REPUBLIC OF KENYA

MINISTRY OF AGRICULTURE AND LIVESTOCK DEVELOPMENT

NATIONAL AGRICULTURAL MECHANIZATION POLICY

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Map of Kenya showing Counties

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FOREWORD

Agriculture remains the backbone of Kenya's economy. It is one of the most important sectors of the economy, contributing directly 23 percent of the Gross Domestic Product (GDP) in 2020 (Economic Survey, 2021), 60 percent of the export earnings and employs 75 percent of the national labour force. Over 80 percent of the Kenyan population lives in the rural areas and derive its livelihoods directly or indirectly from agriculture. Development of agriculture is also important for poverty reduction since most of the vulnerable groups including pastoralists, landless, and subsistence farmers depend on agriculture as their main source of livelihoods. Given its importance, the performance of the sector therefore directly impacts the economy as a whole. The sector is without doubt a key driver towards the realization of 10 percent economic growth annually as envisioned in the Kenya Vision 2030 and Sustainable Development Goal No. 1 and 2 with respect to reduction of extreme poverty and hunger.

Mechanization is one of the major agricultural production inputs and a catalyst for rural development. Application of mechanization technology increases power to agriculture, largely enhancing productivity of human labour. Despite mechanization being vital for agricultural production, most farming communities lack machines to undertake their operations efficiently and effectively. Currently the use of motorized power stands at 30 percent, hand and animal draught power (ADP) at 50 percent and 20 percent respectively.

The policy intends to: create an enabling environment for mechanization development, build capacity for training, research and technology development, promote adoption of mechanization for increased productivity and provide quality assurance. The policy sets out goals and directions for present and future development and management of mechanization in the country. It consists of measures and guidelines which the government shall undertake to achieve optimal development of the sub-sector and from which laws governing its administration and management shall be formulated.

Additionally, the policy aims at giving a clear direction for sustainable growth and development of the agricultural mechanization sub-sector. The proposed interventions will be supported by appropriate institutional and legal framework and stakeholders in both national and county governments for successful implementation.

The implementation of this policy will thus result in an enabling environment for a vibrant agricultural mechanization industry; and I am confident that this will lead to the realization of increased productivity, food security, income and environmental sustainability as outlined in the Kenya Vision 2030.

The National Agricultural Mechanization Policy takes cognizance of the obligations of each level of government with regard to its development and implementation. The policy recognizes and upholds the participation of all the relevant stakeholders including farmers and the communities in its implementation, as a national value and principle of governance.

The implementation of National Agricultural Mechanization Policy will require active stakeholder participation. It will be complemented by institutional and legal frameworks and sectoral strategies, which will provide an enabling environment for orderly and rapid development of the mechanization sub-sector. The policy will further seek to stimulate and guide agricultural mechanization development through targeted technical support, intensified investment, improved research and technology, extension services and capacity building for both staff and farmer organizations, to ensure development and sustainability of the sub-sector.

Hon. Mithika Linturi EGH
Cabinet Secretary
Ministry of Agriculture and Livestock Development

PREFACE

Agriculture continues to play an important role in the socio-economic development of the country by ensuring food security, creating employment for the rural population, providing raw materials to the manufacturing sector and generating income through domestic and export trade. The sector has continued to play this role in the face of mounting challenges posed by environmental degradation, climate change, unfavorable terms of trade and increased competition with other sectors for production resources.

Agricultural mechanization plays a key role in increasing efficiency and effective utilization of the productive resources. However, a number of reasons have hindered enhanced adoption of the technology along the production value chain. In the past, the environment for mechanization has been unfavorable for adoption while capacity for training, research and technology development has been inadequate. The promotion of mechanization for increased productivity and provision of quality assurance are broadly insufficient.

The relatively low level of mechanization is due to a number of challenges facing the sub-sector. These include; inadequate training, research, and technology development; low access, poor distribution of machinery and equipment, insufficient agricultural mechanization quality assurance, low level of investments in mechanization services, poor extension and technology adoption, and weak institutional and legal framework. The cross-cutting issues affecting mechanization include matters related to vulnerable groups, gender and youth, negative effects of environment, inappropriate land use and climate change.

The National Agricultural Mechanization Policy is based on views and expert opinions collected and collated through a structured all-inclusive and consultative process that brought together stakeholders drawn from the public, private and civil society organizations. The consultation process was carried out around identified thematic areas that formed the nuclei of stakeholder engagement, consensus building, workshops and submission of memoranda. Sectoral policies and strategic plans that have been developed by other Government ministries and agencies were collaborated to ensure that the policy recommendations are relevant and consistent.

The implementation of this policy will require the goodwill and commitment by all stakeholders at the national and county governments to ensure smooth implementation of the recommendations. The Government will provide an enabling policy environment through institutional and financial support.

We believe that this Policy will sustainably raise the levels of agricultural mechanization for increased productivity of the sector and income to the country.

Dr. Kipronoh Ronoh P
Principal Secretary, State
Department for Agriculture

Hon. Jonathan Mueke, CBS
Principal Secretary, State Department
for Livestock

ACKNOWLEDGEMENT

The development of the National Agricultural Mechanization Policy has been a joint and collaborative effort of the Ministry's Departments, County Governments and relevant stakeholders. Invaluable gratitude goes to Cabinet Secretary, Principal Secretaries and the Directors of Departments in the Ministry for their technical guidance and direction in developing the document.

Special thanks are due to the dedicated team that developed this policy from the following institutions and organizations: State Department for Crop Development and Agricultural Research (SDCD&AR), State Department for Livestock (SDL), State Department for Fisheries, Aquaculture and the Blue Economy (SDFA&BE), State Department for Industrialization (SDI), Kenya Agricultural and Livestock Research Organizations (KALRO), Agriculture and Food Authority (AFA), Universities and Kenya Farmers Association. Their commitment to the task is highly appreciated.

Contributions of the members of the Intergovernmental Thematic Working Group on Policy, Standard and Legislations, under the auspices of the Intergovernmental Secretariat, which comprises of the National and County Governments, to the process are highly appreciated.

Further, the Ministry acknowledges the contribution of Alliance for Green Revolution in Africa (AGRA) for financial and technical support for the realization of this policy.

The involvement of other individuals, groups and organizations not mentioned herein is highly appreciated. Their input will go a long way towards the realization of the objectives of the policy.

Eng. Richard M. Kanui, CE
Agricultural Engineering Secretary

EXECUTIVE SUMMARY

Mechanization is a key input in the agriculture sector value chains. The main types of mechanization in the country include the use of animal-drawn and motorized machinery, implements and equipment. Development and promotion of these mechanization initiatives has been carried out by the Government in collaboration with the private sector. In line with the Kenya Vision 2030, agricultural mechanization is expected to play a critical role in putting more land into agricultural production.

The country has not operated with a clearly defined agricultural mechanization policy. This, together with the existing strategies has not sufficiently addressed agricultural mechanization challenges leading to low level of agricultural mechanization in the country. The consequences have been environmental degradation, social and economic challenges including deterioration in produce quality, low agricultural production and under-utilization of agricultural land.

The increase in population and continued subdivision of agricultural land has generally resulted in diminishing area of farm units, which has negatively impacted on agricultural mechanization. Further, this trend is expected to continue in the foreseeable future and hence it is imperative that the mechanization activities take cognizance of this fact.

The need for agricultural mechanization has been brought to the fore by the decreasing availability of farm labour, lack of interest by the youth in farming activities and adverse change in climate. Therefore, there is need for more power for effective and efficient application in modern commercial agriculture.

The objective of this policy is to sustainably raise the level of agricultural mechanization for increased productivity and income of agricultural producers. This will be achieved through training, research and technology development, local manufacture and distribution, agricultural mechanization quality assurance, investments in mechanization services, extension and technology adoption and improved institutional and legal frameworks.

The institutional and legal framework will be reviewed to address the regulatory gaps that limit the assurance of quality of agricultural machinery and equipment and agricultural mechanization services provided by various actors. In addition,

the policy proposes the establishment of key institutions for driving the regulation, enhancing capacity of service provision and compliance, testing and quality assurance of agricultural machinery and equipment, agro-structures and agro-processing facilities in the country. These institutions will include the agricultural mechanization board and testing centre. Lastly, a coordination mechanism is proposed for effective implementation of the policy through the participation and collaboration of all stakeholders.

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ACRONYMS AND ABBREVIATIONS

ACTN	:	Africa Conservation Tillage Network
ADP	:	Animal Draught Power
AFA	:	Agriculture and Food Authority
AFC	:	Agricultural Finance Corporation
AgGDP	:	Agriculture Gross Domestic Product
AGRA	:	Alliance for Green Revolution in Africa
ALDEV	:	African Land Development Board
AMB	:	Agricultural Mechanization Board
AMRI	:	Agricultural Mechanization Research Institute
AMS	:	Agricultural Mechanization Services
AMTI	:	Agricultural Mechanization Training Institute
AMTU	:	Agricultural Machinery Testing Unit
ASTGS	:	Agricultural Sector Transformation and Growth Strategy
ATDCs	:	Agricultural Technology Development Centers
CA-SARD	:	Conservation Agriculture Sustainable Agriculture Rural Development Project
COMESA	:	Common Market for Eastern and Southern Africa
CRI	:	Coffee Research Institute
DLP	:	Directorate of Livestock Production
DRSLP	:	Drought Resilience and Sustainable Livelihoods Programme
DVS	:	Directorate of Veterinary Services
DWFF	:	Distant Water Fishing Nations
EEZ	:	Exclusive Economic Zone
FEUSHA	:	Farm Equipment Use in Small Holder Agriculture
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GDP	:	Gross Domestic Product
JICA	:	Japan International Cooperation Agency
KAGRC	:	Kenya Animal Genetic Resources Center
KALRO	:	Kenya Agricultural and Livestock Research Organization
KARI	:	Kenya Agricultural Research Institute

KCSAP	:	Kenya Climate Smart Agriculture Project
KDB	:	Kenya Dairy Board
KEBS	:	Kenya Bureau of Standards
KEFRI	:	Kenya Forestry Research Institute
KEMFRI	:	Kenya Marine and Fisheries Research Institute
KENDAT	:	Kenya Draught Animal Technology Project
KESREF	:	Kenya Sugar Research Foundation
KEVEVAPI	:	Kenya Veterinary Vaccines Production Institute
KIHBT	:	Kenya Institute Highway and Building Technology
KIRDI	:	Kenya Industrial Research and Development Institute
KLDC	:	Kenya Leather Development Council
KNBS	:	Kenya National Bureau of Statistics
KVB	:	Kenya Veterinary Board
MFIs	:	Micro Finance Institutions
MOALF&C	:	Ministry of Agriculture, Livestock, Fisheries and Cooperatives
NAMP	:	National Agricultural Mechanization Policy
NAMTC	:	National Agricultural Mechanization Testing Centre
NGOs	:	Non-Governmental Organizations
NSWCP	:	National Soil and Water Conservation Project
PHS	:	Plant Hire Services
PWD	:	People With Disabilities
RTDCs	:	Rural Technology Development Centers
SAPs	:	Structural Adjustment Programmes
SCS	:	Soil Conservation Services
SIDA	:	Swedish International Development Agency
SIVAP	:	Small Scale Irrigation and Value Addition Project
SMEs	:	Small Medium Enterprises
SSA	:	Sub-Saharan Africa
THS	:	Tractor Hire Services
TRF	:	Tea Research Foundation
TVE	:	Technical and Vocational Education and Training
VMD	:	Veterinary Medicines Directorate

