SARD and... conservation agriculture in Africa

Did you know?

- The population of sub-Saharan Africa is growing at more than 2 percent a year.[1] Food production will have to double by 2030 to keep pace with demand. Instead, per capita food production has declined by 13 percent over the last 35 years.[2]
- Today, 65 percent of the people in Africa derive their livelihoods from agriculture and natural resources.[3] However, some 20 percent of the land suffers from degradation,[4] with 500 million ha of this degradation being due to water and wind erosion.[2] In addition, 70 percent of Africa's soils suffer from periodic moisture stress.[5] Degradation of soil fertility is considered the single most important food security constraint in sub-Saharan Africa.[6]
- CA enhances food security through increased and stabilized productivity and sustainable land management (SLM). Applying CA, farmers can produce more food, more reliably while gradually reducing their use of fertilizers and pesticides (by as much as 20 percent in Brazil)[7] and their labour (by as much as 50 percent).[8] Well-managed soil cover can increase moisture conservation substantially (by 30 percent)[9] and assist in flood control. Because of this, many farmers who use CA obtain harvests even in drought years or with irregular rains.
- CA is spreading to many areas of Africa. Building on indigenous and scientific knowledge and innovative equipment design from Latin America, farmers in at least 14 countries are now practising CA. In Zambia alone, between 70 000 and 100 000[10] smallholder farmers are practising CA.

Conservation agriculture (CA) can contribute to sustainable agriculture and rural development (SARD) by improving input use efficiency, increasing farm income, sustaining or increasing yields, and protecting the natural resource base. Recognizing that farmers must realize tangible livelihood benefits, CA is characterized by three interlinked principles: reduced or no-tillage, permanent soil cover, and diversified crop rotations and associations. When these principles are applied concurrently, CA can contribute to social and economic well-being while enhancing ecosystem functions and services.

Sustainable Agriculture and Rural Development (SARD)

Agriculture and rural development are sustainable when they are ecologically sound, economically viable, socially just, culturally appropriate, humane and based on a scientific approach.

Rural development policy must aim to meet the nutritional and other human needs of present and future generations; and maintain, and where possible, enhance the productive and regenerative capacity of the natural resource base, It must also provide for the durable employment of those generations, reduce their vulnerability and strengthen their self-reliance.

Why is action needed?

Resource-conserving productive agriculture, including CA, can help to address several of the most important challenges to food security and sustainable rural development in Africa through the following:

- **Making the most of available water.** Water is a limiting factor in African food production and is partially associated with climate variability. Moisture retention practices such as the soil cover, used in CA can help to reduce runoff and capture, manage and store rainfall, thereby making the most of scarce water supplies, stabilizing yields and helping to reduce disaster risks.
- **Addressing an ever-increasing labour shortage.** Most agriculture in Africa depends on human or draught animal power, but labour is frequently in short supply. CA introduces equipment that reduces tillage and the time and labour needed for land preparation in manual labour systems. Good soil cover reduces the labour needed for weeding, especially benefiting the women, children and elders who are left to work the land because of the migration of men and youth and owing to the HIV/AIDS pandemic. Reduced agricultural work enables farmers to spend more time diversifying their on- and off-farm livelihoods.
- **Adapting to climate change by enhancing ecological functions.** By restoring soil organic matter, nutrients and soil life, capturing rainwater and conserving soil biodiversity, CA and other approaches that enhance natural ecological processes can help farmers to adapt to climate change and can contribute to global efforts to enhance ecological functions. These functions include carbon sequestration, maintenance of the hydrological cycle, biological pest control and soil fertility restoration.
- **Responding to demands for sustainable value chains and quality food products.** Growing consumer demand for safe and high-quality food products requires sustainable value chains that are built on a healthy natural resource base. CA and other approaches that enhance natural ecological processes for pest and fertility management through organic matter management and crop rotations can improve food safety and quality.

What are the policy goals?

Policies should address the whole farming spectrum from small- to large-scale, subsistence to commercial, and local

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Equipment such as this jab planter minimizes soil disturbance and decreases labour requirements.

to regional. To overcome barriers and support the shift towards CA, policies and programmes should seek to:

- respond to growing food demand in Africa by increasing food production while reducing negative effects on the environment;
- build the capacities of resource-poor households and entrepreneurs to obtain a consistent supply of quality inputs, technical and business skills and access to markets;
- develop locally adapted technologies that are consistent with CA principles.

The policy issues

Difficult access to knowledge and resources

If the agents of change and policy-makers are to encourage a shift towards CA, farmers must be assisted in overcoming existing constraints. These include access to information for making informed choices and to investment capital. Security of land rights is essential if farmers are to invest in CA. Farmers also need timely access to special tools and equipment for reduced or no tillage and direct planting, and to other inputs such as cover crop seeds, herbicides and fertilizers.

Need for a common vision among key stakeholders, for SLM

All stakeholders, including community members, farmers, pastoralists, service providers and advisers, must be included in the planning and management of policies and programmes for CA and SLM. Some CA efforts have failed because of competition for plant residues with fuel and livestock feed, so farmers and livestock keepers should be involved in the development of win–win options, including appropriate sharing of crop residues for soil cover, livestock fodder and household fuel. Private and public sector equipment suppliers have a role in responding to demands from different types of farmers for adapted tools and equipment. Research and extension can help farmers to experiment with reduced tillage, manage organic matter and rotations to restore their soils, and adapt CA systems to their varied contexts. To be effective, it is most important that policies centre on the priorities and experiences of land users and seek to scale up their successful practices.

