NATIONAL POLICY WORKSHOP ON SMALLHOLDER AGRICULTURE MECHANIZATION IN KENYA
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ACRONYMS

2WT: Two Wheel Tractor

ACIAR: Australian Centre for International Agricultural Research

CA: Computer Associates

FACASI: Farm Mechanization & Conservation Agriculture for Sustainable Intensification

KENDAT: Kenya Network for Dissemination of Agricultural Technologies

MOALF: Ministry of Agriculture, Livestock & Fisheries

SHF: Small Holder Farmers

UON: University of Nairobi

Workshop host facilitator: Dr. Pascal Kaumbutho (KENDAT)

Number of persons attending: 25

Venue: Jacaranda Hotel, Nairobi

Workshop Presenters (name, organization):

- Pascal Kaumbutho - KENDAT
- George Mburathi - ACIAR
- Engineer Jasper Nkanya - MOALF
- Marcos R.G. Brandalise, Group CEO BrazAfric Ltd
- Elizabeth Mukewa – KENDAT / FACASI Project Gender Consultant
1.0 Background, Introduction and Situation Analysis
1.1 Introduction (Purpose and Objective)

The overall goal of Farm Mechanization & Conservation Agriculture for Sustainable Intensification (FACASI) is to improve access to mechanization, reduce labour drudgery, and minimize biomass trade-offs in Eastern and Southern Africa, through accelerated delivery and adoption of two-wheel tractor (2WT) -based technologies by smallholders. The project is being implemented in Ethiopia, Tanzania, Zimbabwe and Kenya, sponsored by the Australian Agricultural Centre for International Agricultural Research (ACIAR) and International Maize and Wheat Improvement Center (CIMMYT). KENDAT is leading this work in Kenya that aims to address the needs of the smallholder mechanization, with success cases to report particularly in Laikipia and Bungoma Counties. Ensuring that this and other good works are captured in the upcoming Kenya Mechanization Policy dialogue and final documents is crucial for this and the other countries.

The aim of the workshop is to review existing large and smallholder mechanization related policies in Kenya, identify policy gaps, constraints, and opportunities, and also assess alternative policy options for a wider use and expansion of smallholder agricultural mechanization in general and 2WT based mechanization in particular. In the advent of expanding Climate Smart practices and the motorbike use in rural settings, the 2WT has a new lease of effective work and business life.

The Workshop provided an opportunity to discuss such issues with a wide range of organisational and individual stakeholders in the mechanization integration process including researchers, funders, managers and policymakers.

The format of the meeting placed an emphasis on sharing the expertise and perspectives of all participants. Presentations were kept very short, with the provision for breakout groups, debate and networking. Together, these stakeholders reviewed the scope for joint and individual action and collectively suggested ways forward.
1.2 Workshop Welcome and Agenda Setting

1.2.1 The FACASI Project (Background, Objectives and Achievements)

*Dr Pascal Kaumbutho – KENDAT/DHL FARMS*

He started by reflecting back on 1992 when he was involved in a government research and consultancy work on Mechanization of sugar and wheat in western part of Kenya. They came up with a draft mechanization policy which was never implemented. Till to date no policy on Agricultural Policy on mechanization/machinery is in place.

He noted that the “National Policy workshop formulation on Smallholder mechanization” was sponsored by ACIAR. Dr. Pascal reminded the stakeholders that they were also gathered because they need to make contributions and proposals on Agricultural mechanization as key players. He noted that there was need to learn from other countries in terms of what they have done, what we can do differently, and, what is the current country’s situation?; so as to come up with workable solutions.

He noted that the FACASI project objectives were to provide;

1. Best-bet 2WT Equipment: Suitable *(reduce labour drudgery, and minimize biomass trade-offs)* and commercially available;
2. Business models for accessible, efficient and serviceable machines and equipment for smallholders;
3. Policy ingredients, gaps, constraints, and opportunities: alternative policy options for wider use and expansion of smallholder mechanization;
4. Create awareness of 2WT-based technologies through sharing of knowledge and information with stakeholders.