CHAPTER

01 INTRODUCTION

1.1 Background

Agriculture is the backbone of the Kenyan economy contributing directly 22.4 percent of the Gross Domestic Product (GDP) in 2021 (Economic Survey, 2022) and another 25 percent indirectly, it accounted for 69.7 percent of total exports (KNBS, 2021). The agriculture sector employs over 80 percent of Kenya's rural work force and provides more than 15.5 percent of formal employment. It generates about 70 percent of raw materials for agro-industrial production and generates 45 percent of government revenue. The sector is therefore a key driver towards the realization of the 10 percent annual economic growth envisioned in Kenya Vision 2030. It plays a key role in respect to reduction of extreme poverty and hunger in line with the Sustainable Development Goals number 1 and 2. Mechanization as a key input has not been explicit in transforming agriculture in tandem with increasing food requirements locally and regionally. The key agricultural sub-sectors which require interventions in mechanization to boost productivity and enhance agribusiness are; crop, livestock, fisheries and forestry.

The crops sub-sector contributes greatly to the economy where the industrial crops contribute up to 70 percent of agricultural exports and these include tea, coffee, sugarcane, cotton, sunflower, pyrethrum, barley, tobacco, sisal, coconut and bixa. Tea is the leading foreign exchange earner and its export value was KES 126.1 billion in 2021 while fresh horticultural crops contributed KES 157.7 billion, (Economic Survey, 2022). Food crops including maize, wheat, rice and potatoes contribute about the largest percentage of the agriculture GDP.

The livestock sub-sector consists of cattle, sheep, goats and poultry among others. According to the Economic Survey 2022, the sub-sector accounted for 12 percent of the national GDP and about 40 percent of the agricultural GDP. The sub-sector supplies the domestic requirements of meat, milk, eggs, honey products and other livestock products and accounts for about 30 percent of the total marketed agricultural commodities. The sub-sector earns the country foreign exchange through export of live animals, meat, germplasm, hides

and skins and their products, dairy products and processed pork products. It employs about 50 percent of the country's agriculture sector labour force. The sub-sector also contributes substantial earnings to households through sale of livestock and livestock products, and provides raw material for agro-industries.

The fisheries sub-sector includes freshwater, marine and aquaculture. The sub-sector supports about 500,000 people directly and about 2,000,000 indirectly in livelihoods and contributes about 0.5% to the National GDP (Economic Survey, 2022). Based on the quantity of fish landed, the total revenue generated from the sub-sector was KES 30.4 billion in 2021. Earnings from freshwater fish landing was 23.3 billion in 2021, earnings from marine landings were KES 7.1 billion in 2021. Fish farming stood at 20.9 thousand tonnes in 2021.

Agroforestry is a climate-smart agricultural practice that reduces climate vulnerability, reduces emissions and improves agricultural production. Agroforestry incorporates trees into agricultural landscapes and enhances carbon sequestration. It is estimated that Agroforestry practices have the potential of contributing to the abatement of 4.2MtCO2e by 2030, while offering climate resilience benefits of improved soil quality, improved water retention, reduced soil erosion, and inclusion of perennials that are better able to withstand climatic changes. (CTCN, United Nations Framework Convention on Climate Change (UNFCCC), 2021, Diversified trees on farms provide income, food, energy, medicine and resilience to climate related risks. Agroforestry also contributes to the government's goal of achieving 10 per cent tree cover on farms in addition to benefits of enhanced food security and improved livelihoods of farmers.

1.2 Overview of Agricultural Mechanization

Agricultural mechanization is a major production input that encompasses application of mechanical technology through the use of machinery, tools and equipment and increased power to agriculture, largely as a means to enhance the productivity along crops, livestock, fisheries and agroforestry value chains. Agricultural mechanization aims at increasing the power input to agricultural activities hence intensified production and enhanced value addition resulting to decreased cost of production and reduction of drudgery. It also improves

the timeliness and efficiency of farm operations; accomplishes tasks that are difficult to perform without mechanical aid. Additionally, it improves the quality and value of processed products; creates employment opportunities and sustainable livelihoods; provides agriculture-led industrialization and markets for rural economic growth among others.

1.3 Global Agricultural Mechanization Trend

According to Hans Binswanger (1986), between the 16th century and the mid-19th century, the now developed countries like Great Britain saw a massive increase in agricultural productivity and net output, associated with mechanization amongst other factors.

With the rapid rise of mechanization in the late 19th and 20th centuries, particularly in the form of the tractor, farming tasks could be done with speed and on a scale previously impossible. These advances, enjoined with science-driven innovations have led to efficiencies enabling modern farming in Europe and America and a few other nations to output volumes of high-quality produce per land unit. Studies in industrialized countries like Brazil, Japan and China established that industrial revolution in those countries was through mechanization of their agricultural production systems.

East Asian Tigers/Countries which include Indonesia, Bangladesh, Bhutan, India, South Korea and Vietnam, among others have fueled their industrial development through agricultural mechanization. This has been achieved through subsidized manufacturing of agricultural machinery and equipment, robust research and development in agricultural mechanization as well as provision of credit facilities and grants through government financing initiatives.

During the early 1900s, the first U.S. factory for tractors driven by an internal combustion engine was constructed. In later years, advancement in technology enabled use of electronic monitoring devices by farmers to plant crops more efficiently, by mounting mechanical planters and air seeders, which can sort the number and spacing of seeds being planted. In 1990s, combine harvester with similar devices were used for yield mapping, measuring and displaying the quality and quantity of harvest. In 1994, Farmers began using Global Positioning

System (GPS) receivers, ushering in the new "precision agriculture," to record precise locations on their farms and determine which areas need particular quantities of water, fertilizer, and pesticides.

In this 21st century, agricultural mechanization has advanced to the use of precision agriculture equipment e.g., GIS tools and devices, internet and unmanned tractor.

1.4 Agricultural Mechanization in Africa

Sub Saharan Africa (SSA) has the lowest uptake of agricultural mechanization in the world and largely depends on manual labour (Bymolt and Zaal, 2015). In the 1960s many countries in SSA, Kenya included established public sector operated machinery hire services with the objective of enabling small holder farmers to access farm machinery and equipment services (Ahmed, 2015). These services however, have faced several challenges and most of them are neither operational nor efficient (Ahmed, 2015). Farm power availability per area of agricultural land has declined or stagnated in many SSA countries over the past decades resulting into increased reliance on manual labour (Baudron et al., 2014; Vergnani, 2013). The number of tractors in SSA has declined from 235,000 in 1970 to 222,000 in 2000 (Vergnani, 2013). The East African countries of Kenya, Uganda and Tanzania have witnessed a negligible improvement in agricultural mechanization over the last forty years. The situation has been in declining trend despite improvement at the global level (Keya and Rubaihayo, 2013). The three countries had more tractors than India in the 1980s. In the contrary, by 2005 India had hundred times more tractors in use than Kenya, Uganda and Tanzania combined (Keya and Rubaihayo, 2013).

1.5 Kenyan Perspective

The major sources of power for agricultural production available in Kenya include manual, animal and motorized (mechanical, electrical, and renewable energy). The use of motorized power stands at 30 percent, manual 50 percent and Animal Draught Power (ADP) at 20 percent as at 2022 against the target of 50 percent of motorized power as per the Kenya Vision 2030.

1.5.1 Mechanization by Production Systems

Agricultural production systems consist of crops, livestock, fisheries and agroforestry which require mechanization to increase productivity and tap the enormous existing potential. The systems consist of small, medium and large-scale farms averaging 0.5 to 5, 5 to 100, and over 100 hectares, respectively (ASTGS 2019-2029). There are approximately 4.5 million small-scale farmers in Kenya, including 3.5 million crop farmers, 600,000 livestock farmers and 130,000 fisher folks (ASTGS 2019-2029), predominantly in the high and medium rainfall areas that produce over 75 percent of agricultural production.

a. Crop Production Systems

Crop production systems comprise production at the farm level, post-harvest management and primary processing. The extent of mechanization depends on the scale of farm operation. Farmers under the large-scale system usually own specialized and custom-built machinery and equipment and keep up with recent technological advancement. Farmers in the medium scale farming system mostly hire machinery and equipment. Mechanization in the small-scale system is limited to a few farm operations such as land preparation while other operations are done manually. Mechanization services in this category are mainly availed by private service providers. Comparatively, use of machinery on small-scale systems is very low in relation to the medium and large-scale agricultural production systems.

The level of mechanization in post-harvest management and primary processing is still very low resulting in high post-harvest losses.

b. Livestock Production Systems

Most livestock such as cattle, sheep and goats are raised in extensive systems with communal grazing and free ranching of rain-fed rangelands. Intensive production is mostly practiced for dairy, poultry and piggery, with dairy being undertaken in the high rainfall areas. Use of mechanization in livestock production systems is generally low in extensive systems compared to intensive systems. However, there is high potential for mechanization to meet the growing demand for livestock produce and products.

c. Fisheries Production Systems

Fisheries production systems include capture which takes place in the marine waters, inland waters and aquaculture which can be land based in ponds or water based in cages. The Kenyan marine fishery is mainly artisanal with very few commercial/industrial vessels targeting mainly shallow water shrimps, deep water shrimps and lobsters. The country has for a period been having a Kenyan flagged long liners exploiting the Exclusive Economic Zone (EEZ). Other vessels are purse seines and long liners owned by Distant Water Fishing Nations (DWFN) which operate under Kenyan license in our Exclusive Economic Zone targeting Tuna and Tuna-like species. Kenya's aquaculture is primarily focused on semi-intensive culture systems, with ponds being the primary method of fish culture. However, new farmers entering the fish farming industry have invested extensively in intensive fish farming technologies such as cage culture, recirculating culture systems, and aquaponics, which are still in their infancy. Fresh water capture fish is characterised by use of motorized boats, cooling plants, refrigerated trucks and fish processing plants. Mechanization has played a major role in the development of fish production systems in Kenya. However, adoption of mechanized production system is still low.

d. Agro-Forestry Production Systems

The major trees that are grown by farmers alongside their crop and animal keeping activities include but not limited to fruit trees (avocado, mango), fodder trees, grevilia robusta and indigenous trees for pollen and medicinal use as well as exotic and fast maturing trees like cypress, eucalyptus and pines for timber, firewood and building materials. Medium to high potential areas of Kenya are currently leading in this type of farming but enormous potential exists in the Arid and Semi-Arid Land areas which comprise of over 80% of the land cover and currently heavily degraded due to desertification, climate change effects, overstocking and charcoal burning as a means of sustaining livelihoods of the inhabitants in such areas.

