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African Technology Policy Studies Network

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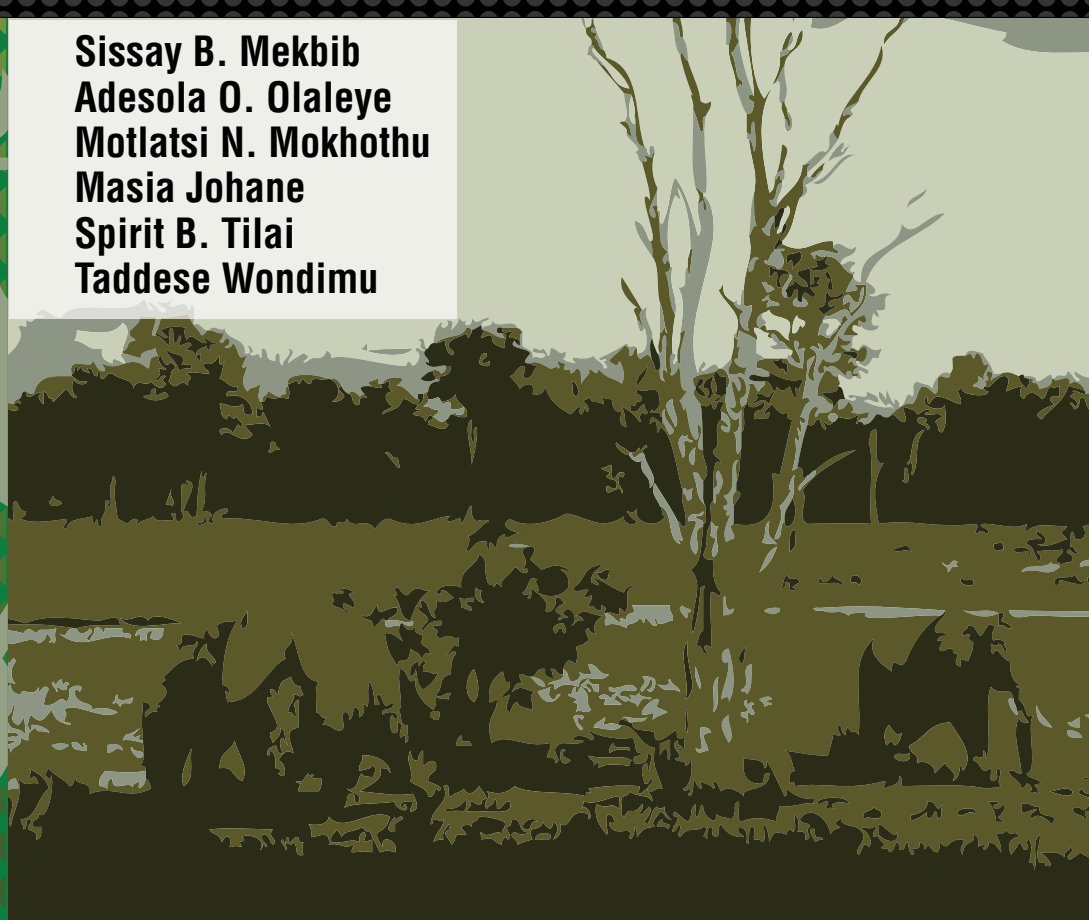

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The African technology Policy Studies Network (ATPS) is a multi-disciplinary network of researchers,private sector actors and policy makers promoting the generation, dissemination, use and mastery of science, technology and innovation)ST&I) for African development, environmental sustainability and global inclusion. ATPS intends to achieve its mandate through research, capacity building and training, science communication/dissemination and sensitization, participatory multi-stakeholder dialoque, knowledge brokerage, and policy advocacy.

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1.0 Introduction

Lesotho is heavily influenced by a variety of competing weather systems because of its high elevation that range from 1,388 to 3,482m above sea level. In accordance with Article 4 of the United Nations Framework Convention on Climatic Change (UNFCCC), these climatic conditions make Lesotho to be highly vulnerable to climate change impacts. The country is already experiencing some impacts of global warming as seen by the increasing frequency of natural disasters, droughts and emerging signs of desertification, fragile characteristics of its soil and terrain, and erratic climatic conditions such as changing patterns in rainfall periods and the risk of shorter growing seasons.

