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MINISTRY OF AGRICULTURE, LIVESTOCK AND FISHERIES

AGRICULTURAL MECHANIZATION POLICY



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AGRICULTURAL MECHANIZATION POLICY

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Foreword

Agriculture remains the backbone of the Kenyan economy. It is the single most important sector in the economy, contributing approximately 26 percent of the Gross Domestic Product (GDP), 60 percent of the export earnings and employing 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 performance of the whole economy.

The growth of the sector is therefore expected to have a greater impact on a larger section of the population than any other sector. 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 Millennium Development Goal No. 1 with respect to reduction of extreme poverty and hunger.

Agricultural mechanization is one of the major agricultural production inputs and a catalyst for rural development. Application of agricultural mechanization technology increases power to agriculture, largely therefore enhancing productivity of human labour. Despite agricultural 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 relatively low level of mechanization is due to a number of challenges facing the sub-sector. These include; inadequate research and technology development; weak local manufacturing and distribution, and insufficient agricultural mechanization quality assurance, low level of investments in mechanization services, poor extension and technology adoption, weak institutional and legal framework. The cross-cutting

issues affecting agricultural mechanization include matters related to vulnerable groups, gender and youth, negative effects of environment, inappropriate land use and climate change.

This policy aims at giving a clear direction for sustainable growth and development of the agricultural mechanization sub-sector. The proposed interventions herein will be supported by appropriate institutional and legal framework and stakeholders in both the national and county governments for successful implementation. The policy will thus result in an enabling environment for a vibrant agricultural mechanization industry.

I am confident that the implementation of the outlined policy will not only lead to the realization of higher levels of agricultural mechanization but also increased productivity, food security, income and environmental sustainability as outlined in the Kenya Vision 2030.

Mr. Willy Bett

Cabinet Secretary

Ministry of Agriculture, Livestock and Fisheries

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 and climate change, unfavourable 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. The environment for agricultural mechanization has in the past been unfavourable for adoption while capacity for research and technology development has been inadequate. The promotion of agricultural mechanization for increased productivity and provision of quality assurance are broadly insufficient.

The objectives of the policy are creation of enabling environment for agricultural mechanization development, building capacity for research and technology development, promoting agricultural mechanization for increased productivity and providing quality assurance. The policy sets out goals and directions for present and future development and management of agricultural 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.

The 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.

Finally, we are confident that we will collectively achieve the overall objective of the Policy of sustainably raising the level of agricultural mechanization for increased productivity of the sector and income to our country.

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The contribution 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.

Acronyms and Abbreviations

ADP	Animal Draught Power
AFC	Agricultural Finance Corporation
AFFA	Agriculture Fisheries and Food Authority
AgGDP	Agriculture Gross Domestic Product
AIDS	Acquired Immuno Deficiency Syndrome
AMS	Agricultural Mechanization Stations
AMTU	Agricultural Machinery Testing Unit
ASDS	Agricultural Sector Development Strategy
ATDCs	Agricultural Technology Development Centers
ATN	Africa Tillage Network
CBOs	Community Based Organizations
CEO	Chief Executive Officer
CGA	Cereal Growers Association
CMA	Capital Markets Authority
CMC	Cooper Motors Corporation
EAGC	East Africa Grain Council
FAO	Food and Agriculture Organization
FEUSHA	Farm Equipment Use in Small Holder Agriculture
GDP	Gross Domestic Product
HIV	Human Immuno-deficiency Virus
ILRI	International Livestock Research Institute
JICA	Japan International Cooperation Agency
KALRO	Kenya Agricultural and Livestock Research Organization
KAM	Kenya Association of Manufacturers
KEB	Kenya Engineers Board
KeBS	Kenya Bureau of Standards
KENAFF	Kenya National Farmers Federation
KEPSA	Kenya Private Sector Alliance
KIRDI	Kenya Industrial Research and Development Institute

KRA	Kenya Revenue Authority
M&E	Monitoring and Evaluation
MFI	Micro Finance Institutions
MOALF	Ministry of Agriculture, Livestock and Fisheries
MoE&P	Ministry of Energy and Petroleum
MOH	Ministry of Health
MoI&ED	Ministry of industrialization and Enterprise Development
NACC	National AIDS Control Council
NACOSTI	National Commission for Science Technology & Innovation
AMB	Agricultural Mechanization Board
NAMP	National Agricultural Mechanization policy
NAMS	National Agricultural Mechanization Strategy
NARS	National Agricultural Research System
NCPB	National Cereals and Produce Board
NEMA	National Environment Management Authority
NGOs	Non-Governmental Organizations
PHS	Plant Hire Services
RTDCs	Rural Technology Development Centers
SAPs	Structural Adjustment Programmes
SCS	Soil Conservation Services
SDA	State Department of Agriculture
SRA	Strategy for Revitalizing Agriculture
THS	Tractor Hire Services
UNIDO	United Nations Industrial Development organization
VAT	Value Added Tax
WAFC	World Agro forestry Centre

Definition of Terms

Term	Definition
Agricultural Production	The carrying out of activities long fisheries, crops and livestock value chains
Farm Unit	Includes land holding, livestock and fisheries
Farmer	Means livestock producers, crop producers and fisher folk
Farming	Includes aquaculture, raising of livestock and crops

Executive Summary

The Kenyan agricultural sector is important in contributing to food security, production of agro-based raw materials, employment creation, income generation and earning of foreign exchange. The major factors that contribute to crops, livestock and fisheries growth and development include: suitable land, availability of moisture, favorable climatic conditions, availability of quality farm inputs and appropriate mechanization, reliable labour and functioning markets.

Agricultural mechanization is a key input in the agricultural sector production value chain. The main types of mechanization in the country include the use of human, animal-drawn and motorized machinery, implements and equipment. Development and promotion of these have 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 legislation framework has not sufficiently addressed agricultural mechanization challenges leading to the low level of agricultural mechanization in the country. The consequences have been environmental degradation, social and economic problems including deterioration in produce quality, low agricultural production and under-utilization of agricultural land.

The past agricultural reforms coupled with the increase in population have generally resulted in diminishing size of farm units which have negatively impacted on agricultural mechanization. Furthermore, this trend is expected to continue in the foreseeable future and hence it is imperative that the mechanization activities take cognizance of this fact.

Furthermore, 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, adverse change in climate, and HIV and AIDS prevalence. Coupled with these, 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. These will be achieved through research and technology development, local manufacture and distribution, agricultural mechanization quality assurance, investments in mechanization services, extension and technology adoption and improved institution and legal frameworks.

The institutional and legal framework will be reformed to ensure participation by all stakeholders, representation and sustainability. Institutions will be set up including the Agricultural Mechanization Board, Agricultural Mechanization Research Institute (AMRI), Agricultural Mechanization Training Institute (AMTI) and Agricultural Mechanization Testing Centre to mobilize resources, implement, monitor and evaluate the policy.