The level of mechanization in this system of farming is still very low and is only limited to tree harvest and few post-harvest activities.

1.6 Development of Agricultural Mechanization in Kenya

Kenya's agriculture system has undergone tremendous evolution over the last nine decades. In the colonial era (1920-1960), commercial agriculture was limited to white settler farmers. After independence in 1963, the policy focus shifted to increased participation of indigenous Africans in commercial agriculture. The large-scale farms were highly mechanized in comparison with indigenous African farms. Post-independence policies emphasized on broad self-sufficiency in agricultural products and gradual reduction of government control in the production process.

In early 1990s, upon economic liberalization both the input and output markets were opened to forces of demand and supply thus, affecting most agriculture commodities. Generally, liberalization led to increased input sources and output market channels; wide variations in both input and output prices for agricultural machinery and equipment and wide fluctuations in seasonal commodity production.

In this regard, and to help cushion agricultural producers in mechanization services, the government embarked on various initiatives to support production.

1.6.1 Agricultural Mechanization Services

Agricultural Mechanization Service was established in 1947. The service, initially known as Soil Conservation Services (SCS) involved use of heavy earth moving machinery (Plant Hire Service) to open up land for agricultural development in the former white highlands. Other functions included construction of soil conservation and water harvesting structures, bush clearing and land leveling. Through this, more land was brought into agricultural production.

In 1965 the Government established Tractor Hire Service (THS) whose broad objective was to open new land for wheat production, introduce modern farming practices, stimulate and encourage private ownership of farm tractors, machinery and equipment and train the farming communities on the general techniques for good seedbed preparation. The amalgamation of THS and PHS in 1981, resulted into the creation of Agricultural Mechanization Services (AMS).

Agricultural mechanization service is a devolved function since the constitution 2010 came into effect. The service is not being offered effectively owing to limited resources and management challenges for the existing stations in counties.

1.6.2 Agricultural Machinery Testing Unit

The Agricultural Machinery Testing Unit was set up in 1959 in Nakuru, with responsibility of testing and evaluating both local and imported agricultural machinery and equipment for the purpose of authorizing firms to sell their products in the country. Further, the unit was charged with continuous monitoring and evaluation for quality assurance. Its operations stopped during the implementation of Structural Adjustments Programme (SAPs) in the early 1990s.

Consequently, there has been unregulated and non-validated imported and locally manufactured agricultural machinery and equipment which don't meet the required standards. Further, there is inadequate quality assurance and advisory services from experts on agricultural machinery and equipment entering the Kenyan market.

1.6.3 Agricultural Technology Development Centres

The Agricultural Technology Development Centres (ATDC) were initially set up as Rural Technology Demonstration Units to undertake demonstrations on agricultural mechanization technologies. Later the units were transformed into Rural Technology Development Centres (RTDCs) with additional responsibility of adaptive research, design and fabrication of agricultural engineering technologies.

In 2006, as part of the Ministry's strategy to revitalize agriculture, they were rebranded as Agricultural Technology Development Centres with a broad mandate that included agricultural mechanization, agro-processing, agro-structures for storage, renewable energy development and land resources management. The ATDCs assist the Government in informing policy development, quality assurance and standards, monitoring and evaluation of agricultural engineering technologies in agriculture sector. There are ten (10)

ATDC which are distributed across the country based on agro-ecological zones to address agricultural mechanization challenges among others to improve agricultural productivity.

1.6.4 Farm Equipment Use in Small Holder Agriculture Project

In 1990, the Ministry formulated the Farm Equipment Use in Small Holder Agriculture (FEUSHA) Project to address mechanization needs especially in the production of wheat, maize, rice and beans. This project promoted utilization of agricultural mechanization technology amongst the small holders (up to 4 hectares) to increase production and value addition at farm gate level. The project identified appropriate tools and equipment for small holder farmers and conducted adaptive trials. Most of the equipment which were promoted for use worked but their production could not be scaled up. This was due to low capacity of local manufacturing entities such as Jua Kali to produce standardized products for commercialization.

1.6.5 Mechanization and Soil Conservation

The Soil Conservation Service in Kenya was started during the 1930s with broad objective of combating declining soil fertility and productivity in cultivated and overgrazed areas using mechanized systems. Consequently, soil conservation stations were established and fully equipped with earth moving machinery. From 1937 to the end of the colonial era in 1963, it was compulsory to practice soil conservation to reduce soil degradation especially in sloppy arable lands.

Throughout the late 1940s and the 1950s, soil and water conservation initiatives in the areas occupied by Africans were promoted through the African Land Development Board (ALDEV) and the Swynnerton Plan (1953-1957). The efforts of the ALDEV Ten Years Plan (1946-1955) and its subsequent endeavors up to 1963 were mainly focused on reconditioning of African areas and settlement. Resulting from the initiatives of the Swynnerton Plan, most of the settled high medium-potential areas were terraced with the aid of rudimental hand tools, labour coercion and restrictive regulations.

The decade after independence was marked by low soil conservation activities that resulted in erosion accelerating to alarming levels with signs of decline

in soil fertility. To address this challenge, the country in 1974, developed the National Soil and Water Conservation Project (NSWCP) supported by Swedish International Development Agency (SIDA). The project supported the development and acquisition of hand tools. The tools were supplied to farmers as an incentive for development of soil and water conservation structures.

After the project ended in 1998 agricultural land has reverted back to serious degradation due to lack of an institutional framework to take over activities implemented by Mechanized Soil Conservation Service and National Soil Conservation Project which served small holder farmers.

1.6.6 Second Kennedy Round-More food for Africa Programme

The Government of Japan supported Second Kennedy Round-More food for Africa programme (2KR-2013-2017) which focused on rice mechanization. The project enhanced land preparation, contributed to increased area under rice production, reduced drudgery in production within the rice value chain. In addition, it also increased efficiency, productivity and profitability as well as reduced post-harvest losses in rice growing areas. The scope of the project involved training of beneficiaries in seven (7) rice irrigation schemes (Mwea, Bunyala, Ahero, West Kano, Perkerra, Hewani and Wema) and supply of assorted rice production agricultural machinery which included, tractors, combine harvester, reapers and threshers. The project stimulated the private sector to invest in modern rotavators, combine harvesters and Rice Mills in Mwea Irrigation Scheme and successfully improved mechanization by 80 percent. This improved earnings and increased farmers profit by 40 percent. The success in Mwea was contributed by good governance of the farmers' cooperative in provision of timely and efficient services.

1.6.7 Climate Smart Agriculture Programs

There have been a number of programs focusing on climate smart agriculture that have been implemented over the past years which have mechanization components. These include;

i. Conservation Agriculture Sustainable Agriculture Rural Development Project (CA-SARD) in collaboration with stakeholders such as African

Conservation Tillage Network (ACTN) piloted the use of conservation agriculture machinery and equipment with moderate success.

ii. Kenya Draught Animal Technology Project (KENDAT) promoted the use of animal draught conservation agriculture machinery, which later, after evaluation resulted into promotion of small-motorized conservation agriculture machinery.

iii. The current climate smart agriculture programs run by the Government include Kenya Climate Smart Agriculture Program (KCSAP), Small Scale Irrigation and Value Addition Project (SIVAP), Drought Resilience and Sustainable Livelihoods Program (DRSLP)

Common Market for Eastern and Southern Africa (COMESA) supported use of land preparation CA equipment. The above projects have been learning grounds for major stakeholders in the mechanization sector.

1.6.8 Incubation of SMEs in Agricultural Mechanization

The Government in collaboration with stakeholders provides incubation services to SMEs specialized in agriculture-based enterprises including machine development and fabrication as well as agro-processing and value addition. The initiative has registered some degree of success of some SMEs undergoing certification and availing new products in the market. The main public institutions that offer such services include Agricultural Technology Development Centres (ATDC), Kenya School of Agriculture (KSA), Kenya Industrial Research Development Institute (KIRDI), Kenya Industrial Estates (KIE) and education training institutions such as Technical and Vocational Education and Training (TVET) institutions and universities.

1.6.9 Grain Drying and Storage Programme

The Government has been implementing the Grain Drying and Storage Project since 2013 to comprehensively address grain quality issues with a view of reducing post-harvest losses, encourage grain aggregation and aflatoxin contamination control hence enhance marketing. The project components included provision of mobile grain dryers and construction of community-based medium capacity grain drying and storage facilities. In 2018, a total of 36 dryers

were distributed and 11 storage facilities constructed in various grain growing regions of the country. However, full utilization of the facilities is hampered by among other factors poor management of farmer groups, inadequate after sale service, low capacity of operators, fluctuation in production levels and inappropriate business model.

1.6.10 Private Sector led Mechanization Initiative

Private sector led mechanization initiative has been successful in private sugar companies like West Kenya Sugar, Butali and Kabras. The private sector has offered timely mechanization services through provision of mechanization credit facilities, private lease and hire services which include planting, harvesting, transportation, processing and marketing. This has enhanced productivity and made the industries thrive as opposed to government managed facilities such as Mumias, Nzoia and Muhoroni Sugar companies. Mechanization in large scale private farms e.g., Delamere, Kakuzi, Del monte, Rea Vipingo etc. have sustainably maintained and operated their mechanization services along the value chain of the produce effectively and efficiently. Private mechanization service providers e.g., individuals, hire and lease companies have also proven to be successful in serving small and medium scale agricultural producers.

