



REPUBLIC OF KENYA



NATIONAL AGRICULTURAL RESEARCH SYSTEM POLICY

JULY 2012



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FOREWORD

Agricultural research in Kenya has undergone tremendous changes since its inception early in the 19th century by the colonial government. The subsector has evolved from a purely advisory services function of the mainstream ministry of Agriculture to private sector, university and semi-autonomous institutions that have the most qualified scientists and the best research capacity in sub-Saharan Africa.

Despite these developments and the importance of agricultural research in a country such as Kenya whose economy is based on agriculture, there is no national agricultural research policy. Agricultural research is guided by the Companies Act, Science and Technology Act Cap 250, Agriculture Act, Cap 318, as well as university legislations. The civil society, NGOs, and many non-state actors also claim to do agricultural research. It is evident that despite its importance and the huge human and physical capacity, currently agricultural research in Kenya is uncoordinated and exposed to risks of confusion, duplication of effort and misallocation of resources.

The Government recognizes the important role agricultural technology development and application can play in transforming and modernizing agricultural research. The *Agricultural Sector Development Strategy 2010–2020* (ASDS) seeks to rationalize, streamline and enhance coordination of agricultural research services so that the sector can play its role of delivering the 10 percent annual economic growth envisaged under the economic pillar of *Vision 2030*. In the constitution, agricultural research is placed under the responsibility of the national Government while services to farmers through agricultural extension, are placed under the county governments.

This National Agricultural Research System Policy seeks to streamline, rationalize and put in a system that is consultative, efficient and effective and takes into account economies of scale to not only use the current scientific, human and physical capacities but also position Kenya as a hub for agricultural research and development in the region.

The policy will thus create an enabling environment for a vibrant agricultural research industry that contributes to the overarching national policies of economic growth and wealth creation, poverty reduction and gender equity.

**Hon. Dr. S. J. Kosgei, EGH, MP
Minister for Agriculture**

ACKNOWLEDGEMENTS

The process of developing this policy has been long and concerted because of the need to be consultative, comprehensive and thorough. This process was initiated in 2001 as part of reforming state corporations. When the NARC party came to power, the Government through Presidential Circular No 1 of 2003, started the reforms by merging some of the research entities such as the Kenya Trypanosomiasis Research Institute and the Kenya Veterinary Vaccines Production Institute with the Kenya Agricultural Research Institute. This process was not continued because of political and vested interests but was picked up later during the formulation of the Kenya Agricultural Productivity Programme (KAPP) and the *Strategy for Revitalizing Agriculture* in 2004. While negotiating for World Bank support, the Kenya government promised that it would put in place a process for reforming agricultural research so that it could be better coordinated and responsive to the need of farmers. The implementation of KAPP was therefore designed to test some of the procedures that could be used in the reformed agricultural research system by involving other research bodies apart from KARI in implementation of research. Several attempts were made to develop this policy through consultants in 2006 and 2007 but the results were not satisfactory.

The momentum was lost in 2008 after the 2007 election but picked up in 2009 as the Government was negotiating for World Bank support to the Kenya Agricultural Productivity and Agribusiness Programme (KAPAP) and the *Agricultural Sector Development Strategy 2010–2020*. In the ASDS, the government undertook to develop and release the national agricultural research policy by the end of 2011. The process has been long and concerted; many individuals and institutions have contributed to this policy and it would not be practical to acknowledge all of them. I will mention a few institutions that have played a key role in this process. I acknowledge the intellectual and material support that was provided to this process by the World Bank and the European Union without which the comprehensive consultation process could not have taken place.

I also acknowledge the Inter-ministerial Coordination Committee comprising of permanent secretaries of line ministries in the agricultural sector. The consultation process was led by a team of consultants under the leadership of Dr. Moctar Toure and Prof. Shellemiah Keya.

The coordination role of the Agricultural Sector Coordination Unit (ASCU) led by Dr. Mussolini Kithome is also highly acknowledged.

