Executive summary

Agriculture is the backbone and key driver of Kenya’s economy. However, agricultural productivity is significantly constrained by declining soil health resulting in underperformance of major crop and livestock enterprises. Soil can be viewed as a nutrient bank from which plants draw nutrients for their growth. If nutrients are not returned, the nutrient level decreases to a point that cannot support crop production.

Key Messages

• Create a one-stop easy access forum for soil health input information and knowledge
• A consumer driven regulatory framework to check the quality of soil health inputs
• Improve farmers access to soil health inputs and agricultural financial services
• Promote innovative mechanization for smallholder farmers

Only ‘living’ things can have health, therefore viewing soil as a living ecosystem reflects a fundamental shift in the way we need to take care for our soils - Kenya Soil Health Consortium

Soil Health Inputs for Increased Agricultural Productivity in Kenya

Maize crop lacking essential soil health inputs

Maize crop with essential soil health inputs
For this reason, appropriate soil health management is necessary through application of soil health inputs such as organic and inorganic fertilizers, and soil amendments (liming). Declining soil health in Kenya has been caused by continuous cultivation without adequate replenishment of plant nutrients in soil, lack of access to sufficient quantities of quality inputs, compounded by the adverse effects of climate change and variability. Another contributing factor is the limited access to affordable credit and financial services for smallholder farmers. Various studies have shown that Integrated Soil Fertility Management (ISFM) can reverse this declining trend. Appropriate use of soil health inputs increases yields by 100 - 300%, but farmers are not likely to achieve such high yields due to policy related challenges affecting agriculture.

Experts recommend the following policy options:

- Creation of a one-stop multi-stakeholders’ association for easy access of information and knowledge on soil health inputs e.g. fertilizers, seeds and planting materials.
- Formulation of consumer driven regulatory framework to assure quality of soil health inputs
- Improve access to agricultural financial services
- Promotion of innovative mechanization for resource constrained smallholder farmers

**Justification**

Soil health inputs comprise of inorganic and organic fertilizers, bio-fertilizers and soil amendments (lime, inoculants). In addition to soil health inputs sufficient water

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**Soil Health and Ecosystem functions**

**Soil health** (or soil quality) is defined as the capacity of a soil to continue to function as a vital living ecosystem that supports and sustains plants, animals, and humans. **Ecosystem** is described as a community of living organisms (plants, animals and microscopic life forms) in conjunction with the non-living components of the soil such as air, water and nutrients interacting as a system. Critical ecosystem functions or services include increasing the following: carbon storage, crop productivity, nutrient cycling between plant, soil and animals, water capture and infiltration and biodiversity (range and number of plants, animals and micro-organisms).
in the soil and the use of improved seeds, planting materials and crop-livestock integration are required for optimal crop yields. The national average use of inorganic fertilizer in Kenya stands at 32 kg/ha against the Abuja Declaration recommended rate of 50 kg/ha, while organic fertilizer use stands at 2 tons/ha against the national recommended rate of 5 tons/ha. This low use of soil health inputs is due to a number of reasons, including

1. Access to inputs:– Access to input is constrained by unavailability of fertilizers and improved seeds at the right time, place and quantity. Agro-dealers tend to concentrate in areas with accessible infrastructure (usually within and close to urban areas), leaving out the majority of farmers in rural areas. As a result, these rural based farmers (who make up more than the 80% of farming population in Kenya) experience difficulties in accessing soil health inputs.

2. Finance: - A 50 kg bag of fertilizer costs between KES 3,000 and 4,500, but a typical farming household in Kenya survives on less than KES 150 per day. The recommended application rate for inorganic fertilizers such as Di-ammonium phosphate (DAP) is 200 kg/ha (or 80kg/acre). This will cost a household about KES 16,000/ha (or KES 6,400/acre) at a subsidized price while the recommended rate of application of organic fertilizers of 5 tons/ha (2tons/acre) will cost the farmer on KES 8,000 (or KES 3,200/acre) on average. Were it not subsidized, it would cost twice as much. Moreover the cost of transporting fertilizers to local rural outlets is passed on to the farmer, further increasing the buying price. This implies that majority farming households in Kenya are in no position to afford sufficient quantities of fertilizer without external support.