This initiative entailed involvement of the private sector in provision of mechanization and extension services to the small and medium scale farmers at the central point while the government provides an enabling environment as illustrated in Figure 1.1

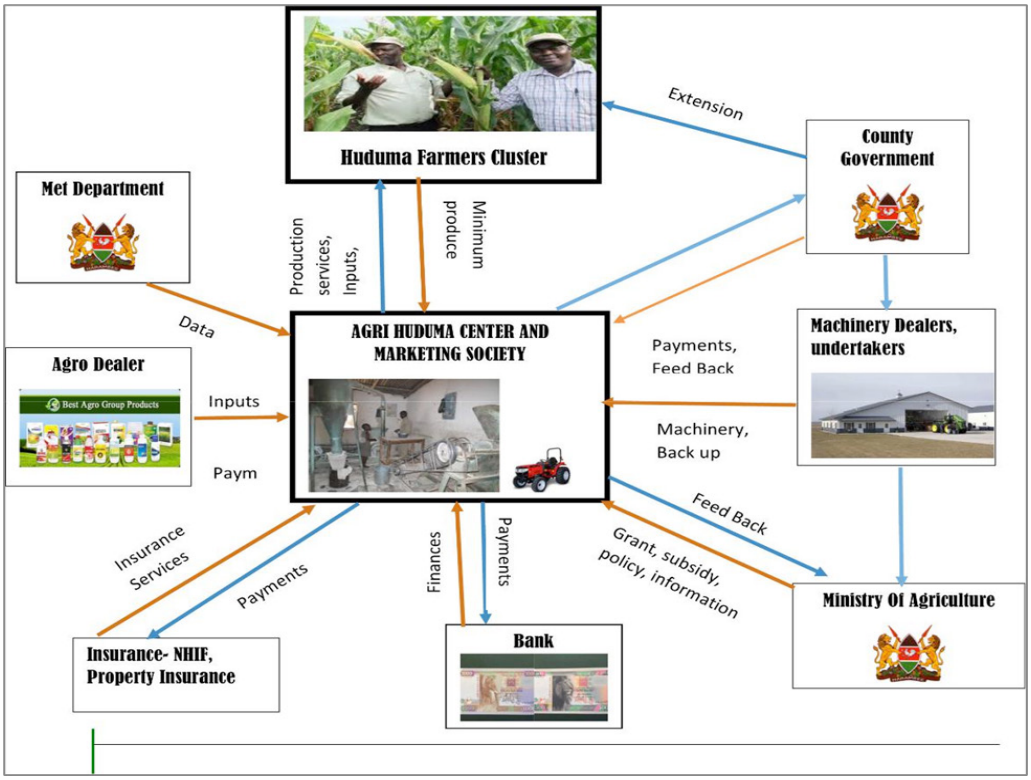

Figure 1.1: Agri-Huduma Mechanization Hub Model

The Ministry has piloted two (2) Agri-Huduma Mechanization Hubs to experiment on private sector involvement. There has been notable success with the two mechanization hubs established for maize and rice value chains in Soy Mateeny (Uasin Gishu) and Bunyala (Busia County), respectively. The National Agricultural Mechanization Policy seeks to institutionalize the private sector led mechanization strategy to foster development of mechanization in production systems.

1.7 Agricultural Mechanization under Devolution

In the year 2010 Kenya adopted a new constitution in which some functions of agriculture including agricultural mechanization services were devolved to the counties. By the time of devolution there were a total of 78 machinery plants and 115 farm tractors available in 24 AMS stations countrywide.

Some County Governments have continued to operate Agricultural Mechanization Service (AMS) stations offering services to farmers such as dam construction and de-silting, construction of farm access roads and soil conservation structures, and opening up of new land for agriculture through bush clearing, ripping and leveling. The services are categorized into two types namely Plant Hire Service (PHS) and Tractor Hire Service (THS) for farm tractors. Further, a number of counties have acquired and operated agricultural machinery and equipment including farm tractors, dryers, cooling and processing plants among others.

However, most of the county machinery services have dwindled in operation due to inadequate guiding principles, regulation and proper fiscal management systems.

1.8 Justification for National Agricultural Mechanization Policy

Agricultural mechanization is key in improving efficiency of operations along food and non-food commodity value-chains. It reduces drudgery, bridges labour shortages and reduces cost of production thereby increasing resource-use efficiency and improving productivity along value chains. At National level agricultural mechanization can have major influence on food security, be a basis for agro-industrial take-off, employment creation and improved incomes for Kenyans. However, the level of mechanization of Kenya's agriculture remains low and inadequate to spur the required growth and commercialization of agriculture.

The absence of a clear policy on agricultural mechanization has and continues to limit access to quality agricultural mechanization services and constrain the anticipated transformation of agriculture in Kenya. This has resulted in the many initiatives instituted by the Government in collaboration with the development partners and the private sector being disjointed and of little effect. In addition, absence of a policy has led to lack of a quality assurance system for agricultural machinery and equipment leading to proliferation of importation and manufacturing of sub-standard agricultural machinery and equipment and subsequent loss of investment.

The development and implementation of a National Agricultural Mechanization Policy is meant to contribute to the growth and transformation outlined in

the ASTGS and to spur commercialization and competitiveness of agriculture sector for long-term National economic development as envisaged in Kenya Vision 2030. Consequently, implementation of this Policy will lead to improved access and use of machinery and equipment for improved productivity in crop, livestock, the blue economy and agro-forestry production systems. The Policy will also address the challenge of reduced productivity by refocusing effort towards enhancing access and use appropriate mechanization technologies for medium and small-scale producers and value chain actors.

This policy is targeted at improving agricultural mechanization for improved national food security and nutrition, rural agro-industry development, employment opportunities, reduction of rural-urban migration and increased incomes for actors along the mechanization value chain. In addition, the policy will promote use of modern agricultural mechanization technologies in agricultural production systems to catalyze involvement of youth.

CHAPTER

02 ANALYSIS OF ISSUES IN AGRICULTURAL MECHANIZATION

2.1 Access and Distribution of Agricultural Machinery, Equipment, Agro-Structures, Agro-Processing Facilities and Mechanization Services

Access and distribution of machinery and equipment play a central role in the development of agricultural mechanization. The use of motorized power in Kenya stands at 30 percent, manual 50 percent and Animal Draught Power (ADP) at 20 percent as at 2020. Farmers, fisher folks and processers access mechanization services from private service providers and public sector institutions including Agricultural Mechanization Services (AMS) stations and Agricultural Technology Development Centres (ATDCs). The public sector institutions and cooperatives that provide agricultural mechanization services face a number of challenges which includes limited resources and capacity resulting into inadequate service delivery.

Manufacturers and dealers of machinery and equipment are located mainly in established urban centres away from the farmers and fisher folks thereby making it difficult to access machinery, equipment and after sale and support services. Despite the government prioritizing local manufacturing, agricultural machinery manufacturing is still faced with the challenge of high cost of raw materials, unfavorable taxation regime, high cost of energy and labour, consequently increasing the cost of production. This has discouraged entrepreneurs from investing in local machinery and equipment manufacture. Additionally, farmers and other users of agricultural machinery are disadvantaged as they pay for road fuel levy despite the fact that most of the work they do is in the farms.

Mechanization in small-scale systems is limited to only a few operations such as land preparation and transportation while other operations are done manually. A survey carried out in 2016 showed that the level of agricultural

mechanization varied across enterprises and operations along the value chains. Land preparation had the highest level across most enterprises with wheat at over 95 percent. Planting operation is only mechanized in a few crops such as maize at 56 percent and wheat at 95 percent. While weed control is a high labour-intensive operation, it has realized low levels of mechanization across enterprises with maize at 46 percent and tea at 14 percent. The highest application of mechanical weed control occurs in wheat at over 95 percent. Harvesting is another labour-intensive operation that escalates production costs when done manually. Its levels are low in most enterprises except for wheat at 98 percent and paddy rice at 55 percent. Mechanization in processing and value addition is also low across enterprises despite the existing huge potential. This is mainly due to limited awareness on technologies and high cost of machinery and equipment.

Agricultural mechanization in the livestock sub-sector is key for the development of watering infrastructure, pasture and animal feeds production, disease and pest control, livestock products processing and storage. In livestock production system, mechanization is mostly concentrated in hay baling, forage and feed production and ranges from 37.5 to 40.9 percent. In the ASALs areas, livestock production is conducted in the traditional pastoral systems which do not favour mechanization. However, modern livestock systems which include ranching and conservancies have relatively high levels of mechanization. Additionally, increasing population and climate change necessitate the need for mechanization in the livestock sub-sector.

Mechanization in fishery systems is divided into capture and aquaculture. Under the capture system, small scale fisher-folk usually apply artisanal techniques such as non-motorized boats and nets, with use of motorized boats remaining low. Capture operations for Semi-industrial fisher-folk is fully mechanized. Under aquaculture small scale fisher-folk utilize manual labour during excavation, harvesting and pond lining while large scale fisher-folk use motorized machinery and equipment including excavators, feeders and aerators in their operations.

Comparatively, use of machinery on small-scale systems is very low in relation to the medium and large-scale production systems. Mechanization services in this category are mainly provided by private service providers. The low access to mechanization by small-scale producers is also associated with low awareness,

declining farm units, uncoordinated producers, poor governance of producer organizations and cooperatives as well as insufficient operational skills.

2.2 Agricultural Mechanization Quality Assurance

Agricultural machinery manufactured or imported and offered for sale in the Kenyan market meets set quality standards as guaranteed by Kenya Bureau of Standards. However, agricultural machinery and equipment imported as well as some locally manufactured for use in agriculture are not tested for suitability for agricultural use in the country. Subsequently, there is no sufficient performance data and information on different agricultural machinery and equipment and engineering technologies. The machinery and equipment are sourced based on the manufacturer's specifications, some of which are not suitable with Kenyan conditions and may not take into account the machine hours worked or age. This compromises their efficiency and effectiveness. In this regard, there is need to develop standards that are appropriate and suitable for Kenyan conditions.

There are no clear set skills requirement for operators, fabricators and artisans for various agricultural machinery and equipment. In addition, some consultants and contractors involved in the construction and installation of agro-structures and agro-processing facilities often do not possess the requisite qualifications. This may lead to performance failure. Whereas certification for all buildings is carried out by the Ministry for Public Works, there are no adequate legal and institutional framework in place to ensure that the agro-structures and agro-processing facilities operate and function effectively.

2.3 Investment in Agricultural Mechanization

Investment in agricultural mechanization is undertaken by both public and private sectors. Public investment is mainly through infrastructure development, training and direct service provision to farmers and fisher folks. However, up to the year 2020 agriculture sector allocation from the national budget has been less than 5 percent, against a target of at least 10 percent as recommended by Malabo Declaration (2014) on Accelerated Agricultural

Growth and Transformation for Shared Prosperity and Improved Livelihoods. Further, agricultural mechanization sub-sector receives only a small and inadequate proportion of the allocation for the agricultural sector. This has led to inadequate resources to acquire, maintain and operate the machinery and equipment hire services offered by the government.

Private sector investment in agricultural mechanization is low. This is due to inadequate information on investment opportunities, heavy capital required, low farm returns and high maintenance cost. Financial institutions offer credit facilities for acquisition of machinery and equipment though at interest rates beyond the reach of most farmers, fisher folks and service providers.

2.4 Human Resource Capacity for Agricultural Mechanization

Agricultural mechanization adoption requires extension services. Skilled human resource is critical in agricultural mechanization development. The skills are required by artisans, operators, producers and other end-users, service providers (mechanics, engineers), suppliers and extension agents. Training is offered by universities, middle level colleges and machinery dealers. Extension services are offered by public sector, private companies and non-governmental organizations. However, some of the trainings offered by these institutions are not sufficiently tailored to meet the requirement of the job market. In addition, there is no certifying authority for agricultural machine operators. The existing extension packages are deficient of mechanization skills and hence low rate of adoption.

