



ODI Food Security Briefings

4 Sustainable Use of Soil and Water: Links with Food Security

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Introduction and overview

Sustainable increases in food production are critical for achieving food security for growing populations in many developing countries. However, degradation and declining productivity of agricultural soils, due primarily to inappropriate resource management practices, poses a serious threat to agriculture in many areas (IFPRI). Productivity, with its emphasis on the long-term ecological sustainability of soil resources, is a key determinant of food security, especially in resource-poor areas. Mitigation of degradation processes and restoration of soil productivity, through the promotion of sustainable use of soil and water resources, is thus a priority concern in respect of achieving both food security and wider poverty reduction objectives.

The negative effects of degradation processes on agricultural production, rural incomes, food consumption and even national wealth are evident in many areas, most notably in Sub-Saharan Africa. The different effects of degradation on food security are discussed later in this paper. The threat however is not uniform, but depends on a variety of environmental, social, economic, demographic and political circumstances. The worst affected areas are often marginal lands characterised by intensification of production in the absence of economic incentives or appropriate technologies for sustainable resource management and with limited alternative livelihood options, sources of food supply, or non-agricultural development potential. The identification of such hot spots where land degradation poses a serious threat to food security for significant numbers of poor people, e.g. parts of the Sahel, is key to effective priority targeting of policy interventions and allocation of resources.

Soil quality is only one of many variables influencing agricultural yield, which is, in turn, only one of many factors influencing food availability, food consumption, and food income¹. Understanding which groups of producers and which farming systems are experiencing what types of degradation problems, and the relative importance of these problems compared to other challenges facing the agricultural sector is therefore essential. Policies that support dynamic agricultural development by providing for market access and attractive producer prices may encourage more sustainable use of soil and water in selected areas. However more direct policy interventions are required to avert the grave nutritional and economic consequences of degradation processes for the poorest groups in the worst affected areas.

Policymakers typically consider soil quality not as a policy objective in itself, but as a factor contributing to achieving other policy objectives. Establishing sustainable use of soil and water as a priority concern in respect of wider food security objectives is critical. However, policies designed to promote sustainable use of soil and water must provide tangible benefits to targeted individual households or communities. The soil and water conservation techniques imposed and enforced in the past were often inappropriate and largely rejected by intended users. Successful initiatives emphasise sustainable use in the context of raising agricultural productivity, food security and income, against a background of wider livelihood strategies, rather than focusing on controlling land degradation *per se*. The promotion of widespread systematic use of simple and efficient soil and water conservation techniques requires a more holistic approach, taking account of how sustainable use of soil and water 'fits' with wider livelihood/food security strategies of poor farmers.

Position, thinking and priority issues promoted by other key global players

Different institutions and agencies have different interests and comparative advantages in relation to sustainable use of soil and water and food security. Many activities in this area relate to the Convention to Combat Desertification (1997), the financing instrument of which is managed jointly by the World Bank, UNDP and IFAD.

The World Bank supports the convention through various instruments and programmes such as the Soil Fertility Initiative established in 1997 (with FAO, IFPRI and ICRAF), emphasising maintenance and improvement of soil fertility as the basis for long-term food security. It focuses on improving productivity of cultivated lands and the revenue of farmers through dissemination of appropriate technologies, promotion of enabling policies and development of soil fertility programmes via National Action Plans for Soil Fertility Improvement.

More recently, the World Bank Africa Land and Water Initiative (implemented by the GEF) was approved 'to develop, in close collaboration with concerned African institutions, other UN agencies, regional banks, bilateral and multi-lateral institutions and on high priority basis a co-ordinated 'Action Program' that promotes and supports holistic and integrated management approaches to reverse the rapid trends of land and water degradation'. The emphasis is on capacity building for multi-sectoral reform. Both food security and poverty

reduction come under the broader objective of sustainable development.