Chapter 1: INTRODUCTION

1.0 Background Information

1. Agriculture remains the backbone of the Kenyan economy as it contributes directly about 26% of the Gross Domestic Product and another 25 percent indirectly. The sector accounts for 65 percent of total exports, provides more than 18 per cent of formal and 70 percent of informal employment in the rural areas. It generates about 70 percent of raw materials for agro-industrial production and generates 45 percent of government revenue. Further, the agricultural growth has a catalytic effect on the other sectors with an estimated growth multiplier of 1.64, compared to 1.23 for other activities. The sector is therefore a key driver towards the realization of 10 percent annual economic growth envisioned in Kenya Vision 2030. It also has a critical role to play with respect to reduction of extreme poverty and hunger in line with the Millennium Development Goal No. 1. The agricultural sector comprises of three main sub-sectors which are agriculture, livestock and fisheries.

2. The agriculture sub-sub-sector comprises the Industrial crops which contribute 17 per cent of the Agriculture Gross Domestic Product (AgGDP) and 55 per cent of agricultural exports. Horticulture has recorded a remarkable export-driven growth and is now among the largest subsector, contributing 33 per cent of the AgGDP and 38 per cent of export earnings. Food crops contribute 32 per cent of the AgGDP but only 0.5 per cent of exports.

3. The livestock sub-sector accounts for 12 percent of the national GDP and about 40 percent of the agricultural GDP. The industry supplies the

domestic requirements of meat, milk and dairy products and other livestock products while accounting 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, skins and their products, dairy products and processed pork products. It also employs about 50 percent of the country's agricultural 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.

4. The fisheries subsector contributes to national food security, wealth creation and foreign exchange earnings. The sub-sector contributes 0.7 percent of the country's GDP and about Kshs. 5 billion in foreign exchange. According to the Statistical Bulletin (2013), Kenya's fish production is dominated by freshwater capture fisheries which account for 80 percent of national fish production. Marine waters contribute approximately 6 percent and aquaculture approximately 14 percent. Kenya's annual fish production is valued at Kshs. 8 billion ex-vessel price.

However, the level of mechanization in the country is still at low levels that cannot address the national needs to meet the optimum agriculture productivity.

1.1 Production Systems

5. Agricultural production systems in crops, livestock and fisheries require mechanization to increase productivity and tap the enormous existing potential. The level of mechanization in the country is low compared to international standards.

1.1.1. Crop Production Systems

6. Crop production systems consist of small, medium and large-scale farms averaging 0.2 to 3, 3 to 49 and over 50 hectares respectively. There are approximately 4.0 million small-scale farmers predominantly in the high and medium rainfall areas that produce over 75 percent of agricultural production. Use of machinery on small-scale systems is very low in relation to the medium and large-scale agricultural production systems.

1.1.2. Livestock Production Systems

7. Most of the livestock is raised in extensive systems with communal grazing and free ranging of rain-fed rangelands. Intensive production is practiced in the high rainfall areas, semi-intensive systems are found in semi-arid lands and extensively in arid areas. Use of mechanized livestock production systems is very low. However, potential for mechanization is high to meet the growing demand for livestock and livestock products.

1.1.3. Fisheries Production Systems

8. 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. Production systems in capture fisheries are categorized into artisanal fishing and semi-industrial fishing. Aquaculture systems are categorized as semi-intensive, intensive and extensive depending on the inputs and production system. However adoption of mechanized production system is low.

1.2 Agricultural Policy Framework

9. 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. With political 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.

10. 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 including agricultural machinery and wide fluctuations in seasonal commodity production.

11. The Strategy for Revitalizing Agriculture (SRA) recognized some the major causes of low agricultural productivity as low adoption of mechanization. The strategy proposed agricultural mechanization agricultural operations to increase efficiency in agricultural productivity.

The Agricultural Sector Development Strategy (ASDS) is geared to transform Kenya's agriculture into a profitable, commercially-oriented and internationally and regionally competitive economic activity that provides high-quality, gainful employment to Kenyans. This was to be achieved within the framework of improved agricultural productivity and

farm incomes, while conserving the land resource base and the environment.

1.3 Legislation Affecting Agricultural Mechanization

12. The Ministry has embarked on a number of legislation and regulatory reforms in order to create an enabling environment for all the players in the sub-sector. The enactment of the Agriculture Fisheries and Food (AFFA) Act, 2013, the Crops Act, 2013 and the Kenya Agricultural and Livestock Research (KALR) Act, 2013 consolidated the numerous pieces of legislations within the Agriculture Sector to address the overlap of functions, obsolete legislations and to benefit from economies of scale. The Acts provided for the establishment of Agriculture Fisheries and Food Authority (AFFA) and Kenya Agricultural and Livestock Research Organization (KALRO). Other relevant existing legislation include the Land Act, Standards Act Cap 496, Appropriations Act, Dairy Act, Fisheries Act, Water Act 2002, National Cereals and Produce Board Act, Micro and Small Enterprises Act, Environmental Management and Coordination Act (1999), Devolution Act, Intergovernmental Relations Act, 2012. However, the Acts do not sufficiently address legislation affecting agricultural mechanization

1.4 Agricultural Mechanization in Kenya

13. Agricultural mechanization is a major agricultural production input that encompasses application of mechanical technology and increased power to agriculture, largely as a means to enhance the productivity of land and human labour. Agricultural mechanization aims at increasing the power inputs to farming activities hence intensified production and

enhanced value addition resulting to decreased cost of production and reduction of drudgery in farming activities. It also improves the timeliness and efficiency of farm operations; accomplish tasks that are difficult to perform without mechanical aids; improve the quality and value of work produced and processed products; provide employment, sustainable rural livelihoods; provide agriculture-led industrialization and markets for rural economic growth among others.

14. The different sources of agricultural mechanization power available include human power, animal power, mechanical power, electrical power, and renewable energy. Currently the use of motorized power stands at 30 percent, hand and animal draught (ADP) is 50 percent and 20 percent respectively.

15. Use of farm machinery and equipments depends on production system; farm size and availability of power. Provision of agricultural mechanization services is offered by individual farmers, private service providers and the public sector including Agricultural Mechanization Stations (AMS) and Agricultural Technology Development Centers (ATDCs). For successful agricultural mechanization planning and implementation, a holistic approach should be used that should specifically include private sector involvement, economic profitability and creation of an enabling environment with clear roles for both public and private sector stakeholders.

1.5 Past Agricultural Mechanization Programmes

1.5.1 Agricultural Mechanization Services

16. Established in the pre-independence Kenya in 1947 the service formerly known as Soil Conservation Services (SCS) which involved use

of heavy earth moving machinery (the plant hire service (PHS)) which was used to open up land for agricultural development in the former white highlands. Its main functions included construction of soil conservation and water harvesting structures, bush clearing and land leveling. Through this, more land was brought into agricultural production.

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

1.5.2 Agricultural Machinery Testing Unit

18. The unit was established in 1959 at Nakuru, with responsibility of testing and evaluating both local and imported agricultural machinery and equipments 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 were discontinued during the implementation of Structural Adjustments programme (SAPs).