2.5 Research, Technology Development and Adoption

Before 2014 agricultural mechanization research was being undertaken by various institutions; Kenya Agricultural Research Institute (KARI), Kenya Sugar Research Foundation (KESREF), Coffee Research Institute (CRI), Tea Research Foundation (TRF), universities and other research institutions.

Through KALRO Act of 2013, KARI was restructured and established combining four former research institutes (KARI, KESREF, CRI and TRF). The Kenya

Agricultural and Livestock Research Organization (KALRO) is mandated to carry out all agricultural research in crops and Livestock subsectors including agricultural mechanization. In 2015, the Agricultural Mechanization Research Institute (AMRI) was established with the mandate of carrying out research in agricultural mechanization technologies and innovations geared at enhancing productivity and value addition for crops and livestock in Kenya. However, its performance has been hampered by limited funding and low capacities in human resource and infrastructure. Other institutions involved in agricultural mechanization research include Universities, Kenya Forestry Research Institute (KEFRI), International research institutes, Kenya Industrial Research Development Institute (KIRDI), private companies and Non-Governmental Organizations (NGOs). In the fisheries sub sector, the research in carried out by Kenya Marine and Fisheries Institute (KEMFRI) however, there is limited research on the same due to inadequate capacity in terms of personnel, infrastructure and funding.

There are also several institutions involved in fabrication of agricultural mechanization technologies including private companies, Agricultural Technology Development Centres (ATDCs), non-governmental organizations NGOs and the informal sector. There are many agricultural technologies that have been developed and modifications/improvements made in the area of farm mechanization, irrigation, post-harvest handling and agro-processing. These organizations are also involved in promotion and dissemination of mechanization technologies; however, the adoption of these technologies has been low owing to high investment cost and low extension capacity.

The agricultural mechanization research, technology development and adoption activities have not been effectively coordinated and prioritized. In addition, information sharing among these institutions and other stakeholders has been inadequate.

2.6 Agricultural Mechanization for Sustainable Agricultural Land Development and Climate Smart Agriculture

Environmental conservation is key to agricultural development as it assures sustainability of natural resource base for use by future generations. In Kenya, the major causes of land degradation are deforestation, overgrazing, poor

agricultural practices, climate change effects, and other human activities. Mechanized operations in soil and water conservation, land preparation and other farming activities are low due to inadequate technical skills, inaccessibility and high cost of agricultural machinery and equipment. In addition, improper use of agricultural machinery and equipment has continued to exacerbate land degradation.

The major climate change hazards associated with agriculture are rampant floods and droughts. Global warming causes change in temperature regimes and precipitation patterns, which affects the time window for agricultural operations. These effects of climate change necessitate use of appropriate climate smart technologies including conservation agriculture.

However, agricultural machinery and equipment used for climate smart technologies are of high cost, require technical skills to operate and therefore inaccessible to most users and service providers. Nonetheless, few large-scale farmers have been able to use them effectively.

2.7 Institutional and Legal Framework

Various institutions are involved either directly or indirectly in the agricultural mechanization sub-sector. At the National level, the subsector is served by Agricultural Engineering Services Directorate (AES) in the Ministry of Agriculture, Livestock, Fisheries and Cooperatives, which has ten (10) ATDCs as regional field stations.

In the Livestock sub-sector there are various public and private sector institutions involved in service delivery and have a role in the agriculture mechanization process. These include Directorate of Veterinary Services (DVS), Directorate of Livestock Production (DLP), the Kenya Veterinary Board (KVB), Kenya Dairy Board (KDB), Kenya Animal Genetic Resources Center (KAGRC), Kenya Veterinary Vaccines Production Institute (KEVEVAPI), Kenya Leather Development Council (KLDC) and Veterinary Medicines Directorate (VMD). Due to the various limitations emanating from current institutional arrangements and weaknesses, agriculture mechanization has not been adequately addressed in the country, thus leading to a constrained service delivery system that is slow in responding to new and emerging challenges in the livestock sector.

The Kenya Bureau of Standards (KEBS) constitutes committees to develop standards and ensures adherence using Kenya Bureau of Standards Act. Designs, structures and materials are approved by Ministry of Public Works using several laws not specific to agricultural mechanization. The counties have agricultural engineering units in charge of agricultural engineering services and include the Agricultural Mechanization Services (AMSs) stations. The agricultural machinery and equipment manufacturers, dealers and service providers operate independently hence do not benefit from synergy, lacks platform for collaboration and information sharing.

Agriculture Policy, Sessional Paper no. 2 of 2021 has identified Agricultural mechanization as a key input in the development of agricultural sector production value chain through the development and adoption of modern, appropriate, cost effective and environmentally safe mechanization technologies for crop, livestock and fisheries production. The issue however, is not adequately addressed in the National Livestock Policy, Sessional Paper no. 3 of 2020 and the Veterinary Policy, Sessional Paper no. 2 of 2020. In Agribusiness and Value Addition, the National Livestock policy acknowledges limited value addition largely constrained by high cost of investment, limited access to financial and business development services, poor infrastructure and inadequate value addition technology. The Veterinary and Dairy policy are inadequate on matters relating to Agriculture mechanization. They however recommend for certification of livestock equipment and structures to the relevant standards.

The Livestock Sector is governed by over 17 legislations such as the Animal Diseases Act, Cap 364, and the Meat Control Act Cap 356 among others. Most of these legislations have not been updated to conform to the current realities. The weaknesses in legal framework particularly in the areas of regulation, facilitation, promotion and development of agriculture mechanization affect the performance of enterprises in the Livestock Sector

2.8 Cross Cutting Issues in Agricultural Mechanization

Cross cutting issues identified in agricultural mechanization are in reference to persons with special needs and gender considerations. For persons with special needs, inadequate employment opportunities and low skills necessary to

enhance agricultural productivity affects adoption of agricultural mechanization. Gender roles and responsibilities are dynamic and they respond to changing economic circumstances. Different genders have specific roles in agricultural mechanization. Generally, the males are involved in manufacturing, sales and operation while females and youth have limited roles other than learning basic skills and technology. In agricultural development, men, women and youth are recognized as important players, but women and young agricultural producers generally face more socio-cultural and economic constraints than men do. However, according to Kenya Youth Agribusiness Strategy 2017 - 2021, majority of the farmers engaged in agriculture are aged between 50 and 65 years. This domination of agriculture by the aging community negatively affects adoption of agricultural mechanization technologies.

With regard to labour, it is noted that women participate more in agricultural production than men and hence they experience drudgery due to the kinds of technologies used and their labour contribution is not commensurate with the returns they get. There is therefore need to encourage the development of gender sensitive agricultural mechanization technologies.

CHAPTER
03 POLICY OBJECTIVES AND INTERVENTIONS

3.1 Agricultural Mechanization Policy Focus

The Agricultural Mechanization Policy aims to improve agricultural mechanization for the subsector to measurably contribute to agriculture sector growth and development in Kenya.

3.1.1 Overall objective

The overall objective is to raise and sustain the level of agricultural mechanization for increased productivity, incomes, and food and nutrition security.

3.1.2 Specific objectives

The specific objectives of the policy are to:

1. Enhance access and distribution of agricultural machinery, equipment, agro-structures, agro-processing facilities and mechanization services
2. Enhance quality assurance for agricultural machinery, equipment, agro-structures, agro-processing facilities and mechanization services
3. Promote investment in agricultural mechanization
4. Enhance the human resource capacity for delivery of agricultural mechanization services
5. Enhance mechanization research, technology development and adoption along agricultural value chains
6. Enhance adoption of agricultural mechanization technologies for sustainable agricultural land development and climate smart agriculture

7. Establish a legal and institutional framework for collaboration and coordination for agricultural mechanization
8. Develop agricultural mechanization technologies that address the interest of people with special needs and support local initiatives

3.2 Challenges and Policy Interventions

3.2.1 Enhance Access and Distribution of Agricultural Machinery, Equipment, Agro-Structures, Agro-Processing Facilities and Mechanization Services

Challenges

i. High cost of agricultural machinery, equipment, agro-structures, agro-processing facilities and mechanization services
ii. Inadequate distribution mechanism of agricultural machinery, equipment, agro-structures, agro-processing facilities and mechanization services
iii. Inadequate local manufacturing of agricultural machinery and equipment
iv. Inadequate availability of agricultural machinery and equipment dealers and after sale service
v. Inadequate information on availability of relevant agricultural machinery, equipment, agro-structures, agro-processing facilities and mechanization services.
vi. Poor management of public owned agricultural mechanization service providers.

Policy Interventions

National and County governments will;

i. Institute measures that create an enabling environment to reduce cost of agricultural machinery, equipment, agro-structures, agro-processing facilities and mechanization services

ii. Stimulate participation of investors and SMEs in distribution of agricultural machinery and equipment

iii. Stimulate local manufacturing of agricultural machinery and equipment by private investors and SMEs.

iv. Ensure provision of adequate after sales services for agricultural machinery and equipment by the private sector

v. Strengthen agricultural mechanization information sharing

vi. Institute innovative management systems for public and other organizations that offer agricultural mechanization services

County government will:

i. Mainstream agricultural mechanization information in agricultural extension services

3.2.2 Enhance Quality Assurance for Agricultural Machinery, Equipment, Agro-Structures, Agro-Processing Facilities and Mechanization Services

Challenges

i. Insufficient performance data and information on different agricultural machinery and technology

ii. Inadequate national agricultural mechanization standards, testing procedures and certification mechanisms

iii. Low capacity for testing and evaluation of agricultural machinery and equipment for quality assurance

iv. Use of inappropriate designs of agro-structures and agro-processing plants

Policy Interventions

National Government will:

i. Establish national data bank for agricultural mechanization.

ii. Promote testing of agricultural machinery and equipment by establish agricultural machinery and equipment testing centers and develop national standards, testing procedures and certification mechanisms for agricultural machinery and equipment

iii. Enforce standards for agricultural machinery and equipment in collaboration with Kenya Bureau of Standards (KEBS) and other relevant regulatory agencies.

iv. Strengthen the capacity for testing and evaluation of agricultural machinery and equipment

v. Regulate service providers for agro-structures and agro-processing facilities

vi. Promote use of standards, designs for agro-structures and agro-processing plants

National and County governments will:

i. Establish and regularly update data bank for agricultural mechanization

ii. Enforce standards for agricultural machinery and equipment in collaboration with Kenya Bureau of Standards (KEBS) and other relevant regulatory agencies.

