6 SCP in Agriculture and Rural Development

6.1 Introduction

Achieving more sustainable consumption and production in the agricultural sector requires a coherent response to the intimate linkages between agricultural production, agro-ecosystems and the people who rely on them, and also the concerns and preferences of a growing number of consumers. Less input intensive and more resource efficient agriculture offers a means to strengthen the competitiveness of the agricultural sector. It can also improve living conditions and economic opportunities in rural areas, including for the poor, by reducing production costs and developing new markets for sustainable products.

There is a close relationship between agricultural development, agro-ecosystems and poverty. Poverty can force people to deplete natural resources and pollute the environment, leading to degradation of the ecosystems on which they rely for food production and income generation. The reverse is also true, i.e., a degraded natural resource base is often an underlying cause for rural poverty, hunger, rural-urban migration, health problems and water scarcity.[65] Achievement of the Millennium Development Goals 1 and 7 in particular - eradicating extreme poverty and hunger and securing environmental sustainability - are strongly linked to agricultural development and the conservation of the natural resource base in developing countries. While an increasing share of rural households in developing countries have their primary income source from off-farm activities, a dynamic non-farm sector is typically associated with sustained growth in the farm sector.

This section outlines the sustainability challenges, the changes in agricultural policies and practices required to meet these challenges, and the incentives and support that farmers need to make the shift to more sustainable agricultural practices. These can take the form of government policies, voluntary actions and new investments by business, and expression of consumer preferences for food produced from more sustainable agricultural production systems.

6.2 Current status & best practices in SCP policies in agricultural and rural development

Promoting good environmental practices in agricultural production for sustainable agricultural development and poverty reduction

[65] Hengsdijk, H., W. Guanghuo, M. M. Van den Berg, W. Jiangdi, J. Wolf, L. Changhe, R. P. Roetter and H. Van Keulen (2007), "Poverty and biodiversity trade-offs in rural development: A case study for Pujiang county, China", Agricultural Systems, In Press, Corrected Proof, Available online 17 January 2007.

In its role as Task Manager for Agenda21/Chapter 14, FAO facilitated the Sustainable Agriculture and Rural Development (SARD) Initiative, a multi-stakeholder umbrella framework launched at the 2002 World Summit on Sustainable Development. The Initiative seeks to build the capacity of rural communities and disadvantaged groups to improve access to resources, promote good practices for SARD, and foster fairer conditions of employment in agriculture. It also serves to raise public awareness of the importance of SARD for achievement of the Millennium Development Goals.

There are a wide range of negative impacts resulting from conventional agriculture which require an integrated, systems-based approach to sustainable agriculture and rural development, both with respect to farm management and the design and application of policies and market-based instruments.

Land degradation in all its forms (including depletion of soil nutrients, salinization, agrochemical pollution, soil erosion, vegetative degradation due to overgrazing, and deforestation) is a threat to food production and rural livelihoods, especially in the poorest areas of the developing world. The poor are more dependent on agriculture, and within agriculture, more dependent on annual crops and on common property which increase pressure on land relative to perennial crops and private property, respectively. The poor are proportionately more affected by land degradation, and also often lack the capacity to undertake land-improving investments. This increases poverty as all forms of land degradation reduce productive capacity and thus yields. In turn, this may force producers to resort to increasing fertilizer use to maintain yields, abandon some plots of land (temporarily or on a permanent basis), or convert land to lower value crops which can grow on poor soils or to grazing.[66]

In the early nineties, 38% of cropland worldwide was estimated to be degraded to some extent. The cumulative impact of soil degradation on loss of cropland productivity over the second half of the twentieth century is estimated to be about 13% (4% for pasture lands). The reduction in crop yields between 1970 and 1990 due to water-induced soil erosion alone is estimated to be 8% in Africa. While effects on global food supplies are modest, due to the potential for compensation from non-degraded areas, land degradation could have serious effects in certain countries and sub-regions in the developing world.[67] In South and Southeast Asia, estimates for total annual economic loss from degradation vary between 1 to 7% of agricultural GDP, while estimates based on a sample of eight African countries range from 1% of GDP in Madagascar to 9% in Zimbabwe. Country models for Ghana and Nicaragua estimate that annual GDP growth is reduced by almost one percentage point by land degradation.[68]

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[66] Scherr, S.J. and S. Yadav (2001), "Land degradation in the developing world – Issues and policy options for 2020", Ch.21 in *The unfinished agenda – Perspectives on overcoming hunger, poverty, and environmental degradation*, eds. Pinstrup-Andersen, P. and R. Pandya-Lorch, IFPRI, 302 pp.