1.5.3 Agricultural Technology Development Centres

19. They were initially established as Rural Technology Demonstration Units with mandate of demonstrating agricultural mechanization

technologies. Later the units were transformed into Rural Technology Development Centers (RTDCs) with additional mandate of adaptive research, design and fabrication of agricultural engineering technologies. In 2006 as part of the Ministry strategy to revitalize agriculture, they were rebranded ATDC with broad mandate that included; agricultural mechanization; agro-processing, renewable energy and storage. Following devolution, the mandate of ATDCs will be to assist the National Government in influencing policy development, applications of quality assurance and standards, monitoring and evaluation of agricultural engineering technologies in agriculture sector. Further the centers will ensure quality assurance through machinery, equipment and implements testing and evaluation. The distribution of the 10 regional centers across the country is based on ecological zones to address agricultural engineering oriented challenges to agricultural productivity.

1.5.4 On-Farm Storage Programmes

20. The Rural Structures and On-farm Grain Storage Programmes were spearheaded to address the challenges the small scale farmers faced in drying and storage of cereals and pulses. Further the programme addressed storage of potatoes. The Programme was a joint venture by the Government of Kenya and development partners. The Programme demonstrated the testing and applicability of appropriate post-harvest technologies applicable in small households.

1.5.5 Farm Equipment Use in Small Holder Agriculture

21. It was realized that the small scale farmers (up to 10 acres) mainly used hand tools. For them to increase their production and have value

addition in their production system, the Ministry formulated the FEUSHA project to address the mechanization needs for the small scale farmers including the production of wheat maize, rice, beans etc.

1.5.6 Soil and Water Conservation Programme

22. 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. The situation on soil degradation was studied by the Government and it became compulsory to practice soil conservation from 1937 to the end of the colonial era in 1963.

23. 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 coercive and restrictive regulations.

24. The decade that followed independence was marked by low soil conservation activities that resulted in erosion accelerating to alarming levels with signs of decline in soil fertility. The country developed the National Soil Conservation Project supported by SIDA. The project revived the activities of the Soil Conservation Service up to 1993 when the project ended. Agricultural land has reverted back to serious

degradation due to lack of an institutional framework to take over activities implemented by National Soil Conservation Service (colonial era) and National Soil Conservation Project (Post-Colonial).

1.6. Current Situation

25. Production costs within the sector are still high due to high costs of inputs, poor and long marketing chains, low level of mechanization and high transport costs.

The use of agricultural machinery has generally declined; the purchase of new machinery declined from an annual average of 1500 pieces 20 years ago to about 300 per year in the last 3 years. This has been due to the high costs arising from taxation and maintenance. The use of animal-drawn equipment such as ox-ploughs has also remained low due to their technological inappropriateness. Most of the farm equipment, machinery and spare parts are imported. Further, the increased reduction in farm size through sub-division makes the use of large machinery and mechanization of farming generally uneconomical.

Land in the high- and medium-potential areas as well as in arid and semi-arid lands (ASALs) remains under-exploited for agricultural production. Much of the available cropland remains under-utilized with smallholders using only 60 per cent of their land for agricultural production.

To increase agricultural productivity and improve farming as a business, farmers need capital investment for infrastructure, value-addition technologies and general farm development.

Chapter 2: TOWARDS THE AGRICULTURAL MECHANIZATION POLICY

Kenya has no written policy on agricultural mechanization. However, there is a National Agricultural Mechanization Strategy (NAMS) adopted by Government in 1995. The Strategy therefore is not anchored on written policy and therefore its implementation has proved to be a challenge. For agricultural mechanization to make a contribution to agricultural development and effectively contribute to increased food security there is need to promote the development and adoption of modern, appropriate, cost effective and environmentally safe mechanization technologies for crops, livestock and fisheries production. Furthermore, the country has an enormous potential for crops, livestock and fisheries production that remains largely untapped. This policy aims at giving a clear direction for sustainable growth and development of agricultural mechanization.

2.0 Rationale and Objectives of the Policy

2.1 Policy Rationale

26. The Constitution of Kenya (CoK) 2010 assure Kenyans of the right to be free from hunger and to have adequate food of acceptable quality (Article 43 (c)). It describes the two levels of government as distinct and interdependent. It requires the two levels to not only to cooperate with, support and consult each other, but also to liaise with each other for the purpose of exchanging information, coordinating policies and administration, and enhancing policy. Article 186 and The Fourth Schedule of the Constitution – Part 1: National government and Part 2: County Governments have assigned specific functions on agriculture to

the National Government and the County governments. It stipulates that the two levels of government shall conduct their mutual relations on the basis of consultation and cooperation (Article 6, Article 189 (1) (b) (c)).

27. The provisions related to agricultural mechanization at the national government include: protection of the environment and natural resources with a view of establishing a durable and sustainable system of development, construction of dams, agricultural policy, capacity building, technical assistance to the counties and public investment.

At the County government level the functions assigned by the Fourth schedule and Kenya Gazette Supplement (No. 116 of 9th August 2013) include: Agricultural extension and farmer advisory services, implementation of programmes in the agricultural sector to address food security in the county; Development of programmes to intervene on soil and water management and conservation of the natural resource base for agriculture; land development services such as construction of earth dams and water pans for agricultural production for food security.

28. Cooperation requires that there be intergovernmental dialogue or consultation to inform both the vertical and horizontal relationships between national and county levels of government and among the county governments respectively. The Constitution requires the national government and county governments to embrace a system of consultation, negotiation and consensus building to promote social and economic development (Article 174 (f)) while upholding the principle of good governance, integrity, transparency, accountability and sustainable development. The relationship between the two levels of government is further guided by the Intergovernmental Relations Act no. 2 of 2012

which provides for the establishment of a framework for consultation and co-operation. It also establishes mechanisms for the resolution of intergovernmental disputes in line with Articles 6(2) and 189 (i); (3) and (4).

29. The agricultural mechanization policy takes cognizance of the obligations of each level of government with regard to its development and implementation respectively. 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.

30. The sharing of roles and functions between the National and County governments will require review of some of the existing policies and acts. There will also be development of new policies and Acts of Parliament for various agencies within Government as the current dispensation either adds or takes away roles that were earlier performed by the central government. It will also require the development of new institutional framework for the sub-sector.

31. 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.

32. The Vision and Guiding Principles of this policy are aligned to Vision 2030 and other relevant policies and strategies in the sector including Agricultural Sector Development Strategy (ASDS), Agriculture Policy (under development) and National Land Policy 2007. This policy further makes reference to various and relevant Acts of parliament including Agriculture, Food and Fisheries (AFFA) Act 2013, Crops Act 2013, Kenya Agriculture Livestock Research Organization (KALRO) Act 2013, Water Act 2002 (under review), Environmental Management and Coordination (EMCA) Act 1999. The policy takes into account the relevant and emerging issues that affect or are affected by the sub sector at the county, national, regional and international levels.