3.2.3 Promote Investment in Agricultural Mechanization

Challenges

i. Low public funding for agricultural mechanization

ii. Low private sector investment in agricultural mechanization

iii. Inadequate knowledge on investment opportunities in agricultural mechanization

iv. High cost of credit

Policy Interventions

National and County governments will:

i. Increase allocation of public expenditure to the agricultural mechanization sub-sector

ii. Promote incentives for financing agricultural mechanization investment by the private sector

iii. Establish a knowledge sharing platform on investments opportunities for agricultural mechanization.

iv. Establish innovative and sustainable funding mechanisms for agricultural mechanization research facilities and agricultural mechanization infrastructure development facilities in Kenya

County governments will:

i. Establish innovative and sustainable funding including a dedicated credit facility for agricultural mechanization and revolving fund for AMS

3.2.4 Enhance the Human Resource Capacity for Delivery of Agricultural Mechanization Services

Challenges

i. Inadequate human resource and skills for agricultural mechanization

ii. Inadequate facilities for supporting agricultural mechanization development

Policy Interventions

National Government will:

i. Strengthen collaboration with universities, research institutes, Technical and Vocational Education and Training (TVET) institutes and other stakeholders in the development of the curriculum and training.

ii. Create an enabling environment for investors to provide and support agricultural mechanization training.

County government will:

i. Enhance capacity for agricultural mechanization service provision through continuous capacity and skills enhancement for agricultural mechanization service providers

ii. Support development of agricultural mechanization facilities

3.2.5 Enhance Mechanization Research, Technology Development and Adoption Along Agricultural Value Chains

Challenges

i. Uncoordinated agricultural mechanization research efforts.

ii. Low level of funding towards research and technology development in agricultural mechanization

iii. Ineffective research, technology advisory and clientele linkages in agricultural mechanization development

iv. Inadequate human resource capacity and infrastructure for agricultural mechanization research and technology development

v. Low accessibility and adoption of agricultural mechanization technologies

Policy Interventions

National government will:

i. Enhance coordination and collaboration of agricultural mechanization research among stakeholders

ii. In collaboration with stakeholders, enhance funding towards research in agricultural mechanization technologies

iii. Strengthen linkages of existing public research institutes involved in crop, livestock, fisheries and agro-forestry mechanization

iv. Strengthen human resource and infrastructure capacity of research institutions to modernize agricultural mechanization

v. Enhance technology development and adoption in agricultural mechanization

National and County government will:

i. Create systems for effective stakeholders linkages in agricultural mechanization in research and development

ii. Support adaptive research in agricultural mechanization

County government will:

i. Promote uptake of agricultural modern mechanization technologies including renewable energy sources and ICT in agricultural mechanization

3.2.6 Enhance Adoption of Agricultural Mechanization Technologies for Sustainable Agricultural Land Development and Climate Smart Agriculture

Challenges

i. Inadequate mechanization in soil and water conservation

ii. Inappropriate agricultural mechanization in land development and management practices

iii. Underdeveloped and inadequate application of climate smart agricultural mechanization technologies

Policy Interventions

National governments will:

i. Support mechanized soil and water conservation

ii. Develop guidelines for mainstreaming agricultural mechanization in sustainable land development and management

iii. Support mechanized climate smart technologies for drought and flood adaptation and mitigation systems

National and County governments will:

i. Enhance mechanized soil and water conservation initiatives

County government will:

i. Promote mechanized soil and water conservation

ii. Support availability of affordable land development agricultural machinery

iii. Support mechanized climate smart agriculture technologies

iv. Promote environmentally friendly mechanized agricultural production and processing techniques

3.2.7 Establish Legal and Institutional Framework for Collaboration and Coordination for Agricultural Mechanization

Challenges

i. Poor coordination, partnership and collaboration among private and public sector players in agricultural mechanization

ii. Inadequate institutions to support agricultural mechanization

iii. Inadequate legal framework in agricultural mechanization sub-sector.

iv. Lack of a certification authority for agricultural plant operators

Policy Interventions

National Government will:

i. Strengthen coordination, collaboration and partnership among actors involved in agricultural mechanization

ii. Promote establishment and strengthening of agricultural mechanization institutions

iii. Develop legislation to support the agricultural mechanization sub-sector

iv. Collaborate with public and private institutions for capacity building and certification of plant operators

3.2.8 Develop Agricultural Mechanization Technologies that Address the Interest of People with Special Needs and Support Local Initiatives

Challenges

i. Inadequate agricultural mechanization technologies tailored for women, youth and persons with special needs

ii. Biased preference on imported agricultural machinery and equipment

Policy Interventions

National and County governments will:

i. Promote and support development of appropriate mechanization technologies which are suitable to youth, women and persons with special needs

ii. Promote the buy-Kenya-build-Kenya initiative on agricultural machinery and equipment

CHAPTER
04 POLICY IMPLEMENTATION

Effective implementation of the National Agricultural Mechanization Policy will require the establishment of the policy implementation coordination mechanism, mobilizing resources for undertaking interventions outlined in each of the key thematic areas of the policy and coordination. It will also require an effective monitoring and evaluation and policy review system for ensuring that implementation is on track and delivers on intended objectives.

4.1 Policy Implementation Coordination

An implementation framework is meant to guide effective implementation of the National Agricultural Mechanization Policy. The implementation framework for the policy will incorporate an integrated approach, joint planning and regular joint reviews of progress. A five-year strategy will be developed to implement the policy spearheaded by the National Agricultural Mechanization Forum (NAMF). Annex 1 provides a detailed implementation framework matrix for National Agricultural Mechanization Policy.

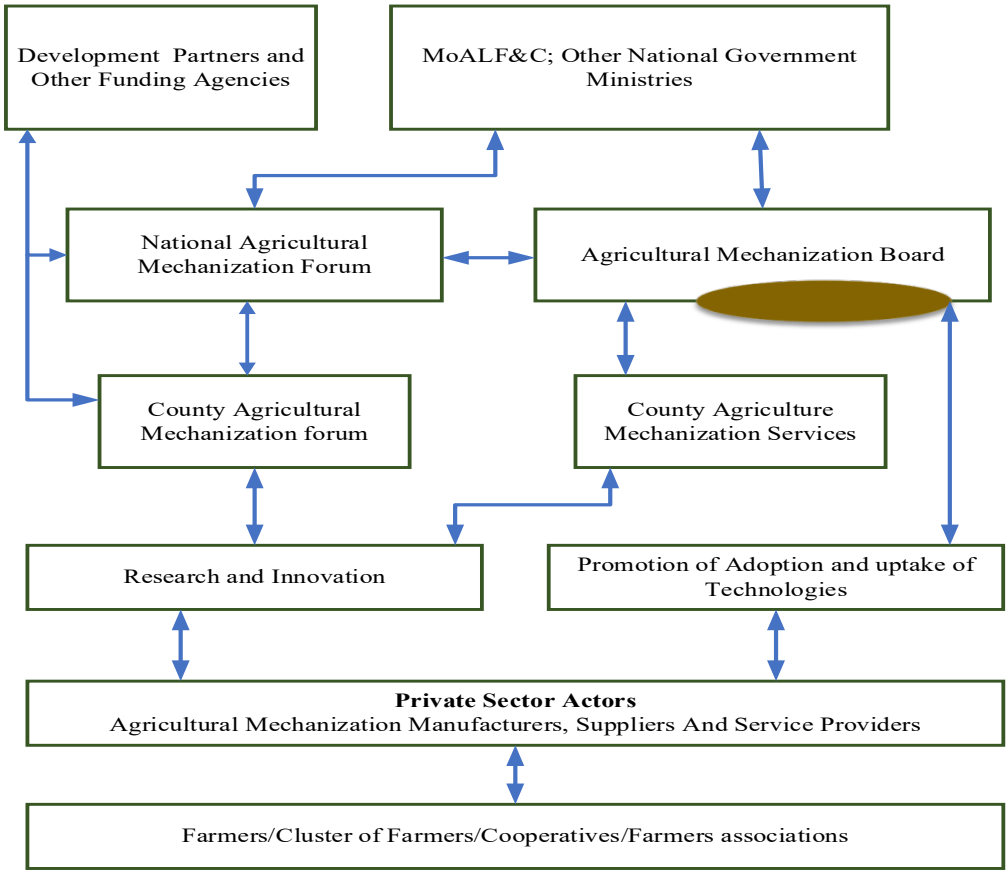

Figure 4.1: Conceptual Framework for Coordination of National Agricultural Mechanization Implementation.

a. Role of the National and County Governments

The National Government will provide overall leadership in the policy development while the County Governments will be responsible for implementation. The roles of the two levels of government will be as follows:

National Government

i. Oversee and coordinate agricultural mechanization sub-sector stakeholders

ii. In consultation with county governments, develop a national agricultural mechanization development, investment and regulations strategic plan;

iii. Formulate and review agricultural sector mechanization policy and strategy in collaboration with the county governments and other relevant stakeholders

iv. Undertake the roles and responsibilities assigned to the National Government in the implementation matrix

v. Convener of the National Agricultural Mechanization Forum

vi. Link with the Development Partners and other Funding agencies

vii. Policy oversight of the regulatory functions of the Agricultural Mechanization Board

County Government

i. Collaborate and liaise with other agencies involved in agricultural mechanization development at the local level

ii. Jointly formulate projects and programmes in collaboration with other stakeholders to coordinate technology and research development

iii. Establish a National Agricultural Mechanization Data Management Information System (AMDMIS)

iv. Conduct monitoring and evaluation of Agriculture Sector Mechanization Policy implementation

v. Undertake regulatory function for the sub-sector including conflict resolution mechanisms to deal with agricultural mechanization disputes.

vi. Support capacity building for agricultural mechanization contracting service providers.

vii. Mobilize resources and finances for the sub-sector

viii. Organize farmers to ensure systems in the provision of credit

ix. Implement programs for ensuring the provisions of incentives and facilities to promote agricultural mechanization

b. National Agricultural Mechanization Forum

The National Agricultural Mechanization Forum will comprise all key stakeholders at the national level and representatives of county government in the agriculture Sector. Other members will be the CEOs of the Agricultural Mechanization Board and other relevant Boards in the agriculture sector, head of the Agriculture Machinery Testing Centre, representatives of private sector players, representatives of agricultural research institutions and development partners and beneficiary associations.

The Forum shall be the platform for:

i. Promoting collective initiatives for enhancing agricultural mechanization

ii. Identifying, incubating and showcasing agricultural mechanization technologies and innovations

iii. Coordination and promoting collaboration and partnerships among agricultural mechanization stakeholders

c. County Agriculture Mechanization Forum

The County Agricultural Mechanization Fora will comprise all key stakeholders at the county level and shall include the County Agricultural Machinery Services, private sector players, local agricultural research institutions, officers from the regional offices of the agricultural machinery testing centre and representatives of beneficiary associations.