[67] For instance, salinization is a major problem in the irrigation systems of the Indus, Tigris and Euphrates river basins, in northeaster Thailand and China, in the Nile Delta, in Northern Mexico and in the Andean highlands, whereas soil erosion affects with special severity the Himalayan foothills, southern China, Southeast Asia and Central America.

[68] Scherr, S.J. and S. Yadav (2001), "Land degradation in the developing world – Issues and policy options for 2020", Ch.21 in *The unfinished agenda – Perspectives on overcoming hunger, poverty, and environmental degradation*, eds. Pinstrup-Andersen, P. and R. Pandya-Lorch, IFPRI, 302 pp.

It is thus important to create the incentives for producers to avert or reverse degradation by modifying farming practices and undertaking land-improving investments on which long-term agricultural and rural development depend. Based on the lessons from past experience, the following policies should be considered: (a) Increased utilization of environmentally friendly ways of pest control and fertilizer use (e.g. integrated production and pest management[69]); (b) Improved water management to reduce soil salinization and erosion; (c) Industrial treatment of organic waste (e.g. manure waste from large poultry and livestock operations); (d) Dynamic monitoring and warning systems to track soil quality; and (e) Conservation agriculture, which targets the maintenance of permanent or semi-permanent soil coverage (through practices such as conservation tillage, use of cover crops, extensive crop rotations, and straw mulching) to reduce soil erosion.[70] Research shows that conservation agriculture produces net benefits for adopters in both the developed and the developing world.[71]

In many cases, both technical and financial support will be required to enable farmers to shift to more sustainable agricultural practices, especially the poorest. FAO is actively involved in promoting conservation agriculture especially in developing and emerging economies. Integrated pest management (IPM) is notably being promoted through "farmer field schools", a group-based learning process initiated by FAO in 1989 in Indonesia to reduce farmer reliance on pesticides in rice cultivation. Such programmes are now being conducted in over 30 countries worldwide.[72] More recently, a number of partnerships between businesses and NGOs and along supply chains have emerged, benefiting both producers and the environment in the area of IPM (e.g. partnerships between the Wisconsin Potato and Vegetable Growers and the World Wildlife Fund, and between Sysco and its suppliers with third-party validation by the Wisconsin IPM Institute[73]).

At the same time, as global projections for water availability and the demand for water in agriculture point towards increasing scarcity and supply variability, more attention is being paid to the role that innovative policies can play in enhancing the efficient and sustainable management of water, in terms of both quantity and quality – including under the Integrated Water Resources Management (IWRM) concept. Institutional and market-based instruments must be combined with promoting dialogue between competing water users (farmers, municipalities, industry and eco-system custodians) in order to achieve successful results. Possible measures include the following: (a) Allocation of property rights to water consuming agents; (b) Water banking (to support economically beneficial re-allocations in times of water

[69] Integrated Pest Management (IPM) is a sustainable approach to managing pests by combining biological, cultural, physical and chemical tools in a way that minimizes economic, health, and environmental risks.

[70] http://www.fao.org/ag/ca/

[71] Knowler, D. and B. Bradshaw (2007), "Farmers' adoption of conservation agriculture: A review and synthesis of recent research", Food Policy, 32, 25-48.

[72] Van der Berg, H. (2004), IPM Farmer Field Schools A synthesis of 25 impact evaluations Report prepared for the Global IPM facility (www.fao.org/docrep/006/ad487e/ad487e00.htm).