33. Expansion in farming coupled with campaigns to attract the youth to agriculture explains the need to further promote agricultural mechanization and more so anchoring it in policy. Further, there is need to bring on board the private sector players who are the drivers of the economy.

2.2 Policy Objectives

2.2.1 Overall Objective

34. The overall objective is to sustainably raise the level of mechanization of the agricultural sector for increased productivity and incomes, create a strategic institutional and market environment that provides a choice of agricultural machinery, equipment and technology, within a sustainable delivery and support system.

2.2.2 Specific objectives

35. The specific objectives of the policy are to:

- ❖ Promote Public-Private-Partnership in agricultural mechanization service delivery
- ❖ Promote agricultural mechanization research and technology development for efficiency and effectiveness
- ❖ Promote a conducive environment for local manufacturing and distribution of agricultural machinery and technologies
- ❖ Promote and regulate agricultural mechanization quality and standards
- ❖ Stimulate mobilization of resources for investment in agricultural mechanization
- ❖ Strengthen collaboration with the departments regulating trade on agricultural machinery and equipment.
- ❖ To refocus extension and technology repackaging for enhanced adoption by stakeholders in agricultural mechanization for increased productivity
- ❖ Enhance adoption of sustainable agricultural land management best practices and scientific innovations for increased agricultural productivity
- ❖ Promote climate smart agricultural mechanization measures to mitigate the adverse effects of climate change
- ❖ Promote agricultural mechanization technologies that mitigate the negative impacts on vulnerable groups (aged, PLWD, PLWH, orphans)
- ❖ Promote agricultural mechanization technologies that are gender responsive

- ❖ Promote youth participation in agricultural activities through agricultural mechanization
- ❖ Establish an effective and efficient institutional framework for development of agricultural mechanization

Chapter 3: CHALLENGES AND POLICY INTERVENTIONS

3.1 Research and Technology Development

36. Agricultural mechanization in Kenya is still undertaken through use of outdated technology which relies on human muscle power in approximately 60 to 90 percent of the cultivated land. Mechanization is an essential input that can transform farm family economies by facilitating increased output and reduction of drudgery.

37. The research agenda is guided by the National Agricultural Research System Policy (2012) which however, has not addressed issues relating to agricultural mechanization in a holistic manner. There is a sizeable pool of agricultural research institutions that is managed by independent management boards or councils, with each institution planning and executing research programmes independently. The institutions have been in existence for a number of years but have had limited impact on agricultural mechanization research development. The industry has also attracted little adaptive research over the years.

Challenges

- ❖ Inadequate attention to research and development of agricultural mechanization
- ❖ Low level of government funding towards research in agricultural mechanization
- ❖ Inadequate demand-driven research in agricultural mechanization
- ❖ Ineffective research-extension-farmer linkages in agricultural mechanization development

Policy Intervention

- ❖ National government shall enhance research and development of agricultural mechanization and establish the Kenya Agricultural Mechanization Research Institute
- ❖ National government in collaboration with stakeholders shall enhance funding towards research in agricultural mechanization
- ❖ Both National and County governments shall create systems for effective stakeholders linkages in agricultural mechanization development

3.2 Local Manufacturing and Distribution

38. The manufacture and distribution of agricultural machinery and equipment occupy a central place in the development of agriculture. The manufacturing industry includes formal and informal segments. The manufacturing sector is still ill equipped and underdeveloped and lacks entrepreneurial skills, technical knowledge, and capital to develop businesses. The capacity for local manufacturing has not been fully realized.

39. Though the informal sector plays an important role in the development, manufacture and adoption of certain equipment for mechanization, their capacity is limited. However, it contributes to research and development related to agricultural machinery and equipment which are crucial to raise the level of mechanization and the productivity of agriculture. Furthermore, the supply of agricultural machinery and implements is inadequate. Though the need for machinery is associated with firms/farms where the activities are

located, the manufacturers, distributors and dealers are located in major towns thus hindering distribution.

Challenges

- ❖ High cost of production due to expensive raw materials, energy, labour and transport
- ❖ Inadequate capacity for the local manufacturing of agricultural machinery and equipment
- ❖ Insufficient management system for repair, maintenance and replacement parts
- ❖ Inadequate testing capacity for locally manufactured and imported agricultural machinery and equipments
- ❖ Enforce minimum percent local content of imported and locally manufactured machinery and equipment

Interventions

- ❖ National and county governments shall institute measures to reduce cost of local manufacture of agricultural machinery and equipment
- ❖ National and county governments shall institute measures to ensure after sales service and maintenance of agricultural machinery and equipment in the industry
- ❖ National and county governments shall develop capacity for the local manufacturing of agricultural machinery and equipment
- ❖ National and county governments shall stimulate participation of local investors in manufacture and distribution of agricultural mechanization technologies

3.3 Agricultural Mechanization Quality Assurance

40. Imported agricultural machinery and equipment are not necessarily designed to operate in the various Kenyan agro-ecological conditions. They are imported without any standardized testing and evaluation. In addition, some locally manufactured agricultural implements are reported to be of substandard quality. There is also poor quality of raw materials leading to substandard product. This low quality machinery leads to financial losses and is also unsafe for operation in the fields, hence the need for standardization and testing. Quality assurance ensures adherence to high standards and provides a significant benefit by guaranteeing safety and smooth operations for product users.

Challenges

- ❖ Insufficient performance data and information on different agricultural machinery and technology
- ❖ Inadequate standards, testing procedures and certification mechanisms
- ❖ Poor quality of both locally manufactured and some imported machinery and equipment
- ❖ Poor quality post-harvest machinery, farm structures and practices
- ❖ Inappropriate designs and layouts of processing facilities leading to poor quality of the processed products
- ❖ Poor quality of some raw materials for manufacture
- ❖ Lack of capacity (trained personnel, infrastructure, equipment) for testing and evaluation of agricultural machinery and equipment for quality assurance.

Interventions

- ❖ National and County Governments shall establish data bank for agricultural mechanization technologies and machinery
- ❖ National Government shall develop capacity for testing and evaluation of agricultural machinery and equipment
- ❖ National Government shall develop standards, testing procedures and certification mechanisms for agricultural machinery and equipment
- ❖ National and county governments shall enforce standards for locally manufactured and imported machinery and equipment.
- ❖ National and county governments shall enhance the quality of post-harvest machinery and practices
- ❖ National govt shall develop standards for designs and layouts of processing facilities and structures to improve quality of processed products
- ❖ National and county governments shall enforce standards for raw materials

3.4 Investments in Agricultural Mechanization

41. Agricultural mechanization in Kenya requires major investment to industrialize. For instance, the country currently has about 10,000 tractors, for the sector to achieve 50 percent mechanization level; an additional 9,500 tractors would be required with accompanying basic implements for other farm operations. In addition, mechanization involves other processes along agriculture value chains. As the country endeavors to increase productivity, more investment is required to meet these demands.

Investments in mechanization are majorly public-private-partnership driven with the government providing appropriate environment while private sector manufactures and distributes. Despite this fact the industry has not attracted sufficient investment for its growth.