Dr. Pascal also noted the Objectives of the workshop as to;

i. Review existing smallholder mechanization related policies in Kenya;
ii. Identify policy gaps, constraints, and opportunities;
iii. Assess alternative policy options for a wider use and expansion of smallholder agricultural mechanization in general and 2WT-based mechanization in particular.

Dr. Pascal concluded by stating that, the agricultural mechanization policy in Kenya had taken long to actualize.

1.2.2 Agricultural Mechanization in Kenya; A Policy Perspective

Dr. Mbathi Musyimi – University of Nairobi (UON)

Dr. Mbathi noted that his main concerns were what an outsider/common public would reflect on this policy. In his presentation he explained the requirements of the public in terms of what needed to be done about mechanization. He noted that:

a. Analyze the Situation as it is today: Doesn’t wish to see a situation where the County/National Government provide the machinery but not being able to effectively use them;

b. A situation where we are able to analyze and identify Issues and trends.

c. Advance the Proposal: to a level where they will reach the right offices. He noted that mechanization is a concern of many professional and not a preserve of the mechanical engineer;

d. Engage Stakeholders;

e. Develop Political Strategy: Despite being having a good policy document with good proposals, it is paramount to not that someone somewhere determines whether the policy document would be implemented. He reminded the forum that the policy formulation was a process oriented approach.

Dr. Mbathi explained that the purpose of agricultural mechanization should increase labour productivity, increase land productivity and decrease the cost of production. He went ahead to answer the question “Why is agricultural mechanization important?” by stating that mechanization (animal or motor power driven) can significantly increase the productivity of human labour and improve the quality of life for large scale, small scale and cooperative holding.
He went on to clarify that Agricultural mechanization policy should address issues beyond tools and implements. Dr. Musyimi gave out three pointers in which the policy should address:

1. Issues of manufacture, distribution, maintenance, repair, management, and utilization of agricultural tools, implements, and machines;
2. Address issues on agricultural land development, crop production, harvesting, and preparation for storage, on-farm processing and rural transport;
3. Meeting the real needs of farmers and can be used efficiently and effectively and is financially viable.

For successful agricultural mechanization, Dr. Mbathi noted that at the end of the day as much as there is need to develop a good policy then the following factors are very critical:

- Holistic principle (multidisciplinary and participatory): the policy needs to think and incorporate the needs of farmers, the needs of consumers among other stakeholders;
- Safeguard Public-Private Partnership;
- Economic Profitability: He stated that if mechanization doesn’t make economic sense it is not needed;
- Mechanization is Demand-driven: He elaborated that if farmers don’t need it (the policy document), then it wasn’t necessary to have it: no need to force the policy on them.

Dr. Musyimi gave the following priorities by the Public Sector for Successful Agricultural Mechanization:

1. Enabling Environment (Improving rural infrastructure, removing legal and regulatory constraints, providing direct support to private sector);
2. Training and Human Resources Development (Establish / upgrade training and extension facilities, Strengthen the entrepreneurial skills of commercial farmers and agribusiness managers, Provide technical training);

Dr. Mbathì reiterated that a good policy should have or address the following:

a. Clear Purpose & Measurable Outcomes;
b. Sensitive to Current and Future Needs;
c. Stakeholder Inclusion: Need for continual engagement with various stakeholders;
d. Policy should be enforceable;
e. Historically Informed: History can teach a lot;
f. Able to Provide Strategic Direction;
g. Due Process Observed: In the event the process would take political dimensions, there will be need to provide prove of engaging stakeholders.

Dr. Musyimi finalized his opening remarks by thanking the stakeholders and hoped that his presentation was understood in terms of the outcome and what the public sector would require to be addressed by the policy.

### 1.2.3 Agricultural Policy and National Development

**Mr. Goerge K. Mburathi-ACIAR**

Mr. Mburathi started by expressing his gratitude to Pascal and his team for inviting him to the forum. In his views he noted that without policy it is very difficult to tackle a given sector. Agriculture in our country is shifting towards small scale agriculture and if we don’t catch up with changes in time we will be failing. He added that without policy agriculture sector can’t be successful in demanding objectively from the government.