[73] Gunningham, N. 2007, "Incentives to improve farm management: EMS, supply-chains and civil society", *Journal of Environmental Management*, 82, 302-310; and SYSCO: http://www.sysco.com/aboutus/aboutus_pestm.html.

scarcity); (c) Tradable permits[74]; and (d) Salinity control and drainage management (e.g. Re-use of drainage water on salt-tolerant crops; Drainage water treatment).[75]

Finally, governments should consider promoting organic farming systems. Organic agriculture has a smaller footprint on the natural resource base, ecosystems and the health of agricultural workers than conventional agriculture. In addition, it provides for an environmentally sound and affordable way for smallholders to intensify production in marginal areas and offers promising export opportunities for developing countries which have in many cases an inherent comparative advantage due to relatively abundant labour supply and relatively low use of agro-chemicals. Several studies show that the use of organic methods of farming by small producers in developing countries can lead to an increase in yields and thus increase food security among the poor. The potential to reverse the bias against smallholders embedded in the model emphasizing purchased inputs as opposed to the assets that farmers already possess (low opportunity costs of labour) is another positive aspect associated with organic methods of farming.[76]

The ability to enter such profitable markets presents however significant challenges for producers, especially those in developing countries, including the fact they are relatively small in terms of traded volumes and that they require substantial investments in developing certification bodies and securing recognition for that certification in developed country markets.[77] Organic agriculture is furthermore fairly knowledge-intensive. Governments should support medium and small-scale producers through institutional and technical support.

Promoting the protection of ecosystem services, including carbon mitigation, biodiversity, and landscape

A combination of regulations, charges and environmental taxes, incentive payments, standards, awareness-raising, research, and institution and capacity building have been deployed to promote the protection of the natural resource base while improving the living conditions of those living in rural areas. At the same time, agricultural support instruments, particularly subsidies in developed countries, continue to encourage intensive and unsustainable agricultural practices. Hence, while below we focus on different

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[74] Pollution trading programmes have been very successful in other contexts, but less notable in water quality trading. There are however interesting lessons to be learned from several programmes in the United States, where most have been initiated (e.g. the Long Island Sound Nitrogen Credit Trading Programme ; the Minnesota River Basin trading system between point and non-point sources; and the Tar-Pamlico River Basin in North Carolina trading programme . Summary information on current trading efforts in the U.S. related to water can be found in http://www.epa.gov/owow/watershed/trading/tradingactivities.html).

[75] Msangi, S., C. Ringler and M. Rosegrant (2006), "The future of agriculture and water: Market and policy-based strategies for sustainability – What can the developing world learn from North America?", in *Water and agriculture: sustainability, markets and policies*, OECD.

[76] WTO (2006), "Environmental requirements and market access – recent work in OECD and UNCTAD", Note by the Secretariat, WT/CTE/W/244. See also Altieri, M.A., Rosset, P. and Thrupp, L.A. (2001), "The potential of agroecology to combat hunger in the developing world", Ch.19 in *The unfinished agenda – Perspectives on overcoming hunger, poverty, and environmental degradation*, eds. Pinstrup-Andersen, P. and R. Pandya-Lorch, IFPRI, 302 pp.

[77] Rodrigues, M. and M. Torres (2003), La competitividad agroalimentaria de los países de América Central y el Caribe en una perspectiva de liberalización comercial, Serie Desarrollo Productivo No. 139, 64 pp.

policy instruments used to promote the protection of ecosystem services, the need for policy reform leading to the removal of perverse subsidies must be part of any discussion in this context.