Romano M. Kiome (PhD, CBS)

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EXECUTIVE SUMMARY

Kenya's agriculture is central to meeting the challenges of feeding a growing population, creating wealth, reducing poverty and managing the degradation of natural resources. These challenges can be met if emphasis continues to be put on the positive factors that underpinned the remarkable agricultural growth realized since 2003. Concerted efforts must be made to address the country's vulnerability to climate change and other external shocks, as well as to policy and institutional reforms.

Over the past decade technological, political and socio-economic factors influencing agricultural research institutions have changed significantly. While the information and communication technology revolution has broadened access to knowledge and information, the private sector has become an essential player. At the same time, agricultural development is increasingly concerned with diversifying, adding value, improving product quality and food safety, equity in economic growth, capturing and creating markets, and addressing gender parity.

In Kenya, research is carried out by public and private sector institutions but without a common vision and a legal and strategic framework. This situation has led to a lack of cohesion, inefficient use of resources and limited impact. The establishment of a national institutional framework that captures the complementarities of the diverse actors engaged in agricultural research and development aims at addressing these shortcomings. The Science and Technology Act established the key building blocks of the national agricultural research system (NARS), namely: the Kenya Agricultural Research Institute (KARI), the Kenya Forestry Research Institute (KEFRI), the Kenya Marine Fisheries Research Institute (KMFRI) and the Kenya Industrial Research Institute (KIRDI). However, this attempt to strengthen and organize the NARS did not lead to systematic rationalization, integration and alignment of the various programs with national goals. Many other key players such as producers, the private sector, universities, NGOs and the civil society were largely ignored. Further, the current shift in global agricultural research towards integrated agricultural research for development and emphasis on demand-driven research call for major adjustments in the way research is organized and managed. To adapt to change processes, the Kenyan agricultural research system must be dynamic, innovative, responsive and well coordinated, guided by a common vision, mission and goal, and have a programmatic framework. The reform agenda must also be synchronized with transformations taking place in agricultural education, training, extension and other scientific and development fields.

The reform process should be guided by the following criteria: *shift* in policy focus from development of institutions towards a problem-solving and impact-driven research agenda; *commitment* to fast

tracking the adoption of available technologies and knowledge; *ability* to listen, communicate and work in a partnership mode; capacity to comprehend, translate and integrate both local and global issues and challenges that require research solutions; *capacity* to access, borrow and adopt knowledge and appropriate technologies available world-wide; *recognition* of the important role played by the private sector and intermediary organizations (non-governmental and community-based organizations); *appreciation* of the interconnectedness among competitiveness, collaboration and capacity building; *adoption* of a business-like management style; and *capacity* to document activities and results into published works. All these principles, values and strategic directions are consistent with and supportive of the newly approved policy, institutional and legal frameworks (the Constitution, *Vision 2030*, ASDS, etc.) that will guide the development of the country in the near future.

Against this background, the Government of Kenya has developed a new and comprehensive National Agricultural Research System Policy (hereinafter referred to as the NARS policy). The overall objective of the NARS policy is to create an enabling environment for a vibrant agricultural research system that contributes effectively to national development. The NARS policy's guiding principles are *inter alia*: adherence to national goals, NARS vision and mission; scientific integrity and professional excellence; reaching out and empowering stakeholders; accountability, drive for results and realizing impact on the ground; decentralizing services and adopting the principle of subsidiarity; programmatic approach along value chains, partnership and competitive funding as organizing principles; creating and responding to market opportunities; integrating public-funded research with research product delivery; mainstreaming social, human and environmental concerns as well as gender issues; and ensuring quality assurance of agricultural research services.

The policy objectives are: improving agricultural research policy framework; harmonizing and providing direction to national research for sustainable development; strengthening the legal, institutional and regulatory framework; coordinated planning, development and sharing of human resources and physical assets; coordinated planning, development and management of knowledge, information and communication technology; increased focus on outreach and technology dissemination and targeted partnership development framework.

To implement these objectives, the policy proposes the establishment of a body corporate called the Kenya Agricultural Research Organization (KARO) to co-ordinate and facilitate all aspects of agricultural research development. KARO shall operate as an interactive and interdependent network of autonomous bodies committed to a common vision, mission and goal. The key organs of KARO shall include: a Board, which shall be the key body making policy recommendations to the central government; a Secretariat, which shall be the executive arm of KARO; a Scientific and Technical Committee, which shall be an independent advisory body to the Board; the Secretariat and the various institutions of KARO; an Agricultural Research Fund, which shall operate as the principle funding arm; and implementing institutions that shall carry out the research agenda.