Mr. Mburathi articulated that inclusiveness of different stakeholders is important because without inclusiveness there will be complains from different quarters. He believed that after the workshop, the policy document will be carried further to the government, because without the government it will be difficult in implementation. Mr. Mburathi expressed his appreciation to the government being represented in the forum.
He also noted that it was very important that the workshop incorporated gender which is important: He confirmed that in the grass root, majority of people who do most of work in the farms include the women. He reiterated that unless we also incorporate the women in the process, the efforts geared towards success of this policy will not be optimized.

In conclusion, he emphasized that without policy, whatever we demand or require support from the government for the people at the rural areas it will not be possible. He concluded by stating that “the road has been long but it has not been of no use”

1.2.4 Agricultural Mechanisation: The 2 Wheeled Approach

Dr. Joseph Mutua-KENDAT/FACASI

In his presentation, Dr. Mutua started by justifying why the policy document focused on 2WT technology by noting the following reasons:

- Declining population of draught animals on the African continent (due to biomass shortage, droughts, and diseases)
- CA systems reduces power requirements – typically by a factor of two – making the use of lower powered and more affordable tractors such as two-wheel tractors (2WTs) a viable option
- There is a marked increase of 2WTs but seldom used for CA
- Supporting infrastructure such as repair services, replacement parts, fuel and lubricants,
- Several CA planters adapted for 2WTs have also been developed recently, and are now commercially available for 2WTs
- Four-wheel tractors and associated equipment have proved inappropriate for small and fragmented fields and too costly for African smallholders,
- Successes in Bangladeshi in the use of 2WT-based technologies where agriculture is characterized by small and fragmented fields.
- Multiple uses of 2WTs - transport, water pumping, crop threshing/shelling and grain milling.
• Highly profitable - Recent studies in Bangladesh demonstrate that 2WT-based CA technologies can be very profitable for service providers, with an average annual rate of return on investment close to 300%.

• 2WT-based technologies will make farming more attractive to the youth (profitable and drudgery free) and alter rural-urban migration trends by creating livelihood opportunities e.g provision of agricultural services, maintenance of machinery, input supply, fuel supply and transport services.

• 2WT-based technologies will lead to reduced labour drudgery particularly for women, increased food security, higher income and improvement of the quality of life of farming families.

He explained the Methodology used as follows:

Data Collected

• Soil parameters
• Crop parameters
• Equipment parameters:
  – Average depth of seed placement (mm)
  – Trash handling. (General observations)
  – Seed coverage (Good, Average, Bad)
  – Handling and manœuvrability (good or difficult)
  – Tractor fuel consumption
  – Work rates

Dr. Mutua concluded by stating the following remarks:

• The search for best-bets should continue as new products become available;
• Adaptations may be necessary to suit our circumstances;
• Encourage and support local manufacture;
• Awareness creation- no clear demand as farmers are not aware of the existence of the technology
• Provision of hire services vs private ownership?
• Potential for entrepreneurship and job creation in the supply chains
• Policy options for wider use & expansion of smallholder agricultural mechanization
2.0 Key Note Presentations
2.1 Policy and Stakeholder Dialogue for Successful Mechanization

*Engineer Jasper Nkanya – Ministry of Agriculture, Livestock and Fisheries*

Engineer Nkanya highlighted the need and justification for mechanization taking into account the growing population and environmental concerns in Kenya. He further added that the available arable areas of Kenya had high population concentrations which posed the challenge of increasing population and decreasing land sizes. He continued elaborating that despite the challenge; Kenya needed to be fed either by producing or importing food stuffs.

Over the years, the government policy has been crafted to enable local food production for food security. The centrality of food security in development politics, necessitated those countries which were not able to produce enough food to sustain their populations to mix foreign policies plus issues related with food security.

One of the major challenges facing the country is low productivity in relation to provisions of Kenya Vision 2030 since agriculture is one of the key sectors to help in growing the economy to 10% annually. He noted that the intervention in place is to improve agriculture productivity.

Mechanization was identified as the major entry point to increasing productivity because the current producers in the rural areas are the aging population and youth are the biggest eaters yet are not being involved in the production system.