Taxes and charges to integrate directly the environmental costs of agricultural activities into farmers' production decisions have been less used in agriculture than in other sectors, reflecting logistical difficulties and poorly defined property rights. Direct payments for ecosystem services are more common, with some governments around the world paying rural landowners to steward their land in ways that will generate ecosystem services while at the same time promoting rural development. The Conservation Reserve Program in the United States, for instance, compensates farmers in exchange for their protection of endangered wildlife habitat, open space and/or wetlands. Colombia, Ecuador, Mexico and South Africa target their payments toward stewards of watershed services. Other examples include payments for protection of a wide range of eco-system services (biodiversity, watersheds, carbon sequestration) in Costa Rica, payments for preserving semi-natural pastures in Sweden, and ecological payments for extensive meadows and animal welfare in Switzerland.[78] [79]

In some rural areas in developing countries, households lack most types of assets and hold very small plots of land while operating in remote, inhospitable environments. Innovative approaches to reduce poverty in such environments require linking isolated communities with distant markets and communities, and include tapping into markets for ecosystem services, which the poor may be supplying in large amounts. Another option is tapping into specialty markets for identity-based goods and services, including sustainable tourism, and in particular ethnic/ecological tourism and fair trade.[80]

Information and communication technologies can be important tools in realising these opportunities. High transaction costs are the single largest barrier to linking these remote, but culturally and/or biodiversity rich rural areas with the global community, and include costs that range from finding information about the market (Who and where are the potential buyers? What standards must be complied with?), to getting in touch with potential customers and negotiating contract terms, to name but a few. In the particular case of tapping into markets for ecosystem services, substantial technical expertise is required. Effective institutions that can establish ownership for the services, provide reliable information on their value, link supply and demand, and deliver payment to the rural communities, must be established. Information and communication technologies can substantially reduce the transaction costs associated with these activities.[81]

Climate change is likely to have severe effects in the agricultural sector, particularly in the developing world, e.g. by exacerbating water shortage and quality problems in many water-scarce regions.[82] At the same time, agriculture is a major source of emissions of methane from animal production and nitrous oxide from fertilizer, which contribute to the greenhouse effect. Furthermore, methyl bromide has been

[78] OECD (2004), Agriculture and the environment: lessons learned from a decade of OECD work.

[79] http://ecosystemmarketplace.com/pages/static/about.conservation_backgrounder.php.

[80] Berdegué, J.A. (2005), "Pro-poor innovation systems", Background paper prepared for IFAD, December.

[81] Berdegué, J.A. (2005), "Pro-poor innovation systems", Background paper prepared for IFAD, December.

[82] United Nations (2006), "Policy options and possible actions to expedite implementation: climate change" Report of the Secretary-General, E/CN.17/2007/5.

used extensively and contributed to the depletion of the ozone layer[83] and the expansion of the agricultural frontier through deforestation is a major contributor to CO_2 emissions.[84]

There is significant potential for GHG mitigation in agriculture through promotion of conservation tillage, reduction of nitrogen fertilizer use and of livestock methane emissions, and afforestation of agricultural land. Policies that should be considered include: (a) Promoting market-based trading systems such as the Clean Development Mechanism (CDM) (interestingly, although the CDM does not currently support soil carbon sequestration projects through conservation tillage practices, emerging carbon markets in Canada and the United States allow GHG offsets from such practices); (b) Supporting the transfer, diffusion and deployment of existing technologies (e.g. crop management, livestock feeding), new uses of existing technologies (e.g. the use of oils in feed as a methane suppressant rather than only as a way to increase the dietary energy content), and R&D (e.g. animal genetics; methane vaccines; precision farming);[85] (c) promoting organic farming (which has been shown to produce lower overall GHG emissions than conventional farms, i.e. from a life-cycle perspective, where indirect requirements from all upstream production stages are considered).[86]

Finally, the agricultural sector can contribute to mitigate GHG emissions through the production of biofuels, although net effects are highly dependent on the type of the feedstock used, the methods of cultivation and conversion technologies. On the other hand, intensification of production may have serious local environmental impacts, including degradation of soils and deforestation.[87] There are also potential benefits for rural development which we discuss below.

Promoting sustainable agricultural & rural development through demand-side management

Governments, the private sector and consumers all have important roles to play in shaping demand for agricultural products derived from improved on-farm environmental practices. Multinational food supply chains and retailers have a major influence on all aspects of agriculture, including those related to agricultural practices. In addition to residue testing, major food retailers now require adoption of Hazard Analysis and Critical Control Point (HACCP)–based quality assurance measures that guarantee safe food production, in response to increasing consumer concerns with food safety and with the environ-

[83] European Commission (1999), *Directions towards sustainable agriculture*, Communication to the Council, the European Parliament, the Economic and Social Committee and the Committee of the regions, Brussels.