3. Quality and quantity:– Contamination, adulteration and debagging of soil health inputs are common practices in Kenya due to limited quality control enforcement mechanisms and unscrupulous business practices. Kenya does not have organic
fertilizers processing plant and consequently no policies have been enacted to facilitate their use. Therefore farmers are not always guaranteed of quality soil health inputs. There is need to process organic inputs into easy to use end products. Appropriate use of soil health inputs increases yields by 100 - 300%, but farmers are not likely to achieve such high yields due to policy related challenges affecting agriculture. For farmers to get full benefits of their investments in soil health inputs, there is a need to establish a regulatory body to assure on quality and quantity of soil health inputs availability in the Kenyan market.

4. Agricultural advisory services:– The human resource to provide agricultural advisory services is inadequate. Currently the ratio is 1:2000 against the international recommended standard of 1:400. This is compounded by limited formal and in-service training due to inadequate budgetary allocations. The implications of this are poor quality of extension information concerning farming methods and soil health inputs. Therefore there is need for increased budgetary allocation to formal and in-service training.

5. Access to Information Whereas a lot of investments and efforts have been put in development of inorganic

\[\text{Figure 1. Effects of ISFM inputs on maize yields in Kenya}\]
fertilizers, improved seed and planting materials, access to these inputs still remains a challenge for many smallholder farmers. Information on soil health inputs is often not easily accessible, often inaccurate and packaged in a manner that is not clear to the end-users. This leads to inappropriate and limited use of soil health inputs. Moreover, even agro-dealers have limited knowledge on products they sell. If equipped with proper information they can support the extension services. Information they can support the extension services.

Creating a one-stop easy access forum (Mandate of the Kenya Soil Health Consortium)

Information about use of soil health inputs in Kenya is scattered in various public, private and international research and development institutions. There is a need for a forum to collect, pool, inventorize, synthesize and harmonize such information into user-friendly packages and share the information to ensure key stakeholders (farmers, input suppliers, policy makers, extension agents and researchers) get the full benefits of time and resources invested. Different stakeholders need different kinds of information, access information in different ways, and need sound evidence to inform their decisions hence there the need to package the information to suit various socio-economic, gender, and cultural groupings.

Regulation and quality control

While seeds/planting materials and crop protection industry are regulated by formal institutions (KEPHIS and or PCPB respectively) there is no formal body for enforcing standards in soil health inputs. For this reason, it is not uncommon to find unscrupulous businessmen selling adulterated, expired and sub-standard soil health inputs to unsuspecting farmers. There is need for legislative participatory quality control mechanism. Additionally, the existing regulatory bodies should be empowered to enforce the existing regulations.

Access to affordable agricultural finance

Generally the price of a 50 kg
A bag of inorganic fertilizer has increased by more than 100% over the last 14 years. The ever increasing cost of organic and inorganic fertilizers has made it difficult for smallholder farmers to afford the required quantities. Considering that organic fertilizers are equally expensive, farmers need access to affordable credit to be able to purchase the required quantities of both organic and inorganic fertilizers at the required time. Also necessary is to allow duty free importation of fertilizers and agro-minerals, and offer tax incentives to encourage the production of legume seed access to rhizobium inoculums.

**Linking farmers to output markets**

Assurance of sustained profits is key to widespread uptake of inputs. Often smallholder farmers in Kenya are not properly linked to profitable markets. This leads to over exploitation by middlemen, high post-harvest losses and ultimately low returns to investment. There is need to support farmers to link up with profitable output markets in order to recoup high returns on investments in soil health.

**Innovative mechanization**

Mechanization ensures nutrients are applied at the right rate, time and place. Farming in the smallholder context is labour intensive. This discourages investment and use of soil health inputs and practices because the application of these further adds to the labor bill. Mechanization particularly during land preparation, planting, weeding and fertilizer application can reduce drudgery from farming. There is therefore need for investment in appropriate and innovative mechanization to increase the use of soil health inputs and consequently increase agricultural productivity.

**Policy implications**

*Create a one-stop easy access forum for soil health inputs*

This can be achieved by strengthening the existing initiatives such as the Kenya Soil Health Consortium (KSHC).

**Policy and Regulation**

*Develop a Soil Health Inputs Policy to provide the basis and guidelines for improved uptake*
of soil health technologies. This policy will provide the guidelines and legal basis for regulation. Regulation of farm inputs quality and standards including quality checks on packaging and repackaging. Set up advanced laboratories to facilitate testing of soil health inputs according to internationally accepted standards. The existing agricultural policies and laws should be strictly enforced by the relevant regulatory bodies.

**Capacity Building**

There is need for formal and in-service training for actors in soil health inputs value chain (advisory service providers, agro-dealers and farmers) to enhance access and appropriate use of the right inputs at the right time. The training curriculum should be tailored to optimize production benefits, economic returns, and environmental sustainability.

**Further reading**


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