He questioned why there was need to have many policies in agriculture yet there existed an opportunity to have an arching policy to address all these issues. He gave examples of other countries with successful agriculture systems that didn’t have a policy on mechanization but a clear law and clear strategies to address issues of mechanization.

To make a breakthrough the country’s mechanization and productivity, there was need to shift from the current 30% to 45%. Further he highlighted the need to shift from subsistence farming to commercial agriculture so as to make the sector competitive.

He noted that some of the critical steps in policy formulation are that the national government and county governments should be incorporated since some of the functions of the agriculture ministry had been devolved. He stated the following steps in agriculture mechanization policy formulation to be followed:

i. Establish a technical working team by the government,
ii. Intergovernmental technical working group: Looking at technical issues and integrates them in the proposed mechanization policy document.

iii. Stakeholders’ participation: seeking views and presentation from all regions and stakeholders in Kenya regarding the proposed policy.

iv. Validation process: The need to have the parliamentary and senate committees on agriculture to vet and debate the proposal before final presentation,

v. Formulation of a cabinet memo and a bill for parliamentary approval.

On agriculture mechanization policy there were some areas that need to be addressed:

- Agriculture mechanization research in Kenya
- Appropriate machinery tailored to local farming/agriculture conditions in the country
- Local manufacture and distribution: need to strengthen the capacity as a country
- Quality assurance of the machines and products imported into the country
- Government to invest money in the sector
- Need for supporting the farming community in technology adoption

Other areas of concern included

1. Import and trade: a machine produced in Kenya was more expensive compared to the one imported. Need to have strategies to promote the use of local machines and support local manufacturers

2. The environment, land use and climate change linkages: The need to have a dedicated policy to reduce land subdivision into un-economical parcels

2.2 Mechanization and the Small Holder Farmer in Africa: An Opportunity

Marcos R.G. Brandalise, Group CEO BrazAfric Ltd

Mr. Marcos observed that the in the future, the role of the SHF would be reduced significantly. This was due to current experiences in many African countries where the large scale operations were taking root given the economies of scale and possibility of mechanization.
Mr. Marcos noted that the current situation of agriculture in African countries was characterized by:

- Relatively small farm holdings / parcels;
- An aging farming population with few youth taking up agriculture;
- Farmers children being educated and seeking new non-farm opportunities;
- Limited Access / Stringent requirements to appropriate financing to farmers;
- Lack of proper and fair marketing channels;
- High concentration of one crop per region;
- Poor techniques and technologies for planting, cultivation and harvesting leading to loss of up to 50% of expected yields
- Lack of appropriate equipment for post-harvest handling, drying and storage for their produce leading to an estimate of 30% loss
- Poor regional distribution of agricultural equipment – leading to poor back up services
- Global warming and other environmental challenges

He noted that the main difference and gap in agriculture practice between the developed countries and Africa was that developed countries depended on mechanization while African countries depended on man power which determined the amount of produce produced.

He observed that Kenya was able to improve its agricultural production by following the Brazilian example characterized by:

- Formulating government policies favorable to agribusiness, including tax incentives
- Providing land for farming (land with no conflicts)
- Research and development including collaboration with local research institutions for accelerated development in agriculture
- Providing affordable finance to farmers who wanted to improve their operations and production systems
Mechanization using appropriate technology for small to large farmers operating in the tropics, e.g. handling, storage, processing, comprehensive training, backup services, original spare parts and extension services

For successful mechanization in Kenya, there was need to take into account the following aspects;

i. Appropriate technology
ii. Comprehensive training
iii. Reliable back-up services
iv. Original spare parts
v. Extension services – to ensure continuity

Impact Agriculture Sector Mechanization

A) Economic Impacts

i. Increased productivity per unit area due to improved capacity of farm operations

ii. Small holder farmers would benefit from the huge demand in local-regional/national consumer markets

B) Social Impact

i. Significant reduction of rural-urban migration

ii. Poverty alleviation

C) Innovation

i. Access to appropriate and Environmentally friendly technologies

D) Sustainability

i. Expansion of area under cultivation and creation of quality employment in the Rural areas

ii. Improved Livelihoods as opposed to subsistence farming

He further highlighted the need to have a “Small Holder Farmer (SHF) Mechanization Kit & Finance Package”. The Kit would ensure the following benefits;