Incentives and capacities are needed for change

To encourage farmers to adopt CA and overcome their reluctance to change, financial incentives may be required, including graduated subsidies for locally available and adapted CA equipment such as jab planters, rippers and direct seeders. CA advisers and suppliers can build farmers' capacity to identify new market pathways that add value to their products, such as good agricultural practice (GAP) certification schemes, environmental service payments for carbon sequestration, and biofuel production (as long as it does not compromise food security and/or the maintenance of surface residues for soil protection).

Adjustments required for small-scale farmers and different contexts

CA was initially adopted by medium- and large-scale farmers in Latin America. More recently, it is being taken up by smaller and more resource-poor farmers in eastern and southern Africa and Asia. Further research, lesson learning and sharing of African experiences can help to encourage adaptation and wider uptake of CA in different small-scale farming contexts. Adaptive research in different agro-ecological zones can help to demonstrate CA's short- and long-term benefits and viability for the millions of small-scale farmers who rely on less than 1 ha of land, and to quantify its contribution to sustainable livelihoods and disaster risk mitigation.

What are the policy options?

Increase investments in soil health for sustainable agriculture

Sustainable agricultural growth in Africa requires increased public and private investment to support practices and technologies that sustain the natural resource base and enhance economic productivity while reducing the risks for poor farmers. Financial support for agricultural

Conservation agriculture

Conservation agriculture is a *holistic* and *sustainable* farming approach that applies three interlinked principles to mimic natural ecosystem processes: minimum soil disturbance through reduced or no tillage; permanent organic soil cover through cover crops, mulch and residues; and diversified crop rotations and associations. In this brief, CA implies the simultaneous adherence to these three principles, with an emphasis on the natural resource base.

The term "conservation agriculture" is also used in other ways. Some multinational corporations increase interest and sales by using conservation agriculture to denote large-scale no-tillage cropping systems that often depend on chemical weed control and herbicide-resistant crop seeds. However, many small-scale farmers are successfully practising CA using traditional varieties and low-cost tools and equipment without herbicides or herbicide-tolerant varieties. Clearly, CA spans very different combinations of practices, but at its core are the combined principles that need to be applied in new ways to meet the needs of resource-poor farmers in Africa.

production must be matched with support to the protection and enhancement of the soil resource base, while reducing the risks for farmers. Policies and regulatory frameworks that secure farmers' rights to land over multiple seasons are also a precondition for farmers to invest in soil resources that may yield returns only after several years.

Enhance research, learning and knowledge sharing

Research is needed to identify feasible alternative practices and technologies that adhere to the three principles of CA. These must be affordable for small-scale farmers with limited access to the required inputs because of low income and limited market access. Insights into the uptake of CA can also result from participatory research and development regarding the impact of socio-economic and agro-ecological dimensions (pests, weeds, soil organic matter, etc.). Because CA is knowledge-intensive, it is particularly important to make use of local knowledge sharing networks and participatory learning approaches, such as Farmer Field Schools (FFS).

Diversify agricultural mechanization and improve access to inputs

Policy-makers are keen to release African smallholder farmers from the drudgery of relying on the hand hoe as their main tool. CA offers an important alternative to plough-based agriculture, but a key limiting factor in its adoption is the irregular supply of reduced-tillage equipment and seed stock for cover crops. Policies that encourage local entrepreneurs in the private sector to manufacture and maintain CA equipment and to identify and market multifunctional seed stock for cover crops are essential if smallholder farmers and farmer groups are to gain better access to these much-needed technologies.

Establish new market opportunities

As well as contributing to food production, the products of CA might also attract higher prices in emerging niche and "green" markets because of the quality and safety of CA produce and the environmental services generated by their production processes. Policy mechanisms that strengthen the marketability of CA produce – such as through certification as GAP or organic produce or by compensating farmers for the carbon sequestration benefits of their production techniques – can help to increase the profitability of CA and encourage farmers to shift to these and other sustainable agriculture practices.

A field of Dolichos lablab serves as a cover crop and nutrient source before maize is planted.

Global commitments

Conservation agriculture is helping to achieve the Millennium Development Goals (MDGs)

Through better productivity, higher profitability and reduced drudgery, CA systems contribute to improved food security and livelihoods (MDG 1: reduced hunger and poverty); enhanced quality of life for women[8] (MDG 3: gender equity and women's empowerment); and sustainable resource management and environmental services (MDG 7: environmental protection).

Implementation of global conventions

By reducing tillage and improving soil cover, moisture conservation, soil biodiversity and carbon sequestration, CA is an important tool for satisfying the demand for food through SLM while implementing the goals of the United Nations Convention to Combat Desertification (UNCCD), Convention on Biological Diversity (UNCBD) and Framework Convention on Climate Change (UNFCCC).

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Tools and resources

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Men working with donkeys and a direct seeder for animal traction made in Brazil.

The "SARD and..." Policy Briefs are designed to encourage and assist governments in developing and implementing policies to achieve sustainable agriculture and rural development.

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