Challenges

- ❖ High investment costs and expensive financial services contributing to un-favorable investment climate
- ❖ Inadequate knowledge on investment in agricultural mechanization
- ❖ Multiple taxation in agricultural mechanization value chain and unfavourable taxation regime
- ❖ Inadequate dealership for agricultural machinery and equipment.
- ❖ Low production due to a combination of high cost of agricultural mechanization and financial services for investment.,

Interventions

- ❖ National and county governments shall promote incentives for financing agricultural investment
- ❖ National and county governments shall streamline taxation regime to support local manufacturing and stimulate demand for agricultural mechanization
- ❖ National and county governments shall provide rebate to farmers on road levy through the proposed Agricultural Mechanization Fund
- ❖ National and county governments shall promote after sales service and spare parts network

3.5 Extension and Technology Adoption

42. Agricultural mechanization technology requires extension services to create awareness and demand. Skilled human resource is critical in agricultural mechanization extension. The critical skills are required by artisans, operators, and farmers, other end-users, service providers (mechanics, engineers), suppliers and extension agents. The agents delivering mechanization extension have inadequate specialized skills due to insufficient training institutions.

Challenges

- ❖ Weak research-extension- industry linkages, networking and collaboration in technology development
- ❖ Inadequate technical skills and human resource for agricultural mechanization extension
- ❖ Low accessibility and adoption of agricultural mechanization technologies
- ❖ Inadequate agricultural information and data management
- ❖ Inadequate private sector participation in agricultural mechanization services delivery

Interventions

- ❖ National and county governments shall develop capacity for agricultural mechanization extension
- ❖ National and county governments shall strengthen research-extension-industry linkages
- ❖ National and county governments shall promote progressive agricultural mechanization technologies

- ❖ National and county governments shall support individuals, community based organizations and co-operatives to provide contracted agricultural mechanization services for improved technology accessibility and adoption
- ❖ National govt shall establish an Agricultural Mechanization Training Institute
- ❖ National and county governments shall establish and strengthen ATDCs and Agricultural Mechanization Service respectively
- ❖ National and county governments shall collaborate and network with stakeholders to enhance agricultural mechanization technology transfer and adoption.

3.6 Soil and Water conservation, Environment and Climate Change

43. The current farming practices in the country have resulted to degradation through erosion, excessive mining of soils, and deforestation. On the other hand, climate change has been associated with frequent, severe and prolonged droughts and floods thereby resulting to further degradation, low productivity and loss of livelihood.

Environment conservation is key to agricultural development as it assures sustainability of natural resource base for use by future generations. Adopting more resilient and sustainable agricultural systems will mitigate effects of climate change while feeding the growing population. Mechanized soil and water conservation is one form of mitigation in proper land development measures and use of conservation agriculture techniques.

Challenges

- ❖ Inadequate investment and development in soil and water conservation
- ❖ Poor land use and management practices
- ❖ Underdeveloped alternative energy for mechanization
- ❖ Lack of agricultural machinery inspection regulations to enforce emission controls
- ❖ Insufficient knowledge and research on appropriate mechanization technology that respond to climate change
- ❖ Declining agricultural land productivity due to climate change, uncontrolled subdivision and improper land use
- ❖ Lack of institutional framework for management of soil and water conservation

Interventions

- ❖ National and county governments shall promote soil and water conservation initiatives
- ❖ National and county governments shall promote climate smart agriculture
- ❖ National govt in consultation with county governments shall develop land-use Master plan for sustainable land management
- ❖ National government shall establish a National and County Soil and Water Conservation Service

3.7 CROSS CUTTING ISSUES IN AGRICULTURAL MECHANISATION

44. The main cross cutting issues in agricultural mechanization include matters related to vulnerable groups, gender and Youth in agriculture.

3.7.1 Vulnerable Groups and Agricultural Mechanization

45. The vulnerable groups include, People Living with HIV/AIDS, People Living with Disabilities, alcohol and drugs dependent persons, resource poor, orphans and the aged and rely on agriculture for their livelihoods. The groups lack employment, capital and in some cases, skills necessary to enhance agricultural productivity. Agricultural mechanization is a key factor identified to address the condition.

Challenges

- ❖ Lack of skills, experience and source of earnings
- ❖ Stigmatization and withdrawal
- ❖ Lack of mechanization technologies tailored for the vulnerable groups

Interventions

- ❖ National and county governments shall promote and support initiatives that will address challenges facing the vulnerable groups
- ❖ National and county governments shall enhance economic empowerment to the vulnerable

3.7.2 Gender in Agricultural Mechanization

46. Gender roles and responsibilities are dynamic and they respond to changing economic circumstances. Different gender have specific role 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 equally important players, but women and young farmers generally face more socio-cultural and socio-economic constraints than men. An important observation has been that majority of the farmers engaged in agriculture are aged between 50 and 65 years.

Gender division of labour in agriculture reveals that women have more demand on their labour due to their triple roles (reproductive, productive and community). In addition they experience drudgery due to the kinds of technologies used and their labour contribution is not commensurate with the returns they get. Further there is a decreasing number of young people involved in agriculture as an occupation. This is an undesirable signal of distress in the agricultural sector that is already negatively impacting on the national economy. As farm power mechanization directly relate to agricultural labour, gender dimensions need to be addressed as an integral part of mechanization interventions. There is need to encourage and promote application of agricultural mechanization in all farming systems for effectiveness and efficiency and to remove drudgery associated with manual labour.

Challenges

- ❖ Lack of information and appropriate protective kits in agricultural mechanization predisposes them to more occupational hazards
- ❖ Income insecurity
- ❖ Inadequate gender sensitive mechanization technologies

- ❖ Negative cultural practices

Interventions

- ❖ National and county governments shall promote appropriate gender friendly mechanization technologies
- ❖ National and county governments shall create awareness on use of appropriate mechanization technologies
- ❖ National and county governments shall develop capacity to counter negative cultural practices

3.7.3 Youth and Agricultural Mechanization

47. The youth number about 13.7 million and account for 35.4 percent of the population yet less than 10 percent are involved in agriculture. Of these 51.7 percent are female. The youth form 60 percent of the total labour force though majority is unemployed. It is estimated that 64 percent of the unemployed Kenyans are the youth (according to Kenya Institute of Economic Affairs (2010). Poor agricultural mechanization among other production technologies have kept the youth out of agriculture.