- Livelihood improvement
- Creation of extra income to group of SHF
- Capacity Building and opportunities to Youth and Quality job creation:

Workshop Report
- Quality assurance and long lasting equipment
- Reliability, functionality and efficiency
- Affordable finance to farmers

He noted the following goals for a master distributor for mechanization of SHF:

1. Transfer agricultural technology to rural areas – e.g. from use of hand tools to mechanized farming
2. Work with Master Distributors (Franchisees) to establish One-Stop-Agrishop shops in marked territories
3. Supply efficient and environmentally friendly technologies that bring better returns to farmers – high yields
4. Ensure Proximity to farmers – for Training, backup service and original spare parts
5. Create quality employment
6. Create opportunity to local investors throughout the country

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**Smallholder Agriculture Mechanization**

*Key points from presentations*

i. How to integrate ideas to inform decision makers on Mechanization
ii. Lack of harmony in policy coordination
iii. Road map and strategy to policy and dialogue
iv. Youth dynamics: How to make agriculture fashionable and attractive
v. Financial models to suit small scale farmers and farmers
vi. Trade, imports and local manufactures
vii. Research and development nexus: Need to consider research institutions
viii. Skills, capacity for local production: How can we establish a local manufacture of these machinery locally
2.3 Mechanization, A Gender Perspective: Elizabeth Mukewa – Gender Consultant

Mechanization Adoption and Challenges

The link between intra-household gender dynamics and adoption of mechanization was highlighted. She elaborated that her data was collected on sites located in Western and Rift Valley regions where there was high concentration of Small-Scale maize growing farmers comprising:

From the study she came up with 4 major conclusions that:

1. Small scale women farmers are still faced with labour intensity/burden
2. Variations in intra-household dynamics between sites, within sites and even within categories of households
3. Land ownership and formal employment are game changers in Intra-HH decision making
4. No specific forums with main goal of addressing labour burden on small scale women farmers.

She concluded her study by giving several pointers of recommendation:

1. The need for appropriate technology types to engage with gender dynamics as well as involve women in design and testing of mechanized technologies;
2. Engage with norms and assumptions – gender aware information, special mechanized farmer field days for women, community dialogues;
3. Design of business models that address labour burden of women;
4. Review of Monitoring & Evaluation plans;
5. Invest in action research with different stakeholders and partners;
3.0 Towards Mechanization in Kenya; Gaps, Constraints, Opportunities and Way Forward

Republic of Kenya
Ministry of Agriculture, Livestock and Fisheries
The workshop held a policy oriented session to evaluate issues that were fundamental towards mechanization policy delivery and implementation in Kenya. The participants were divided into three main groups to deliberate and promote reflection and deeper exploration of the themes emerging from the earlier presentations and discussions.

These three break-out groups comprised:

1. Policy Delivery Mechanisms,
2. Youth, Gender Dynamics And Finance
3. Trade, Local Manufacture And Skill Development

Reports and presentations from the breakout groups and concluding plenary discussion session both the plenary session and the breakout group reports raised issues that transcended the issues pertaining to mechanization. The deliberations focused on gaps, constraints and opportunities for each of the topics above.

The deliberation outcomes are presented in the section below;

3.1 Policy Delivery Mechanisms

Gaps: The following gaps were identified by the participants;

i. Policy not clearly articulated in the existing legal and agricultural policy,
ii. Sustainable intensification without mechanization is not practical,
iii. Lack of policy guidelines had resulted in a distorted man power resource utilization at county level,
iv. Mechanization was a multi-sectoral aspect and therefore required a multiple of actors and ministries to ensure coordination of activities.

Constraints:

i. Limited resource allocation at national level to drive the policy process. The government had not allocated sufficient time and human resources to drive the process over the years.

Opportunities:

i. The medium sized farmers who were yet to fully embrace mechanisation,
ii. The large human resource pool and facilities for research and development in the universities within Kenya,
iii. The emerging practices such as conservation agriculture to increase productivity therefore need for policy,
iv. Donor interest in support of food security and environmental conservation in developing countries including Kenya.

