisation for Economic Co-operation and Development
G8	Group of Eight	PAHM	Plant and animal health management
GAP	Good Agricultural Practices	PES	Payment for Ecosystem Services
GDP	Gross Domestic Product	PICS	Purdue Improved Cowpea Storage
GHG	Greenhouse gas	R&D	Research and development
GMO	Genetically modified organism	ROI	Return on investment
GRID	Global Resource Information Database	RSPO	Roundtable on Sustainable Palm Oil
HICs	High Income Countries	RTRS	Round Table on Responsible Soy
IAASTD	International Assessment of Agricultural Knowledge, Science and Technology for Development	SAM	Sustainable Asset Management AG
ICARDA	International Centre for Agricultural Research in the Dry Areas	SOM	Soil organic matter
IDH	Dutch Sustainable Trade Initiative	SRI	System Rice Intensive
IEA	International Energy Agency	SWFs	Sovereign wealth funds
IFAD	International Fund for Agricultural Development	UMICs	Upper Middle Income Countries
IFOAM	International Federation of Organic Agriculture Movements	UNCTAD	United Nations Conference on Trade and Development
IFPRI	International Food Policy Research Institute	UN DESA	United Nations Department of Economic and Social Affairs
ILO	International Labour Organisation	UNDP	United Nations Development Programme
		UNEP	United Nations Environment Programme
		UNESCO ECA	United Nations Economic and Social Council, Economic Commission for Africa
		WDR	World Development Report
		WIPO	World Intellectual Property Organisation
		WTO	World Trade Organisation
		WWAP	World Water Assessment Programme

Key messages

1. Feeding an expanding and more demanding world population in the first half of this century, while attending to the needs of nearly one billion people who are presently undernourished and addressing climate change, will need managed transitions away from “business-as-usual” (BAU)

in both conventional¹ and traditional² farming. In different ways and in varying degrees, current farming systems deplete natural capital and produce significant quantities of global greenhouse gases (GHG) and other pollutants, which disproportionately affect the poor. The continued demand for land-use changes is often responsible for deforestation and loss of biodiversity. The economic cost of agricultural externalities amounts to billions of US dollars per year and is still increasing. A package of investments and policy reforms aimed at greening agriculture³ will offer opportunities to diversify economies, reduce poverty through increased yields and creation of new and more productive green jobs – especially in rural areas, ensure food security on a sustainable basis, and significantly reduce the environmental and economic costs associated with today’s industrial farming practices.

2. Green agriculture is capable of nourishing a growing and more demanding world population at higher nutritional levels up to 2050.

It is estimated that an increase, from today’s 2,800 Kcal availability per person per day to around 3,200 Kcal by 2050, is possible with the use of green agricultural practices and technologies. It is possible to gain significant nutritional improvements from increased quantity and diversity of food (especially non-cereal) products. During the transition to a greener agriculture, food production in high-input industrial farming may experience a modest decline, while triggering significant positive responses in more traditional systems run by small farmers in the developing world, and producing the majority of staple crops needed to feed the world population. Public, private and civil initiatives for food production and social equity will be needed for an efficient transition at farm level and to assure sufficient quality nutrition for all during this period.

3. Green agriculture will reduce poverty. Environmental degradation and poverty can be simultaneously addressed by applying green agricultural practices. There are approximately 2.6 billion people who depend on agriculture for livelihood, a vast majority of them living on small farms and in rural areas on less than US\$1 per day. Increasing farm yields and return on labour, while improving ecosystem services (on which the poor depend most directly for food and livelihoods) will be key to achieving these goals. For example, estimates suggest that for every 10 per cent increase in farm yields, there has been a 7 per cent reduction in poverty in Africa, and more than 5 per cent in Asia. Evidence shows that the application of green farming practices has increased yields, especially on small farms, between 54 and 179 per cent.

4. Reducing waste and inefficiency is an important part of the green agriculture paradigm.

Crop losses due to pests and hazards, combined with food waste in storage, distribution, marketing and at the household level, account for nearly 50 per cent of the human edible calories that are produced. Currently, total production is around 4,600 Kcal/person/day, but what is available for human consumption is around 2,000 Kcal/person/day. The Food and Agriculture Organisation (FAO) suggests that a 50 percent reduction of losses and wastage in the production and consumption chain is a

1. Refer to section 1.2 for more details about what this report categorises as conventional or industrial agriculture.

2. Refer to section 1.3 for detailed information about what this report considers traditional, smallholder and subsistence farming.

3. Refer to section 1.4 for detailed information about a green agriculture paradigm.

4. For details, refer to the Modelling Chapter of this report.

necessary and achievable goal. Addressing some of these inefficiencies – especially crop and storage losses – offers opportunities that require small investments in simple farm and storage technology on small farms, where it makes the most material difference to smallholder farmers. The FAO reports that although reducing post-harvest losses could be achieved relatively quickly, less than five percent of worldwide agricultural research and extension funding currently targets this problem.

5. Greening agriculture requires investment, research and capacity building. This is needed in the following key areas: soil fertility management, more efficient and sustainable water use, crop and livestock diversification, biological plant and animal health management, an appropriate level of mechanisation, improving storage facilities especially for small farms and building upstream and downstream supply chains for businesses and trade. Capacity building efforts include expanding green agricultural extension services and facilitating improved market access for smallholder farmers and cooperatives. The aggregate global cost of investments and policy interventions required for the transition towards green agriculture is estimated to be US\$ 198 billion per year from 2011 to 2050.⁴ The value added in agricultural production increases by 9 per cent, compared with the projected BAU scenario. Studies suggest that “Return on investments (ROI) in agricultural knowledge, science and technology across commodities, countries and regions on average are high (40-50 per cent) and have not declined over time. They are higher than the rate at which most governments can borrow money”. In terms of social gains, the Asian Development Bank Institute concluded that investment needed to move a household out of poverty, in parts of Asia, through engaging farmers in organic agriculture, could be as little as US\$ 32 to US\$ 38 per capita.

6. Green agriculture has the potential to be a net creator of jobs that provides higher return on labour inputs than conventional agriculture. Additionally, facilities for ensuring food safety and higher quality of food processing in rural areas are projected to create new better quality jobs in the food production chain. Modelled scenarios suggest that investments aimed at greening agriculture could create 47 million additional jobs in the next 40 years, compared with the BAU scenario.

7. A transition to green agriculture has significant environmental benefits. Green agriculture has the potential to: rebuild natural capital by restoring and maintaining soil fertility; reduce soil erosion and inorganic agro-chemical pollution; increase water-use efficiency; decrease deforestation, biodiversity loss and other land use impacts; and significantly reduce agricultural GHG emissions.

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