Challenges

- ❖ The drudgery nature of agriculture and low rate and duration of returns
- ❖ Negative attitude towards agricultural activities
- ❖ Lack of ownership and access to land by majority of the youth acts as a dis-incentive
- ❖ Limited opportunities for the youth to participate in value chains
- ❖ Lack of collateral

- ❖ Low commercialization of agriculture

Interventions

- ❖ National and county governments shall promote youth friendly agricultural mechanization technologies and innovative initiatives
- ❖ National and county governments shall promote customized, affordable and innovative credit products and packages for the youth in agricultural mechanization
- ❖ National and county governments shall develop capacity to counter negative attitude of the youth about agriculture

Chapter 4: INSTITUTIONAL AND LEGAL FRAMEWORK

4.1 Institutions

48. There are various institutions that are involved either directly or indirectly in the agricultural mechanization sub-sector. These institutions are classified as public, private and development agencies and are interlinked by different mandates and responsibilities along the mechanization value chain. They include farmer/pastoralist/fisherfolk organizations, processors, research institutions, private sector and Non-Governmental Organizations. At the county level, the institution dealing with agricultural mechanization in the public sector is the AMSs. At the national level, the subsector is serviced through the Ministry of Agriculture, Livestock and Fisheries.

Institutional Challenges

- ❖ Limited coordination resulting in low effectiveness and efficiency
- ❖ Inadequate funds to support mechanization initiatives
- ❖ Lack of agricultural machinery field testing and training institutions
- ❖ Inadequate institutional and legal framework

Intervention

- ❖ National Government shall establish the following:
 - a National Agricultural Mechanization Board
 - an Agricultural Mechanization Fund
 - a National Agricultural Mechanization Testing Centre
 - an Agricultural Mechanization Training Institute
 - a National Agricultural Mechanization Research Institute
- ❖ The National and County Governments will establish a Soil and Water Conservation Service

4.1.2 Functions of the Institutions

National and County Governments

49. 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 shall formulate and review agricultural mechanization policy and strategy in collaboration with the county governments and other relevant stakeholders;
- ❖ National and county governments shall oversee and coordinate agricultural mechanization sub-sector entities and agencies;
- ❖ National and county governments shall collaborate and liaise with other agencies involved in agricultural mechanization development at local, regional and international levels;
- ❖ National government shall formulate sub-sector legislations, standards and guidelines in collaboration with the county governments and other relevant stakeholders;
- ❖ National government shall coordinate technology and research development;
- ❖ National and county governments shall jointly formulate projects and programmes in collaboration with other stakeholders.
- ❖ National and County Governments shall mobilize resources and finances for the sub-sector;

- ❖ National Government shall in consultation with county governments, develop a national agricultural mechanization development, investment and strategic plan;
- ❖ National and County Governments shall establish a National Agricultural Mechanization Data Management Information System (AMDMIS);
- ❖ National and County Governments shall conduct monitoring and evaluation of agricultural mechanization policy implementation;
- ❖ National and County Governments shall undertake regulatory function for the sub-sector including conflict resolution mechanisms to deal with agricultural mechanization disputes.
- ❖ National and County Governments shall support capacity building for agricultural mechanization contracting service providers.

Agricultural Mechanization Board

50. The Agricultural Mechanization Board (AMB) shall be established with key responsibility of regulatory function. The Board shall be composed of representatives of both National and County Governments, machinery and equipment manufacturers/suppliers/dealers, agricultural mechanization service providers, national farmers' organizations research organizations and extension service providers.. The Cabinet Secretary responsible for Agriculture will appoint the chairman of the board and competitively recruit the Chief Executive Officer (CEO). The CEO of AMB will be the secretary to the board and will implement the policy decisions and programmes of the board. The functions of the Board will include:

- ❖ Liaising with the National & County Governments in reviewing national policy to include strategies dealing with mechanization.
- ❖ Licensing and registering production of identified agricultural mechanization machinery, plant and equipment
- ❖ Inspection of facilities involved in manufacture of agricultural machinery and equipment
- ❖ Surveillance on quality, performance and safety of agricultural machinery and equipment
- ❖ Review and development of standards and guidelines of agricultural machinery
- ❖ Provide guidance on imports and exports of agricultural machinery
- ❖ Development and review of agricultural mechanization strategies

Agricultural Mechanization Testing Centre

51. The centre will be responsible for ensuring quality control and assurance of imported and locally manufactured/assembled agricultural mechanization technologies. The functions will include:

- ❖ Testing and evaluating agricultural machinery, implements and equipment.
- ❖ Creating strong linkages with other players in view of adopting locally, durable, safe and high performing agricultural machinery for sustainable agricultural productivity.
- ❖ Carry out survey on agricultural mechanization in view of advising policy makers on the types of machinery required for the Kenyan

Agriculture, and development of export oriented Agricultural machinery industries.

- ❖ Advising manufacturers and government against dumping of obsolete equipment.
- ❖ Contribute towards promotion of up scaling of an agricultural mechanization regulations and standards
- ❖ Develop and maintain a Kenyan Agriculture machinery data base for reference in design & development.

Agricultural Mechanization Training Institute

52. The Agricultural Mechanization Training Institute (AMTI) will develop human resource targeting all cadres of stakeholders in agricultural mechanization. The specific mandate of AMTI will be;

- ❖ Identify key training priority areas for the sub-sector in collaboration with the County Government and key stakeholders;
- ❖ Development of training curricula in collaboration with the County Government and other key stakeholders;
- ❖ Undertake scheduled training in collaboration with relevant stakeholders;
- ❖ Assessment of the impact of training through monitoring and evaluation;
- ❖ Revision of the training modules in collaboration with relevant stakeholders;

- ❖ Set linkages with relevant professional bodies, universities and other training institutions for improved human resource development;
- ❖ Create a data bank in collaboration with other stakeholders to facilitate planning of appropriate institutional programs;
- ❖ Establish mechanisms for information sharing amongst stakeholders; and
- ❖ Keep pace with technology changes and ensure continuous human resource development through regular review of training needs.

Agricultural Mechanization Fund

53. At the national level an Agricultural mechanization Development Fund (AMDF) shall be established to facilitate the development of agricultural mechanization sub-sector. The funds for the AMDF will be drawn from the government, development partners and other stakeholders for the following purposes:

- ❖ Support development, repairs, maintenance, improvement and rehabilitation of agricultural mechanization infrastructure at the national and county government levels.
- ❖ Support agricultural mechanization research and innovation
- ❖ Provide grants and loans for development of agricultural mechanization at the national and county government levels. .

Agricultural Mechanization Research Institute

54. Agricultural Mechanization Research Institute (AMRI) will be established under KALRO to undertake research on agricultural mechanization in collaboration with the county governments and other stakeholders. The ATDCs will be strengthened to be satellite centres to undertake adaptive research trials in their respective mandate areas. The specific mandate of (AMRI) will be:

- ❖ Research on agricultural mechanization.
- ❖ Research for application in agricultural mechanization.
- ❖ Undertake research on mechanized soil and water conservation and management
- ❖ Seek research and innovations advances in mechanized agriculture for improved productivity and quality standards;
- ❖ Promote international cooperation in agricultural mechanization research and information
- ❖ Promote linkages between research, extension and farmers for effective adoption of technological packages.
- ❖ Development of research manuals, publications and materials for dissemination;
- ❖ Promote coordinated and regulated research and technology development for agricultural mechanization sub-sector to gain from emerging knowledge.
- ❖ Identify research priority areas in collaboration with the county governments and other stakeholders.