The goal of this new legal, institutional and regulatory framework is to improve the synergies and complementarities among the various players operating along the research–development continuum. This reform process focuses also on rationalizing and consolidating existing publicly funded institutions. Using the programmatic approach as the organizing principle, the NARS policy proposes the establishment of six new semi-autonomous institutes organized along commodities and value chain lines (food crops, livestock, forestry and environment, fisheries, horticulture and industrial crops); three new semi-autonomous institutes dedicated to arid and rangelands, water resources management, and biotechnology; and a genetic resources centre. The Kenya Industrial and Development Institute (KIRDI) will maintain its key functions.

ABBREVIATIONS

ASCU	Agricultural Sector Coordination Unit
ASDS	<i>Agricultural Sector Development Strategy 2010–2020</i>
CAADP	Comprehensive African Agriculture Development Program Comprehensive African Agriculture Development Program
Cap	Chapter, in the Laws of Kenya
CDF	Constituency Development Fund Constituency Development Fund
GDP	Gross Domestic Product Gross Domestic Product
IAR4D	Integrated Agricultural Research for Development Integrated Agricultural Research for Development
ICC	Inter-Ministerial Coordinating Committee Inter-Ministerial Coordinating Committee
ICT	Information Communication Technology Information Communication Technology
ICIPE	International Center for Insect Physiology and Ecology
ICRAF	World Agroforestry Centre World Agroforestry Centre
ILRI	International Livestock Research Institute
KARO	Kenya Agricultural Research Organization
KARI	Kenya Agricultural Research Institute
KAPAP	Kenya Agricultural Productivity and Agribusiness Program Kenya Agricultural Productivity and Agribusiness Program
KAPP	Kenya Agricultural Productivity Program
KEFRI	Kenya Forestry Research Institute
KENFAP	Kenya National Federation of Agricultural Producers
KETRI	Kenya Trypanosomiasis Research Institute
KIRDI	Kenya Industrial Research Development Institute
KMFRI	Kenya Marine Fisheries Research Institute
KNAS	Kenya National Academy of Sciences Kenya National Academy of Sciences
MDGs	Millennium Development Goals
MTIP	medium-term investment plan medium-term investment plan
NARS	National Agricultural Research System National Agricultural Research System
NARES	National Agricultural Research Extension and Education System National Agricultural Research Extension and Education System
NASEP	National Agricultural Sector Extension Policy National Agricultural Sector Extension Policy
NCST	National Council for Science and Technology National Council for Science and Technology
NEPAD	New Partnership for Africa's Development
NRTF	National Agricultural Research Taskforce National Agricultural Research Taskforce
R&D	Research and Development
SRA	Strategy for Revitalizing Agriculture
SRD	Scientific Research Division Scientific Research Division
STC	Scientific and Technical Committee Scientific and Technical Committee
TICR	Technical innovation resource center Technical innovation resource center
TWG	Technical working group



1. INTRODUCTION



Background

1. Currently agriculture contributes 51 percent of GDP directly and indirectly. The sector accounts for 65 percent of Kenya's total exports and provides more than 18 percent of formal employment and over 60 percent of informal employment in the rural areas. The sector is therefore the mainstay of the country's economy and the custodian of food for the growing population currently standing at 38.6 million people.
2. Growth of the national economy in Kenya is highly correlated to growth and development in agriculture. In the first two decades after independence, Kenya's agricultural sector and in turn the national economy recorded the most impressive growth rates of an average of 6 percent per annum, for agriculture and 7 percent for the national economy. The growth in agriculture was spurred by expansion because there was ample land available and better use of technology. Agricultural extension and research were highly supported by the Government.
3. Between 1980 and 1990 the sector recorded an average annual growth rate of 3.5 percent but declined in the late 1990s to an average rate of 1.3 percent. The main reasons for this decline were low investment in the sector, mismanagement, virtual collapse of agricultural