[84] Wakker, E. (2005), Greasy Palms - The social and ecological impacts of large-scale oil palm plantation development, a report prepared for Friends of the Earth, January 2005.

[85] Smith et al. (2007), "Policy and technological constraints to implementation of greenhouse gas mitigation options in agriculture", Agriculture, Ecosystems and Environment, 118, 6-28.

[86] Wood, R., M. Lenzen, C. Dey and S. Lundie (2006), "A comparative study of some environmental impacts of conventional and organic farming in Australia", Agricultural Systems, 89, 324-348.

[87] See e.g., Dufey, A. (2006), "Biofuels production, trade and sustainable development: emerging issues", Sustainable Markets Discussion Paper Number 2, IEED (http://www.iied.org/pubs/pdf/full/15504IIED.pdf

mental impacts of production processes. Some of the larger food retailers are also adopting protocols that emphasize the social impact of food production (e.g. the EUREPGAP standard).[88]

Retailers in developed countries are showing an increasing interest in marketing products of more sustainable agriculture, including organic products sourced from developing countries given that current organic production in developed countries cannot match the growing demand. There is a potential to expand markets from such produce from developing countries by emphasising the combination of social and environmental benefits that these production systems deliver. Other forms of sustainable farming systems could be recognized (e.g. those based on the FAO model of Good Agricultural Practices - GAP).

Voluntary labelling and certification schemes are identifying and helping to increase demand for agricultural products derived from socially (e.g. fair trade) and environmentally friendly farming practices. NGOs and the business sector are increasingly collaborating in the development of labelling and certification schemes to this end (examples are the roundtables on sustainable commodity production, such as that on palm oil).

Government can and should play a role in harnessing leadership from food retailers. There are significant differences in consumption of organic products in countries with otherwise highly similar concerns with respect to sustainability and food risks, and similar public support to organic farming. In Denmark, the Coop retailer launched already in 1993 a campaign offering reduced prices on organic products. While 70% of organic food is sold through supermarkets, there are also successful alternative distribution channels and this diversity results in fewer than 10% of Danes never buying organic food. In contrast, in Norway, supermarkets have had little interest in promoting organic food, with only few, expensive and relatively low quality products being offered, and without any significant marketing activities to promote them until very recently. Most organic food is sold via sparsely located specialized shops. As a result, two-thirds of Norwegian households never buy organic food.[89]

Differences in the regulatory framework can also be at the core of very different outcomes in terms of availability and consumption of organic food. In the US, the low penetration of organic foods up to recently was linked to consumer confusion as to what exactly constituted organic foods, given the profusion of labels, which led the Department of Agriculture to issue national standards in 2001.[90] Within the EU, fast growth in the organic market was facilitated by the introduction of a common statutory frame-

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[88] See box 2 in Gunningham, N. (2007), "Incentives to improve farm management: EMS, supply-chains and civil society", *Journal of Environmental Management*, 82, 302-310, which describes a partnership between the Wisconsin Potato Growers Association and the World Wildlife Fund. See also http://www.sustainablefood.org/article/view/14193/1/2371 for an example of a partnership between Sysco and its suppliers with third-party validation by the nonprofit IPM Institute in Wisconsin.

[89] Kjærnes, U. and L. Holm (2006), Environmentally sustainable food consumption – an institutional perspective, Conference Proceedings, Sustainable Consumption and Production: Opportunities and Threats, 23-25 November, 2006, Wuppertal, Germany. Launch conference of the SCORE! Network.