4.2 LEGAL FRAMEWORK

55. The National Government in consultation with County Governments and other sectoral agencies and development agencies shall formulate legal framework for the implementation of this policy. The envisaged framework will provide for the establishment of an administrative mechanism to operationalize this policy. The framework shall feed into the wider establishment of new institutions, review and re-organize the existing institutions and other mechanisms to operationalize this policy. This shall include review of existing legislation to be in tandem with the CoK 2010.

CHAPTER 5: MONITORING AND EVALUATION

56. In order to track the implementation of this policy, it will be essential to record and measure progress, changes as well as the overall performance of the agricultural mechanization sub-sector. Monitoring and evaluation (M&E) will provide reliable and timely data to inform the decision makers, stakeholders and the public on progress, results and shortcomings of the policy implementation.

57. A highly consultative and participatory monitoring and evaluation process will be adopted to facilitate periodic reviews of the Agricultural mechanization Policy and its contribution to the national economy. An M&E Committee with representatives of national and county governments and various stakeholders will be established within the Agricultural Mechanization Board to ensure M&E provides reliable and timely data for planning purposes.

58. A coordination unit at national level will be established in the Board for overall management of the inputs from different data sources, and also for the analysis of data and elaboration of respective reports from national and county levels. The coordination unit will have its basis in a partnership between the sub-sector ministries and research institutions, including regular cooperation and exchange with universities in form of research inputs. To achieve sustainability of the M&E system, adequate funds will be provided.

59. The Board in collaboration with other stakeholders will be responsible for monitoring the implementation of the Policy through the

various institutions that have been created by this policy with support of the relevant stakeholders. Participatory M&E will be encouraged and supported through appropriate fora at all levels. The National Government, in collaboration with other stakeholders will build capacity to formulate and implement an appropriate monitoring and evaluation system in all the development, management and research programmes within the sub-sector.

Annex 1: Institutions

The policy has identified public sector, Parastatals, International Institutions, Private Sector and Development Agencies as listed below;

Public Sector

These will encompass national and county governments

- ❖ Agriculture, Livestock and Fisheries
- ❖ Water and Irrigation
- ❖ Environment and Natural Resources
- ❖ Land, Housing and Urban Development
- ❖ Health and Sanitation
- ❖ Industrialization and Enterprise Development
- ❖ The National Treasury
- ❖ Foreign Affairs and International trade
- ❖ East African Affairs, Commerce and Tourism

Parastatals

- ❖ The Kenya Agricultural Livestock Research Organization
- ❖ Kenya Industrial Research Development Institute
- ❖ The Public universities
- ❖ Kenya Bureau of Standards
- ❖ National Environmental Management Authority
- ❖ Agricultural Food and Fisheries Authority
- ❖ National Cereals & Produce Board
- ❖ Numerical Machine Complex
- ❖ Kenya Dairy Board
- ❖ Kenya Revenue Authority
- ❖ Kenya Investment Authority

International Institutions

- ❖ Africa Tillage Network (ATN)
- ❖ Food and Agriculture Organization of the United Nations (FAO)
- ❖ World Agro forestry Centre (WAFC)
- ❖ United Nations Industrial Development Organization (UNIDO)
- ❖ International Livestock Research Institute (ILRI)

Private Sector

- ❖ Machinery and equipment manufacturers
- ❖ Machinery and equipment dealers and suppliers
- ❖ Agricultural mechanization service providers
- ❖ Processors
- ❖ Financial Institutions
- ❖ Community Based Organizations
- ❖ Non-Governmental Organizations

Development Agencies

Development agencies offer financial and technical support to agricultural mechanization sub-sector. These organizations are either multi-lateral or bilateral. They supplement Government resources for promotion of agricultural mechanization.

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 and Universities, 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 supplies/dealers	CMC Agricultural Machinery Division, Holman Brothers Ltd, Same Tract, Farm Equipments & 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, AFFA	Provision of quality, advisory services setting of standards, and regulatory services
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	Provision of financial facilities ,

	Finance Institutions	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	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

Annex 3: Implementation Framework

Thematic Area	Challenges	Intervention	Responsibility
Research and Technology Development	Inadequate attention to research and development of agricultural mechanization	Enhance research and development of agricultural mechanization	MoAL&F, KALRO, KIRDI, NACOSTI, Universities, International Research Institutions, Private Sector, farmer/farmer organizations
		Establish an Agricultural mechanization Research Institute	
	Low level of government funding towards research in agricultural mechanization	Enhance County and National government funding towards research in agricultural mechanization	MoAL&F, The National & County Treasuries, KALRO, NACOSTI, Universities, International Research Institutions, Private Sector
	Inadequate demand-driven research in agricultural mechanization	Enhance demand-driven research in agricultural mechanization Enhance research and development of agricultural mechanization	MoALF, private sector, KALRO, Universities, Ministry of Industrialization & Enterprise Development (MoI&ED) /KIRDI farmer/farmer organizations
	Ineffective research-extension-farmer linkages in agricultural mechanization development	create systems for effective stakeholders linkages in agricultural mechanization development	MoAL&F, County governments, KALRO, KIRDI Universities, International Research Institutions, private sector (jua kali) and farmer/farmer organizations
Local Manufacturing and Distribution	High cost of production due to expensive raw materials, energy, labour and transport	Institute measures to reduce cost of local manufacture of agricultural machinery and equipment	MoI&ED, MoALF, Ministry of Mining, The National Treasury, KRA, private sector, KAM, Ministry of Energy & Petroleum (MoE&P)
	Inadequate capacity for the local manufacturing of agricultural machinery and equipment	Develop and encourage capacity for the local manufacturing and processing	MoALF, MoI&ED, MoE&P, KAM, KEPSA, National Treasury, KRA, KenInvest,

		Stimulate participation of local investors in manufacture and distribution of agricultural mechanization technologies.	
		Enforce minimum percent local content of imported and locally manufactured machinery and equipment	
	Insufficient management system for repair, maintenance and replacement parts	Enhance provision of after sales service and maintenance of agricultural machinery and equipment	MoALF, MoI&ED, County governments, Private sector including jua kali, KAM
	Inadequate testing capacity for locally manufactured and imported agricultural machinery and equipments	Establish an agricultural machinery and equipment testing center	MoALF, private sector, KIRDI, KEBS, County governments
Agricultural Mechanization Quality Assurance	Insufficient performance data and information on different agricultural machinery and technology	Establish data bank for agricultural mechanization technologies and machinery	MoALF, private sector, Universities, KEBS, other extension service providers
	Lack of capacity (trained personnel, infrastructure, equipment) for testing and evaluation of agricultural machinery and equipment for quality assurance	Develop capacity for testing and evaluation of agricultural machinery and equipment	MoALF, private sector, universities, KEBS, KIRDI, The National Treasury, other extension service providers
	Inadequate standards, testing procedures and certification mechanisms	Develop standards, testing procedures and certification mechanisms for agricultural machinery and equipment	MoALF, universities, KEBS KIRDI, private sector, KRA, KAM, KEPISA, County governments,
	Poor quality of both locally manufactured and imported	Enforcement of standards for locally manufactured and imported machinery and	MoALF, universities, KEBS, KIRDI, private sector, KRA,