The fora will be responsible for;

i. Promoting collective initiatives for enhancing agricultural mechanization at the County level
ii. Identifying, incubating and showcasing agricultural mechanization technologies and innovations at the county level
iii. Coordination and promoting collaboration and partnerships among agricultural mechanization stakeholders within the county

d. Agricultural Mechanization Board

In order to provide for effective implementation of specified interventions in this policy, a special purpose vehicle with clear mandates will be established. The policy therefore proposes establishment of an agricultural mechanization board with the responsibility of promotion and regulation of agricultural mechanization.

The functions of the board will include:

i. Advise the Cabinet Secretary on matters concerning agricultural mechanization
ii. Licensing and registering actors of identified agricultural mechanization technologies
iii. Inspection of quality assurance of agricultural machinery, plant and agro-structures
iv. Surveillance on quality, performance and safety of agricultural machinery and equipment
v. Advising government and manufacturers on disposal of obsolete equipment.
vi. Review and development of standards and guidelines of agricultural machinery
vii. Provide guidance on imports and exports of agricultural machinery
viii. Provide a platform for liaison and dialogue with industry stakeholders

ix. Promote coordinated and regulated research and technology development for agricultural mechanization sub-sector

x. Resource mobilization for agricultural mechanization development

e. Agricultural Mechanization Testing Centres

The agricultural mechanization testing centres, both public and private, will be responsible for quality control and assurance of imported and locally manufactured or assembled machinery and equipment meant for agricultural use.

The functions will include:

i. Testing and evaluating agricultural machinery, implements and equipment.

ii. Carry out survey on agricultural mechanization and advise policy makers on the types of agricultural machinery and equipment required for the Kenyan Agriculture, export and development of Agricultural machinery industries.

iii. Contribute towards up scaling of agricultural mechanization technologies

iv. Recommend review of regulations and standards for agricultural machinery and equipment.

v. Develop and maintain a Kenyan Agriculture machinery database for reference in standards, design & development.

vi. Support development of agricultural mechanization standards in collaboration with KEBS

vii. Support the protection of intellectual property rights on technologies and innovations

f. Agricultural Technology Development Centres (ATDCs)

The ATDC will be responsible for the following;

i. Piloting technology and adaptive research

ii. Technology innovation and incubation

iii. Capacity building of agricultural mechanization stakeholders and service providers

iv. Development of knowledge and information platform.

4.2 Resource Mobilization

4.2.1 Policy Implementation Coordination

Coordination of the policy implementation will be funded from the following sources;

i. Resources allocated to the Ministry of Agriculture for the purpose of agricultural mechanization;

ii. Resources allocated by a County Government for the purpose of agricultural mechanization in the respective County;

iii. Innovative and sustainable funding mechanisms initiated by the public and private sector for agricultural mechanization, this will include partnership between state and non- state actors to support implementation of the policy and agricultural mechanization programmes

The resources will be used for coordination activities that include;

i. Supporting establishment and operationalization of National and County Agricultural Mechanization Forums

ii. Coordination and collaborative meetings of stakeholders sanctioned by the National and County Forums

iii. Planning, monitoring and review meetings on the progress of implementation of agricultural mechanization policy interventions

4.2.2 Resources for Policy Implementation

Resources for policy implementation will include the following:

a. Investment in Agricultural Mechanization

The National and County Governments will, through partnerships with the private sector and development partners' initiate and implement programmes to attract investments for modernization and development of agricultural mechanization in Kenya. These initiatives will include bilateral arrangements between Kenya and countries that have employed best practices in agricultural mechanization.

b. Funding for specific initiatives along the agricultural machinery supply chain

Actors along the agricultural machinery, agro-structures and agro-processing plant supply chain will be encouraged to invest in the supply chain through fiscal initiatives such as favorable taxation regimes and other support such as training and incubation of innovations. The County Governments will strengthen and streamline the operations of the County Agricultural Mechanization units (CAMs) through additional allocations and investment in new agricultural machinery and equipment.

4.3 Monitoring, Evaluation and Review of Policy

Monitoring of policy implementation will be central in ensuring that planned policy interventions are implemented efficiently and effectively. The Ministry, the Counties, key national institutions proposed for establishment in this policy such as the Agricultural Mechanization Board, Agricultural Mechanization Testing Centres, private sector organizations, service providers and farmers institutions will be involved in tracking and reviewing implementation of policy through the established structures.

The following will be undertaken;

i. Development of a coordination framework and guidelines for collaboration and cooperation among, public departments and agencies, County Governments and other stakeholders for tracking of policy implementation and review

ii. Development and implementation of mechanization Strategies and workplans for implementing priority policy intervention at the National and County levels

iii. Establishment of a repository data and information relating to all activities, including policy implementation progress on agricultural mechanization in Kenya.

iv. Operationalize a platform for consultation comprising of stakeholders composed of; farmers, relevant public sector institutions, the academia, suppliers of agricultural machinery and equipment, agro-structures and agro-processing facilities, agricultural mechanization service providers, agricultural machinery operators and their respective associations, importers and exporters.

The Ministry will establish a policy implementation unit within the agricultural mechanization Directorate. The coordinating unit will be responsible for compiling and submitting annual reports on the status of agricultural mechanization in the country and policy implementation status to the Cabinet Secretary. The reports will inform annual and five-year evaluation and reviews of the agricultural sector mechanization policy implementation.

ANNEXES

Annex 1: Implementation Framework

Timeline:

Short-term (≤3 years)

Medium-term (3-7 years)

Long-term (7-10 years)

Continuous

Thematic Area 1:	**Access and Distribution of Agricultural Machinery, Equipment, Agro-Structures, Agro-Processing Facilities and Mechanization Services**			
Specific Policy Objective **Enhance access and distribution of agricultural machinery, equipment, agro-structures, agro-processing facilities and mechanization services**				
Policy Intervention		**Lead / Key Responsible Institutions**	**Expected/Outputs/ Outcomes**	**Timeline**
i	Institute measures that create an enabling environment to reduce cost of agricultural machinery, equipment, agro-structures, agro-processing facilities and mechanization services	Ministry responsible for agricultural mechanization County Department responsible for agricultural mechanization	Enabling environment to reduce cost of agricultural machinery and equipment created	LT
ii	Stimulate participation of investors and SMEs in distribution of agricultural machinery and equipment	Ministry responsible for agricultural mechanization County Department responsible for agricultural mechanization	Stimulated participation of investors and SMEs in manufacture and distribution of agricultural machinery and equipment	LT
iii	Stimulate local manufacturing of agricultural machinery and equipment by private investors and SMEs.			

Thematic Area 1:	Access and Distribution of Agricultural Machinery, Equipment, Agro-Structures, Agro-Processing Facilities and Mechanization Services			
Specific Policy Objective **Enhance access and distribution of agricultural machinery, equipment, agro-structures, agro-processing facilities and mechanization services**				
Policy Intervention		**Lead / Key Responsible Institutions**	**Expected/Outputs/ Outcomes**	**Timeline**
iv	Ensure provision of adequate after sales services for agricultural machinery and equipment by the private sector	Ministry responsible for agricultural mechanization County Department responsible for agricultural mechanization	Provision of adequate after sales services for agricultural machinery and equipment ensured	ST
v	Strengthen agricultural mechanization information sharing	Ministry responsible for agricultural mechanization	Agricultural mechanization knowledge and technology information shared	LT
vi	Institute innovative management systems for public and other organizations that offer agricultural mechanization services	Ministry responsible for agricultural mechanization County Department responsible for agricultural mechanization	Innovative management systems for public and other organizations that offer agricultural mechanization services established	LT
vii	Mainstream agricultural mechanization information in agricultural extension services	County Department responsible for agricultural mechanization	Agricultural mechanization information mainstreamed in extension services	LT

Thematic Area 2: Agricultural Mechanization Quality Assurance				
Specific Policy Objective **Enhance quality assurance for agricultural machinery, equipment, agro-structures, agro-processing facilities and mechanization services**				
Policy Intervention		**Lead / Key Responsible Institutions**	**Expected/Outputs/ Outcomes**	**Timeline**
i	Establish national data bank for agricultural mechanization	Ministry responsible for agricultural mechanization	A national data bank for agricultural mechanization established	LT
ii	Promote testing of agricultural machinery and equipment	Ministry responsible for agricultural mechanization		LT
	Establish agricultural machinery and equipment testing centres	Ministry responsible for agricultural mechanization	Agricultural Mechanization Testing Centre established	LT
	Develop national standards, testing procedures and certification mechanisms for agricultural machinery and equipment.	Ministry responsible for agricultural mechanization KEBS	National standards, testing procedures and certification mechanisms for agricultural machinery and equipment developed	LT
	Enforce standards for agricultural machinery and equipment in collaboration with Kenya Bureau of Standards (KEBS) and other relevant regulatory agencies	Ministry responsible for agricultural mechanization Kenya Bureau of Standards (KEBS) County Department responsible for agricultural mechanization	Standards for agricultural machinery and equipment enforced	LT
ii	Strengthen the capacity for testing and evaluation of agricultural machinery and equipment	Ministry responsible for agricultural mechanization	Capacity for testing and evaluation of agricultural machinery and equipment strengthened	LT
	Regulate service providers for agro-structures and agro-processing facilities	Ministry responsible for agricultural mechanization	Service providers for agro-structures and agro-processing facilities regulated	LT

Thematic Area 2: Agricultural Mechanization Quality Assurance				
Specific Policy Objective **Enhance quality assurance for agricultural machinery, equipment, agro-structures, agro-processing facilities and mechanization services**				
Policy Intervention		**Lead / Key Responsible Institutions**	**Expected/Outputs/ Outcomes**	**Timeline**
iv	Promote use of standards, designs for agro-structures and agro-processing plants	Ministry responsible for agricultural mechanization KEBS	Standards, designs and layouts for production, processing facilities and farm structures applied	LT
v	Establish and regularly update data bank for agricultural mechanization	County Department responsible for agricultural mechanization	A County data base for agricultural mechanization established	Continuous
vi	Enforce standards for agricultural machinery and equipment in collaboration with Kenya Bureau of Standards (KEBS) and other relevant regulatory agencies.	Ministry responsible for agricultural mechanization Kenya Bureau of Standards (KEBS) County Department responsible for agricultural mechanization	Standards for agricultural machinery and equipment enforced	LT