[90] OECD (2002), Towards sustainable consumption? Trends and policies in OECD countries.

work (Council Regulation (EEC) No. 2092/91, L198, 22 July 1991, pp. 1–15) to preserve the integrity of the organic claim.[91]

Government policies (a) regulating the distribution of food (e.g. regulatory measures explicitly favouring wholesale markets and small retailers in France, Italy and Spain, which indirectly benefit smaller producers[92]), or (b) promoting innovations in public food procurement (e.g. School Meals Program in Rome, Italy;[93] NY Farm to School Legislation) can also play a role in stimulating demand for more sustainably produced agricultural products. These can be complemented with publicly funded generic advertising, which has been successful in e.g. raising fluid milk sales in the US by 6% between 1984 and 1997.[94]

Increasing demand for sustainable products which currently only occupy niche markets can further help to alleviate the poverty impacts of low commodity prices in developing countries. Production of energy crops, especially sugar and palm oil for the biofuel industry, could also represent an alternative for African farmers and simultaneously help reduce dependence on imported fossil fuels. Governments have a major role to play in creating markets for modern biomass-derived energy sources, as the experiences of Brazil in the case of ethanol and Malaysia in the case of palm oil fuel blend have shown. Increasing attention is being paid to the sustainability of biofuel production methods and the overall impacts of its processing, transport and use. These considerations have to be factored in if expansion in the production and use of biofuels is to contribute to establishing more sustainable patterns of consumption and production in this sector.

6.3 Challenges

In light of the analysis in the previous section, the following challenges for future work emerge:

- Building partnerships between and within supply chains, harnessing pressure from civil society, and increasing demand from consumers generally for products from sustainable farming practices, which also contribute to poverty reduction;
- Developing the institutional support (such as trade facilitation and product certification centres) needed for developing country producers and exporters, notably in Africa, to meet consumer preferences for environmentally and/or socially sustainable agricultural products in international markets;
- Assessing the potential for policies and payments to sustain the provision of ecosystem services to provide simultaneous and tangible benefits in terms of environmental protection and poverty reduction. This will have to be placed in the context of other reforms of agricultural policies required to re-

[91] Smith, E. and T. Marsden (2004), Exploring the 'limits to growth' in UK organics: beyond the statistical image, Journal of Rural Studies, 20, 345–357.

[92] Gibbon, P. (2003), "Value-chain governance, public regulation and entry barriers in the global fresh fruit and vegetable chain into the EU", Development Policy Review, Vol.21 (5-6).

[93] http://www.sustainablefoodlab.org/filemanager/filedownload/phpbgIvxy/Briefing%20paper%20on%20Rome%20model.doc

[94] OECD (2002), Towards sustainable consumption? Trends and policies in OECD countries.

duce the incentives to practice resource-inefficient or environmentally damaging agricultural practices;

- Determining which policies are most effective in increasing demand for more sustainably produced agricultural products, while weighing and addressing the implications of some such choices (e.g. those favouring locally-produced products) for developing country producers/exporters;
- Managing the expansion of energy crop production, which can offer an alternative income source for agricultural commodity producers, in such a way that it is balanced with the needs for adequate food production and for environmental protection;
- Introducing a holistic perspective in the way development agencies develop policy advice and decide how and which projects to support, i.e. one that is redirected to focus on the nexus of food production, sustainable use of natural resources, rural development and poverty, rather than approaching theses issues in an isolated manner.

6.4 Key questions

Some key questions to be discussed among the participants in the working group on sustainable agriculture and rural development (on 27 June, Group 6) are suggested below:

1) What are the key issues on agriculture (sustainable food) and rural development policies that could be reflected in the 10YF on SCP?
2) How can an SCP perspective on agricultural and rural development policy contribute to strengthening the competitiveness of the agricultural sector, improving the living conditions in rural areas, especially for the poor, and protecting the natural resource base?
3) What tools exist and which ones should be developed to measure and monitor the sustainability of agricultural and rural development? Who should be responsible for undertaking this activity?
4) who are the stakeholders that need to be involved in promoting more sustainable agriculture practices and supply of sustainable food, including those from different parts of the supply chain?
5) What scope is there for international co-operation in advancing SCP in the agricultural sector? Is there a case to establish a Task Force or other initiative on sustainable agriculture and food under the Marrakech Process?