	machinery and equipment	equipment through legislation	KAM, KEPSA, County governments,
	Poor quality post-harvest machinery, farm structures and practices	Enhance the quality of post-harvest machinery and practices to reduce losses and improve quality of products	MoALF, universities, KEBS, KIRDI, private sector, KRA, KAM, KEPSA, County governments,
	Inappropriate designs and layouts of processing facilities leading to poor quality of the processed products	Develop standards for designs and layouts of processing facilities and structures to improve quality of processed products	MoALF, universities, KEBS KIRDI, private sector, KRA, KAM, KEPSA, County governments,
	Poor quality of raw materials for manufacture	Enforcement of standards for raw materials	MoALF, universities, KEBS, KIRDI, private sector, KRA, KAM, KEPSA, County governments,
Investments in Agricultural Mechanization	High investment costs and expensive financial services contributing to unfavorable investment climate	Promote incentives for financing agricultural investment	MoALF, MoI&ED, KAM, KEPSA, National Treasury, KRA, KenInvest
	Inadequate knowledge on investment in agricultural mechanization	Capacity building on financial management for actors in the subsector	MoALF, KRA, KenInvest, Huduma Kenya
	Inadequate dealership for agricultural machinery and equipment	promote after sales service and spare parts network	MoALF, KRA, KEPSA, private sector

	Multiple taxation in agricultural mechanization value chain and unfavourable taxation regime	Streamline taxation regime to support local manufacturing and also to increase demand of agricultural mechanization.	MoALF, MoI&ED, KAM, KEPSA, National Treasury, KRA, KenInvest, County governments
		Provide rebate to farmers on road levy through the proposed agricultural machinery fund	County governments, National Treasury, Ministry of Roads and Infrastructure, KRA, KENAFF
	Low production due to a combination of high cost of agricultural mechanization and financial services for investment.,	Provide rebate to farmers on road levy through the proposed agricultural machinery fund	MoALF, private sector, The National Treasury
Extension and Technology adoption	Weak research-extension-industry linkages, networking and collaboration in technology development	Strengthen research-extension-industry linkages	MoALF, Research & Training Institutions, KALRO, private sector, KENAFF, manufacturers,
	Inadequate technical skills and human resource for agricultural mechanization extension	Develop capacity for agricultural mechanization extension	MoALF, Training Institutions, KALRO, County governments, private sector
	Low accessibility and adoption of agricultural mechanization technologies	Promote progressive agricultural mechanization technologies Establish an Agricultural Mechanization Training Institute Establish and strengthen ATDCs and Agricultural Mechanization Service respectively	MoALF, Training Institutions, County governments, Universities, private sector, Public Service Commission

	Inadequate agricultural information and data management	Strengthen local organizations, create networks and information exchange.	MoALF, Training Institutions, County governments, KALRO, Universities, private sector
	Inadequate private sector participation in agricultural mechanization services delivery	Collaborate and network with stakeholders to enhance agricultural mechanization technology transfer and adoption.	MoALF, County governments, private sector
Soil and Water conservation, Environment and Climate Change	Inadequate investment and development in soil and water conservation	promote soil and water conservation initiatives	MoALF, KEBS, KIRDI, private sector, KRA, KAM, County governments, KENAFF
	Underdeveloped alternative energy for mechanization	promote climate smart agriculture Develop and deploy technologies that use alternative energy sources	MoAL&F, KALRO, KIRDI, NACOSTI, Universities, International Research Institutions, Private Sector, farmer/farmer organizations
	Lack of agricultural machinery inspection regulations to enforce emission controls		MoAL&F, County governments, NEMA, farmers, KALRO, Ministry of Water, Environment & Natural Resources, ACT
	Declining agricultural land productivity due to climate change, uncontrolled subdivision and improper land use	promote climate smart agriculture	MoAL&F, County governments, NEMA, farmers, KALRO, Ministry of Water & Irrigation, Environment & Natural Resources
	Insufficient knowledge and research on appropriate mechanization technology that respond to climate change		

	Lack of institutional framework for management of soil and water conservation	establish a National and County Soil and Water Conservation Service	MoALF, MoE&P, KEPSA, KenInvestT, County governments
	Poor land use and management practices	develop land-use Master plan for sustainable land management	National Govt, County govts, NLC, NGOs
Vulnerable Groups and Agricultural Mechanization	Lack of skills, experience and source of earnings	promote and support initiatives that will address challenges facing the vulnerable groups	MoALF, Min of Health, NACC, NGOs, County governments
	Stigmatization and withdrawal		
	Lack of mechanization technologies tailored for the vulnerable groups	Promote agricultural mechanization technologies appropriate for the vulnerable target group	MoALF, KALRO, Training Institutions, County governments
Gender in Agricultural Mechanization	Lack of information and appropriate protective kits in agricultural mechanization predisposes them to more occupational hazards	Create awareness on use of appropriate mechanization technologies	MoALF, National Gender & Equality Commission, County governments, private sector, NGOs.
	Income insecurity	Enhance economic empowerment to the vulnerable	
	Inadequate gender sensitive mechanization technologies	Promote appropriate gender friendly mechanization technologies	
	Negative cultural practices	develop capacity to counter negative cultural practices	
Youth and Agricultural Mechanization	The drudgery nature of agriculture and low rate and duration of returns	Promote youth friendly agricultural mechanization technologies and innovative initiatives	MoALF, Ministry of Internal Security and Coordination of National Government, County governments, private sector, NGOs.

	Low commercialization of agriculture	Develop capacity to counter negative cultural practices and believes	
	Negative attitude towards agricultural activities		
	Lack of ownership and access to land by majority of the youth acts as a dis-incentive	Promote customized, affordable and innovative credit products and packages for the youth in agricultural mechanization	MoALF, Financial Institutions, Private Sector, Youth organizations
	Limited opportunities for the youth to participate in value chains		
	Lack of collateral		
	Low commercialization of agriculture		
Institutional and Legal Framework	Limited coordination resulting in low effectiveness and efficiency	National Government shall establish the following: <ul style="list-style-type: none"> o a National Agricultural Mechanization Board o a National Agricultural Mechanization Research Institute o The National and County Governments will establish a Soil and Water Conservation Service 	MoALF, National Treasury, Private Sector, NEMA, KALRO, KeBS
	Inadequate funds to support mechanization initiatives	Establish an agricultural mechanization fund	
	Lack of agricultural machinery field testing and training institutions	Establish National agricultural mechanization testing centre	
	Inadequate attention to research and development of agricultural mechanization	Establish a National Agricultural Mechanization Research Institute	

	Lack of agricultural machinery field testing and training institutions	Establish agricultural mechanization training institute	
	Inadequate legal framework	Revise and formulate necessary regulations as per this policy	