The observed and anticipated impacts of climate change are likely to affect agricultural production and livelihoods as more than 80% of the population in Lesotho are farmers that depend on subsistence agriculture for their livelihood. The Basotho farmers have adopted innovations and practices imported externally since the arrival of the Missionaries in the 19th century and used them to improve their agricultural production. However, the lack of access to modern technologies and farming methods including High Value Crops (HVCs) and inorganic fertilizers continue to hamper the realisation of food security. Lack of modern technologies notwithstanding, climate change effects have also contributed to decreased crop yields as a result of poorly developing buds; pest infestation, drought, flooding and hail storms. The available arable land has also greatly shrunken and become inaccessible for farming.

The development and promotion of indigenous farming systems like Machobane Farming System (MfS) has over the years become popular among Basotho farmers because it has proved to respond positively to consumer needs of food variety and security. The MfS is an integrated organic farming system which derives inputs from crop-livestock combination and involves a rotational, labour intensive intercropping system using kraal manure/ash to improve soil fertility. The sustenance of fertility from the soil that slowly release nutrients for crops and the conservation of the soil moisture content in MfS makes it resilience to climate change noticeable.

In order to either take full advantage of new opportunities and potential that may come with climate change, or avert human sufferings that may be associated with its adverse effect, a comprehensive study was conducted through the support of the African Technology and Policy Studies Network (ATPS) to investigate the mitigative and/or adaptive characteristics of the MfS in combating the negative impacts of climate change in Lesotho. The study sought to answer the following questions:-

1. What are the perceived causes of poor crop production by households?
2. What are the physicochemical characteristics of both MfS and non-*Machobane* Farming System soils from the different agro-ecological zones of Lesotho?
3. What are the soil microbiota as soil fertility indicator from both MfS and non-*Machobane* Farming System soils from the different agro-ecological zones of Lesotho?
4. What information is available on current traditional pest control practices including important pest list and type of crop diseases in the major cropping zones of the country?
5. How do the basic field agronomic features, cropping practices, and Meteorological data within the study area relate to each other?

2.0 Main Findings

Improvement of soil quality

Most MfS soils were found to be rich in clay, organic content with slightly acidic or neutral pH compared to the non-MfS soils. Although the available phosphorous content of the soil is generally low, the MfS soils exhibited relatively higher content of available phosphorus and low lime requirements compared to the non-MfS soils. Further, the MfS soils showed higher number of soil fertility indicator microorganisms (*Bacillus* and Nitrogen fixing bacteria) compared to the non- MfS soils. The activity of *Bacillus* spp. and Nitrogen fixing bacteria has an overall ameliorative effect to the soil pH. Significant differences were observed in soil pH

improvement in some MfS practicing farms compared to the non-MfS soils.

Presence of crop pests

Insects were identified as the major pests followed by fungal and bacterial infections that cause great damage to crop plants in Lesotho. Stock Borer *(Busseola fusca)*, and Bagrada Bug *(Bagrada hilaris)* were identified as the major insect pests followed by Aphids that damages leafs and stems. Forty four percent of the respondents reported using commercial pesticides to control pests whereas 30 percent reported using traditional pesticides. The formation of concoction using various plant materials and other inputs was also highlighted by farmers during Focused Group Discussions.

Precipitation levels

In general, the percentage change of precipitation over years in Lesotho between 1923 and 2006 was found to be decreasing at a high rate. The specific measures taken to address effects of changing of climate conditions vary from one village to the other. In the mountains and foothills, on-farm trials by farmers are ongoing to establish appropriate crops that can cope with shifting of sawing season. In addition other practices such as mulching and returning residue on to the fields (in the dry Senqu River valley), ploughing the land with retained plant residue and avoiding burning of plant residues are some of the farm practices currently applied to cope with climate change. Construction of small dams for sustainable supply of irrigation water in drought prone areas with high activity of farming practices are also advised.

3.0 Policy options

An alternative promising approach to boosting crop production and combating climate change impacts embraces the introduction and implementation of innovative indigenous farming technologies. There is therefore a greater need to practice more robust farming systems considering the increased climate change

impacts in Lesotho, including boosting government commitment in terms of budget allocation to the agricultural sector.

