Benefits and challenges of sustainable farming practices for green growth in Ghana and beyond.

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Problem: Soil erosion and soil quality









Sustainable intensification

- Given the diminishing area of unused land with good agricultural potential, feeding a growing world population will require the sustainable intensification of agriculture - one that offers a range of productivity, socio-economic and environmental benefits to producers and to society at large

- Agroecological practices can enhance productivity on existing lands while minimizing environmental impact through techniques like cover cropping, integrated pest management, and improved water management

- Agroecology often combines traditional knowledge with modern technologies that are adapted to the needs of small-scale producers.

Examples of agroecological practices

- Conservation agriculture (CA) practices which boosts yields while restoring soil health, (i) Minimum soil disturbance: no till or minimum tillage; (ii) Permanent ground cover. Keeping the soil surface covered with crops, cover crops or a mulch of crop residues and (iii) Crop diversification (rotations and/or associations)
- The use of quality seed of high-yielding adapted varieties
- Integrated pest management (IPM)
- Integrated soil fertility management (SFM) - The best yields are achieved when nutrients come from a mix of mineral fertilizers and natural sources, such as manure and nitrogen-fixing crops and trees

- Efficient water management – use of precision irrigation to deliver the right amount of water when and where it is needed.
- Integration of crops, pastures, trees and livestock

CA Principle1: Minimal or no soil disturbance

Direct seeding using a pointed stick

Direct seeding on no-tilled soil using a jab planter

Localized hoeing to make planting pits

Field being minimally tilled using a ripper

Tractor drawn zero-till seed-cum-fertilizer drill

CA principle 2: Continuous soil cover

No burning

Leave dead plant material as mulch

Living plant material – crops and cover crops

Mulch or dead plant material- crop residues and pruning from trees

CA Principle 3: Crop diversification

Tree-maize intercropping

Cereal-legume rotation

Cereal-legume intercrop

Common features of agroecology practices

- Maintain vegetative cover as an effective soil and water conserving measure (by reducing evaporation, erosion and runoff), met through the use of no-till practices, mulch farming, and use of cover crops and other appropriate methods.

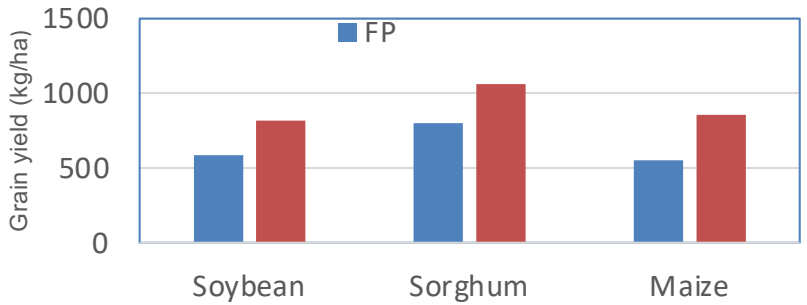
- Provide a regular supply of organic matter through the addition of organic matter (manure, compost, and promotion of soil biotic activity).

- Enhance nutrient recycling mechanisms through the use of livestock systems based on nitrogen fixing legumes, etc.

- Promote pest regulation through enhanced activity of biological control agents achieved by introducing and/or conserving natural enemies and antagonists

Benefits of conservation agriculture (CA)

- **Improved food security:** Increased food production and dietary diversity, resulting in improved food security and nutrition



- **Environmental protection:** Promoting biodiversity both in crops and livestock and reducing soil erosion, pest and diseases incidence

- **Economic viability:** Reduction in labour, time and cost of farm operations and increased profits

Economic analysis of maize production using no-tillage and farmers' current practice in Lawra district in 2009 and 2010

Variable	Farmer Practice	No-till
Gross benefits (GHC/ha)	462	702
Total costs that vary (GHC/ha)	163	62
Net benefits (GHC/ha)	285	611

Partial budget analysis showed that the cost of producing maize or soybean is 20–29% cheaper with no-till systems and gives higher returns to labour compared to convectional tillage practice. Benefit-to-cost ratios also show that no-till cropping systems are more profitable than convectional tillage systems.

Benefits

- The Howard G. Buffett Foundation Centre for No-Till Agriculture (HGBF|CNTA) farmers who transition from traditional farming practices to CA typically see a 35% increase in yields over the first two years.

- Conservation agriculture retains moisture at a rate of 45-60% greater than traditional slash and burn practices (Based on HGBF|CNTA Data, 2016)

- Conservation agriculture farmers reduce their field labour by an average of 45% over time through improved weed control.

- Conservation agriculture practices of no-till, residue retention and crop rotation/intercropping maintained higher soil organic carbon, and total soil N compared to conventional tillage practices after 4 years.

- **Resilience to climate change:** it builds resilience to climate change and reduces greenhouse gas emissions through, for example, increased sequestration of carbon in soil

Major challenges to adoption of CA

- Mistaken perception that soil cultivation (ploughing) is essential for high crop production.

- Limited knowledge and experience on how to adopt the CA practices. CA not well understood

- Limited access to critical inputs, herbicides and affordable seeding machinery and tools that are locally produced and maintained
- Competition for crop residues for mulch or livestock feeding

- Land tenure system
- Unwelcoming policy and extension environments
- Limited promotion of conservation agriculture
- Dry season bushfires
- Free-ranging livestock
- Access to credit and markets

Overcoming challenges to adoption of CA

- For CA practices to be adopted, farmers must see tangible advantages in terms of higher incomes, reduced costs and sustainable livelihoods, as well as compensation for the environmental benefits they generate.

- Policy and institutional improvements are essential to the success of CA in Ghana. If policy makers are to take up CA, a communication or lobby group is needed to properly package its success stories and share them regularly with the policy makers.

- Introducing and promoting simple and appropriate CA equipment and implements while ensuring proper support services will greatly improve labour productivity and enhance the adoption of CA.

- Community agreements to reduce free grazing and to curb indiscriminate bush burning.

Thank You!