UNEP lists soil degradation as a global environmental concern. UNDP's Global Programme on Food Security and Agriculture promotes food security as a fundamental human right, and equitable and sustainable agricultural growth as a key component of poverty reduction. It advocates a Sustainable Livelihoods Approach with emphasis on the empowerment of marginalised groups, through their full participation in the design, monitoring and implementation of agricultural development programmes.

The EC treats food security as part of the broader objective of sustainable poverty reduction. It advocates reform of sectoral policy, public expenditure and institutional frameworks towards pro-poor, non-discriminatory agricultural growth. Member states giving particular importance to food security in poverty reduction include Belgium, Italy and Spain. Many US agencies often treat food security and poverty as the same thing.

IFAD advocates direct targeted support to smallholders and resource poor farmers, towards household food security as a key component of poverty reduction, through building responsive extension systems promoting appropriate technologies and supporting farmers to analyse and articulate their specific needs.

FAO's comparative advantage seems to lie in providing assistance on technical issues related to agriculture. Its Special Programme for Food Security (since 1994) focuses on 'low-income, food-deficit countries'. Mitigation of degradation processes, restoration of degraded soils and sustaining crop production through appropriate management and conservation are well-established components. Their ultimate goals are to improve national level food security, reduce annual variability in agricultural production and improve access to food. However, it is criticised in some circles for insufficient attention to issues of equity. SPFS is a nationally owned programme, formulated and implemented by national experts. FAO Land & Water Development Division provides technical assistance to member countries. A key component is the promotion and facilitation of South-South Cooperation. Their financial support is from bilateral and multilateral donors, development banks, NGOs and the private sector. It is currently operational in over 55 countries and under formulation in 25 others.

Key recent debates on this topic

Over the last five years debate on soil and water conservation has focused on six areas:

- The need for continued increases in food production in order to sustain a growing world population and the importance of effective soil and water conservation and management in this regard, especially in less favoured/low potential areas.
- The problem of low nutrient status in weathered tropical soils coupled with the rapid loss of soil organic matter through continuous cropping, burning and overgrazing) and nutrients (through erosion and leaching), with specific focus on distribution, patterns and trends in land degradation.
- The relative importance of biophysical and socio-economic aspects of soil and water management and the need for their effective co-ordination in multidisciplinary solutions.
- The significance and distribution of farmer knowledge relating to sustainable use of soil and water and the importance of understanding farmer perspectives and the rationale underlying existing practices and land management decisions.
- The socio-economic factors, such as population density, household structure, labour supply, livelihood security, diversification and migration patterns, that determine investment in soil fertility management practices and its role as a component of different livelihood strategies.
- Policy and institutional conditions: land tenure, forestry water and livestock policy in relation to local natural resource management systems, liberalisation of input and output markets, infrastructure and services, decentralisation and local institutional capacity.

A number of issues that need to be addressed have emerged:

- Identification of knowledge gaps and research priorities relating to technical and biophysical aspects of soil fertility and water management, and assessment of existing institutional capacities for research, development and extension in developing countries.
- Promotion of sustainable agricultural intensification and sound management of natural resources; specifically identification of the opportunities and constraints associated with decentralisation of responsibility for soil and water and other natural resource management to local institutions and authorities.
- Strengthening developing country institutional capacities for research and development of extension systems better adapted to support and assist farmers

to make the best decisions for their situations, specifically through farmer participation and the integration of farmer knowledge in soil fertility research and development.

- Establishing the necessary preconditions for sustainable use of soil and water with respect to enabling policies (land tenure, forestry, water and livestock policy, liberalisation of input and output markets, infrastructure and service provision).
- Understanding socio-economic factors influencing investment in sustainable use practices (population density, household structure, labour supply, livelihood security, diversification and migration patterns), and how does soil and water conservation and management 'fit' with the wider livelihood strategies of poor farmers and what are the implications for donor support strategies?