Our findings show that compared to other farming technologies practiced in Lesotho, the *Machobane* Farming System has more adaptive and resilient nature with the application of traditional and technological inputs to produce diverse crops throughout the year. It is more economical and environmentally friendly practice that restores the soil fertility and improves crop production in quality and quantity. Its wider application among Basotho farmers would help them cope with the effects of climate change. The following policy measures are thus recommended;

- To disseminate knowledge to needy communities in all regions, it's proposed that multi-faceted experience sharing program combining workshops, visitations to model farming systems in Lesotho, networking and distribution of training manuals and relevant literature materials should be promoted by responsible national and regional organisations. Such an approach is believed to play an important role in bringing a shift in social attitudes towards the improvement of farming practices in crop production.

- Education and guidance of farmers by Government and NGOs is important based on their indigenous knowledge towards building adaptive measures to climate changes.

- Researching and release of short term growing crops to farmers by the Agriculture research department and higher institutions is suggested as these crops would resist drought and disease.

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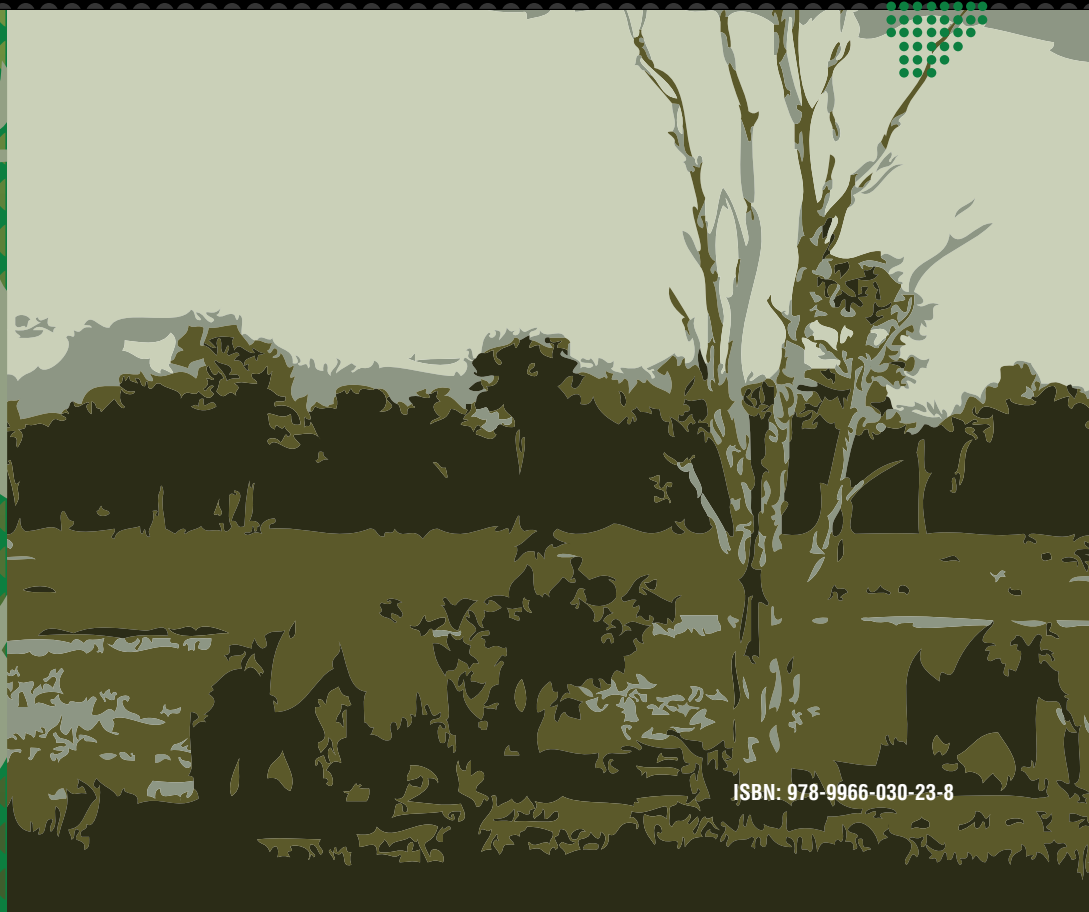

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