Thematic Area 3: Investment in Agricultural Mechanization				
Specific Policy Objective Promote investment in agricultural mechanization				
Policy Intervention		Lead / Key Responsible Institutions	Expected/Outputs/ Outcomes	Timeline
i	Increase allocation of public expenditure to the agricultural mechanization sub-sector	Ministry responsible for agricultural mechanization The National Treasury County Governments	Increased allocation of public expenditure to the agricultural mechanization sub-sector	LT
ii	Promote incentives for financing agricultural mechanization investment by the private sector	Ministry responsible for agricultural mechanization The National Treasury County Governments	Incentives for financing agricultural mechanization investment availed	LT
iii	Establish a knowledge sharing platform on investments opportunities for agricultural mechanization.	Ministry responsible for agricultural mechanization The National Government County Governments	Knowledge platforms for investment opportunities established	LT
iv	Establish innovative and sustainable funding mechanisms for agricultural mechanization research facilities and agricultural mechanization infrastructure development facilities in Kenya	Ministry responsible for agricultural mechanization The National Treasury County Governments	Agricultural Mechanization facility for credit, subsidy, revolving and research established	LT
v	Establish innovative and sustainable funding including a dedicated credit facility for agricultural mechanization and revolving fund for AMS	Ministry responsible for agricultural mechanization County Governments	Agricultural Mechanization facility for credit, subsidy, and revolving established	LT

Thematic area 4: Capacity for Agricultural Mechanization				
Specific Policy Objective Enhance the capacity for delivery of agricultural mechanization services				
Policy Intervention		Lead / Key Responsible Institutions	Expected/Outputs/ Outcomes	Timeline
i	Strengthen collaboration with universities, research institutes, Technical and Vocational Education and Training (TVET) institutes and other stakeholders in the development of the curriculum and training	Ministry responsible for agricultural mechanization	Collaboration with universities, research institutes, Technical and Vocational Education and Training (TVET) institutes and other stakeholders in the development of the curriculum that meets market requirements strengthened	LT
ii	Create an enabling environment for investors to provide and support agricultural mechanization training.	Ministry responsible for agricultural mechanization County Governments	An enabling environment for investors to provide and support agricultural mechanization training in Technical and Vocation Education and Training (TVET) institutes, universities and research institutes created	LT
iii	Enhance capacity for agricultural mechanization service provision	County Department responsible for agricultural mechanization	Capacity for agricultural mechanization developed	LT
	Supports continuous capacity and skills enhancement for agricultural mechanization service providers	County Department responsible for agricultural mechanization	skills enhanced for agricultural mechanization service providers	LT
iv	Support development of agricultural mechanization facilities	County Department responsible for agricultural mechanization	Agricultural Mechanization Service facilities strengthened	LT

Thematic Area 5: Research and Technology Development and Adoption				
Specific Policy Objective Enhance mechanization research, technology development and adoption along agricultural value chains				
Policy Intervention		Lead / Key Responsible Institutions	Expected/Outputs/ Outcomes	Timeline
i	Enhance coordination and collaboration of agricultural mechanization research among stakeholders	Ministry responsible for agricultural mechanization	Enhanced coordination of agricultural mechanization research among stakeholders	LT
ii	In collaboration with stakeholders, enhance funding towards research in agricultural mechanization technologies	Ministry responsible for agricultural mechanization County Department responsible for agricultural mechanization Private Sector Farmers organization	Funding towards research in agricultural mechanization enhanced	LT
iii	Strengthen linkages of existing public research institutes involved in crop, livestock, fisheries and agro-forestry mechanization	Ministry responsible for agricultural mechanization	Existing public research institutes involved in agricultural, fisheries and forest mechanization strengthened	LT
iv	Strengthen human resource and infrastructure capacity of research institutions to modernize agricultural mechanization	Ministry responsible for agricultural mechanization	capacity of research institutions to modernize agricultural mechanization enhanced	LT
v	Enhance technology development and adoption in agricultural mechanization	Ministry responsible for agricultural mechanization	Technology development in agricultural mechanization enhanced	

Thematic Area 5: Research and Technology Development and Adoption				
Specific Policy Objective Enhance mechanization research, technology development and adoption along agricultural value chains				
Policy Intervention		Lead / Key Responsible Institutions	Expected/Outputs/ Outcomes	Timeline
vi	Create systems for effective stakeholders linkages in agricultural mechanization in research and development	Ministry responsible for agricultural mechanization County Department responsible for agricultural mechanization	Availability of systems for effective stakeholders' linkages in agricultural mechanization in research and development created	LT
vii	Support adaptive research in agricultural mechanization	Ministry responsible for agricultural mechanization County Department responsible for agricultural mechanization	Adaptive research in agricultural mechanization enhanced	LT
viii	Promote uptake of agricultural modern mechanization technologies including renewable energy sources and ICT in agricultural mechanization	County Department responsible for agricultural mechanization	Agricultural mechanization technologies adopted	LT

Thematic area 6: Agricultural Mechanization for Sustainable Agricultural Land Development and Climate Smart Agriculture				
Specific Policy Objective Enhance adoption of agricultural mechanization technologies for sustainable agricultural land development and climate smart agriculture				
Policy Intervention		Lead / Key Responsible Institutions	Expected/Outputs/ Outcomes	Timeline
i	Support mechanized soil and water conservation	Ministry responsible for agricultural mechanization County Department responsible for agricultural mechanization	Mechanized soil and water conservation initiatives developed	LT
ii	Develop guidelines for mainstreaming agricultural mechanization in sustainable land development and management	Ministry responsible for agricultural mechanization	Guidelines for mainstreaming agricultural mechanization in sustainable land development and management developed	LT
iii	Support mechanized climate smart technologies for drought and flood adaptation and mitigation systems	Ministry responsible for agricultural mechanization County Governments	Mechanized drought and flood adaptation and mitigation systems developed	LT
iv	Enhance mechanized soil and water conservation initiatives	Ministry responsible for agricultural mechanization County Department responsible for agricultural mechanization	Mechanized soil and water conservation initiatives developed	LT
v	Promote mechanized soil and water conservation	County Department responsible for agricultural mechanization	Mechanized soil and water conservation initiatives developed	LT

Thematic area 6: Agricultural Mechanization for Sustainable Agricultural Land Development and Climate Smart Agriculture				
Specific Policy Objective Enhance adoption of agricultural mechanization technologies for sustainable agricultural land development and climate smart agriculture				
Policy Intervention		Lead / Key Responsible Institutions	Expected/Outputs/ Outcomes	Timeline
vi	Support availability of affordable land development agricultural machinery	Ministry responsible for agricultural mechanization County Department responsible for agricultural mechanization	Affordable land development agricultural machinery availed	
vii	Support mechanized climate smart agriculture technologies	Ministry responsible for agricultural mechanization	Mechanized climate smart agriculture technologies adopted	LT
viii	Promote environmentally friendly mechanized agricultural production and processing techniques	Ministry responsible for agricultural mechanization	Environmentally friendly mechanized agricultural production and processing techniques developed and adopted	LT

Thematic area 7: Institutional and Legal Framework				
Specific Policy Objective **Establish a legal and institutional framework for collaboration and coordination for agricultural mechanization**				
Policy Intervention		**Lead / Key Responsible Institutions**	**Expected/Outputs/ Outcomes**	**Timeline**
i	Strengthen coordination, collaboration and partnership among actors involved in agricultural mechanization	Ministry responsible for agricultural mechanization	Coordination, collaboration and partnership among public regulatory agencies involved in agricultural mechanization strengthened	MT
ii	Promote establishment and strengthening of agricultural mechanization institutions	Ministry responsible for agricultural mechanization	Agricultural mechanization institutions established and strengthened	MT
iii	Develop legislation to support the agricultural mechanization sub-sector	Ministry responsible for agricultural mechanization	Legislation to regulate the agricultural mechanization sub sector developed	ST
iv	Collaborate with public and private institutions for capacity building and certification of plant operators	Ministry responsible for agricultural mechanization Stakeholders	Establishment of guidelines for certification of Plant Operators	LT

Thematic Area 8: Cross Cutting Issues in Agricultural Mechanization				
Specific Policy Objective Develop agricultural mechanization technologies that address the interest of people with special needs and support local initiatives				
Policy Intervention		Lead / Key Responsible Institutions	Expected/Outputs/ Outcomes	Timeline
i	Promote and support development of appropriate mechanization technologies which are suitable to youth, women and persons with special needs	Ministry responsible for agricultural mechanization	Appropriate mechanization technologies suitable to youth, women and persons with special needs developed and promoted	LT
ii	Promote the buy-Kenya-build-Kenya initiative on agricultural machinery and equipment	Ministry responsible for agricultural mechanization	Local agricultural mechanization initiative and technologies supported	LT

Annex 2: Stakeholder Analysis

STAKEHOLDER	KEY INSTITUTIONS	ROLE
Agriculture sector Ministries	Agriculture, Livestock & Fisheries, Water, Coop., Lands, Water & Irrigation, Environment & Natural Resources	Collaboration in Programme development and implementation, coordination and policy guidelines,
Trade Sector Ministries	Trade, Foreign Affairs, Industrialization, East African Community, Finance, Devolution and Planning	Provide international market information, trade negotiation, maintain quality standard, provide information on tariffs, taxes, levies
Infrastructure sector ministries	Public works, Roads, Transport, Energy	Provision and development of power, roads, telecommunication,
Research and Training institutions in agricultural mechanization	KALRO, KIRDI, Universities and ATDCs,	Provision of expertise, capacity building, provision of science technology and innovation, collaboration and coordination of partnership in research programmes in mechanization,
Machinery and equipment manufacturers	Ndume Limited, Kariobangi Light Industries and others	Up scaling of Machinery and equipment
Machinery and equipment supplier/dealers	CMC Agricultural Machinery Division, Holman Brothers Ltd, Same Tract, Farm Equipment & Implements Ltd (FEIL), Farm Machinery Distributors Kenya Ltd, FiatAgri Ltd, Toyota (K), Car & General, Brazafric etc.	Provision of Machinery and equipment supplies
Regulatory bodies	KeBS, AFA	Provision of quality, advisory services setting of standards, and regulatory services

STAKEHOLDER	KEY INSTITUTIONS	ROLE
Farmers and Farmer organizations	CGA, EAGC, KENAFF County Representatives	Empowerment, awareness creation, capacity building, resource mobilization, networking, advocacy and Technology/ information dissemination, support for production and marketing, technology adoption and uptake
Private Sector organizations	KEPSA, CMA, KAM, Chamber of Commerce & Industry	Provide partnership in research, extension, resource mobilization, entrepreneurship development
Financial Institutions	AFC, Private Banks, Micro Finance Institutions	Provision of financial facilities, saving and credit, investment in capacity building and purchasing of Machinery and equipment
Development Partners	Bilateral and Multilaterals	Provision of Technical support, financial assistance, capacity development
Regional and international organizations	JICA, KoTRA, FAO	Cooperation in areas of mechanization. Resource mobilization, technical support
NGOs,	African Tillage Network, Kick start, KENDAT	Community empowerment, capacity building, resource mobilization, networking, advocacy and Technology/ information dissemination, technology adoption and uptake
Agro-Processors,	Agro-processing dealers and millers	Provision of agro-processing machinery and equipment, capacity building, dissemination of this technologies

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