3.2 Youth, Gender Dynamics and Finance

Gap/Constraints: The participants observed that the following gaps existed in the Kenyan environment;

i. The lack of information on benefits of a mechanization policy framework
ii. Insufficient extension services across the country to encourage farmers to take up mechanization initiatives,
iii. The adoption of user unfriendly equipment such as expensive tractors and tools,
iv. The yet to be effected devolution of AMS (Agriculture Mechanization Services) to the County levels has delayed mechanization efforts in Kenya,
v. The lack of vocational training in mechanization hinders the youth in accessing skills necessary for the effective implementation of mechanization,
vi. Inadequate finance/credit facilities to procure tools and implements for farming related activities,
vii. Negative attitude towards agriculture by many youths who prefer urban white collar jobs,
viii. Disjointed apparatus by government agencies in supporting the youth and women who are engaged in agriculture.

Opportunities: The following were presented as opportunities for the Youth and Women to embrace mechanization;

i. ICT/Social Media platforms to facilitate information exchange and flow,
ii. Capacity building of extension workers to enhance uptake of machines and tools,
iii. Gender friendly technology available through research and innovation,
iv. Devolution of AMS programs will enhance mechanization efforts at grassroots,
v. Promote vocational training in mechanization application and maintenance,
vi. Tailored finance products which are less restrictive and have low interest rates,
vii. Promote agriculture as a business and the essence for mechanization to enhance production
3.3 Trade, Local Manufacture and Skill Development

Gaps

i. Access to suitable structured finance remains a challenge especially to small scale farmers,

ii. There exists low levels of awareness of available technology for farmers,

iii. Appropriate technology conducive to local farming population in Kenya

iv. The agricultural sector has not fully developed mechanism for quality assurance/control

v. After-sale/back-up services are restricted to the main urban areas in Kenya,

vi. Linkage between academia/research & practice remains unexploited,

Constraints

i. Less developed markets for bulk products and perishable products,

ii. Lack of resources to access technology especially by small scale farmers who dominate the agricultural production system in Kenya,

iii. The taxation regime discourages many farmers from engaging in the activity,

iv. The high cost for local manufactures especially labour and power connections,

v. The Government has not put in place a framework for providing subsidies to farmers to access technology,

vi. Poor market linkages and market for agricultural produce still hinder many of the producers.

Opportunities

i. Government and private sector support to grow the market to adopt technology

ii. Support farmer field days for training and awareness creation on mechanization benefits,

iii. Business training and capacity building for small farmers across the country,

iv. Consolidation of land holding to improve capacity for mechanization. Small holdings hinder effective mechanization and associated benefits,

v. Structured financing in the agricultural value chain to support mechanization are essential if farmers and producers are to benefit from their activities,

vi. The support and involvement of county governments will encourage many farmer communities to grow their activities and produce surplus for market.
3.4 Mechanization in Kenya; A Way Forward

- **Political goodwill** for implementation of the policy is essential. National and County Governments need to invest resources to drive the policy formulation process. This also entails parliamentary approval of the legislation at the appropriate time.

- **Strategy formulation for implementation** of the policy once approved by the Government is necessary. This calls for a wide stakeholder engagement and approval.

- **Awareness and sensitization** to farmers and service providers who are central to implementation of the policy is essential. Farmers need to be sensitized on the need to adopt new techniques and tools for production.

- **Supportive Financing:** Government to work with private sector for structured financing especially for the youth and women who are less empowered. This also includes subsidies to these groups,

- **Government to facilitate private - public partnership** to create linkages between academia/research with development partners and practice.

**Further Actions:**

The following actions were recommended by the participants of the workshop;

1. Outcome dissemination of the workshop to all stakeholders involved in agricultural mechanization in Kenya,
2. Provide further inputs and ideas to the draft government policy document regarding the gender dynamics of mechanization,
3. Promote/support NGO and Civil Society participation in regional workshops that will be held across Kenya,
4. Information and suggestions on the draft policy document can be forwarded to the government: government website – [www.kilimo.go.ke](http://www.kilimo.go.ke) and/or snyumoo@yahoo.com