Links with wider development themes

Clearly food security is directly related to the ability of the land to support the population. Scherr (1999)² identifies four types of economic impact of soil degradation of particular interest in debates on food security and wider poverty reduction strategies:

- Aggregate supply, stability, or price of agricultural output, when lands with degrading soils are a significant source of supply for national consumers or export markets, and alternative sources of supply are not available or not economical.
- Agricultural income or economic growth, when soil degradation leads to lower production or higher costs, reducing agricultural income and its multiplier effects on an economically significant scale, and alternative sources of economic growth are limited or expensive to develop.
- Consumption by poor farm households, when lands with degrading soils are a critical source of food security for subsistence or semi-subsistence producers with few alternative livelihood options.
- National wealth, when degradation reduces the long-term productive capacity of soil resources deemed to be of future economic or environmental significance, threatening the resource base and food security of future generations.

Degradation has both direct and indirect impacts on food security and there is considerable overlap between recent debates on food security and those relating to sustainable use of soil and water. These are principally: agricultural sector reform (infrastructure investment, price stabilisation, market reform and liberalisation and producer incentives); priority targeting of public expenditure (by activities, regions, groups) and optimal allocation of resources; reform of institutional/

organisational frameworks (role of state and private sector, multi-sectoral co-ordination, decentralisation, stakeholder consultation/participation); direct support to smallholder farmers and rural producer groups (technological support and responsive demand-led extension services).

A common trend in both debates is a move away from state intervention to ensure self-sufficiency in the agricultural sector towards food supply through market reform and liberalisation. Increasing producer and consumer incomes and access to food are increasingly distinguished from agricultural growth objectives in ensuring food security.

It has been suggested that food security is a useful way of viewing the conceptual term 'sustainability'. That is, if production can be assured for a reasonable length of time, then food security is effectively achieved. Food security is therefore a useful indicator of both soil productivity and sustainability, and policy makers could usefully establish food security targets at a variety of levels (household, community, national and regional) to guide effective targeting of policy interventions.

International best practice

A number of key points emerge from the best practice in this field:

- Successful experience and initiatives, to mitigate degradation and restore productivity of agricultural soils, have taken place in specific countries or socio-economic and agro-ecological environments, but their wider dissemination for the benefit of other countries, even in the same region, is rather limited. Therefore there remains a need to develop and implement sub-regional and national programmes, as well as further projects at community level.
- Sustainable use of soil and water for food security requires a flexible/process oriented management and policy approach involving co-ordinated inter-sectoral analysis and solutions. In terms of food security, agriculture and natural resources should not necessarily be regarded as inherently more important and growth in the rural non-farm economy emphasises the importance of taking a more holistic approach to understanding how agriculture and sustainable use of soil and water 'fit' with wider livelihood/food security strategies of the poor.
- Diagnostic analysis at sub-national levels, where soil quality change and its effects can be meaningfully measured and interpreted and where policies need to be implemented (national and international priorities can be derived from aggregating sub-national information). Identification of priority soil

degradation/food insecurity hot spots and monitoring and evaluating performance and impacts. FAO already has comparative advantage in this area analysis and monitoring³.

- Assessment of existing policy and regulatory frameworks and establishing necessary preconditions for sustainable use of soil and water with respect to enabling policies (land tenure, forestry, water and livestock policy, liberalisation of input and output markets, infrastructure and service provision, decentralisation and local institutional capacity).
- Strengthening institutional capacities for research and development of extension systems better adapted to support and assist farmers to make the best decisions for their situations, specifically through farmer participation and the integration of farmer knowledge.

Notes

¹ Sustainable increases in food production are necessary but not sufficient to improve food security.

² Scherr, SJ (1999) 'Soil Degradation: a threat to developing-country food security by 2020' *Food, Agriculture, and the Environment Discussion Paper 27*. International Food Policy Research Institute.

³ Agritex has worked on developing computerised systems for the assessment of degradation and its impact on agricultural productivity at regional levels. An obvious next step would be to prepare these kinds of maps and evaluations at higher resolution for specific regions of countries of concern e.g. Southern or Eastern Africa.