- institutions and, more importantly, negligence of agricultural extension and research. This decline started to reverse with the starting of the *Economic Recovery Strategy for Employment and Wealth Creation* and the *Strategy for Revitalizing Agriculture* which positioned the agricultural sector as a priority and hence key to economic growth.
4. However, these gains were affected by the shocks of the post-election violence of 2007, global food price crises and escalating fuel prices of 2008, and the financial crises of 2008/2009 to the extent that agricultural sector grew by negative 2.5 percent in 2008. The sector has demonstrated its importance and resilience by bouncing back to attain a growth rate of 6.3 percent in 2010.

National Policy Environment

5. *Kenya's Vision 2030* clearly defined the new framework and policy directions towards achieving the vision of: 'A food-secure and prosperous nation'. The agricultural sector is expected to be the key driver for delivering the 10 percent annual economic growth envisaged under the economic pillar of *Vision 2030*.
6. The sectoral policy framework is well laid out in the *Agricultural Sector Development Strategy 2010–2020* (ASDS). The ASDS's overall goal is to transform the current subsistence-dominated agriculture into a profitable, commercially oriented and competitive economic activity. The ASDS aims to contribute to the reduction of the number of people living below the absolute poverty to less than 25 percent, and reduction in food insecurity to less than 30 percent of the Kenyan population.

Rationale for the Policy

7. Formal agricultural research in Kenya dates back to 1903, with the establishment of agricultural testing station at Kabete and livestock testing station in Naivasha. In the colonial period before 1963, national research was organised as a department of the ministry of Agriculture. This run parallel to the regional research institutes under the East African Community that were established in 1950 but disintegrated in 1975. After the breakup of the East African Community, the Science and Technology Act Cap 250 was hurriedly passed in 1979 as a basis for establishing the National Council for Science and Technology and a number of institutes to carry out research in the country. Since then agricultural research has grown tremendously to be one of the most developed systems in sub-Saharan Africa in terms of human and physical capacity as well as the pool of knowledge and technologies.

8. Despite these developments and the importance of agricultural research in a country such as Kenya whose economy is based on agriculture, to date there is no single document that one can refer to as the national agricultural research policy.
9. Currently, the agricultural research system comprises public and private agricultural research institutions established under different legal and institutional frameworks. The Kenya Agricultural Research Institute (KARI), the Kenya Forestry Research Institute (KEFRI), the Kenya Marine and Fisheries Research Institute (KMFRI), and the Kenya Industrial Research and Development Institute (KIRDI) are parastatal research institutions established under the Science and Technology (Amendment) Act of 1979 with specific mandates. The Coffee Research Foundation (CRF), the Tea Research Foundation of Kenya (TRFK), the Kenya Sugar Research Foundation (KESREF), and the Kenya Seed Company (KSC) are state corporations that are registered under the Company's Act (Cap 486). CRF, TRFK and KESREF are responsible for research on coffee, tea and sugarcane, respectively, while KSC is involved in agricultural research relating to seed production. The National Irrigation Board (NIB), established under the State Corporations Act (Chapter 446), has a research division that undertakes research on irrigation technologies and practices.
10. Universities established under various Acts and charters have faculties of agriculture and allied sciences that carry out agricultural research independently or in collaboration with other agricultural research institutions. However, these collaborative efforts are constrained. Despite the large number of skilled scientific staff engaged in agricultural research in both public and private universities, no mechanism exists to harness these strengths at national level or even a designated process to link the universities with the large public or small private research initiatives and industry.
11. Some agricultural research is undertaken by private sector institutions. This research is geared at enhancing productivity, product quality, and safety and competitiveness in domestic and global markets. There are also regional and international research institutions undertaking agricultural research in the country. These institutions have regional and international mandates and offer opportunities for enhancing and complementing national agricultural research.
12. Overall, 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 challenge is how to establish an integrated agricultural research system that is well balanced and directed to address the diversity of national development goals and objectives in light of limited resources.

13. The Agriculture Act (Cap 318) and the Science and Technology Act (Cap 250) constitute the main legal instruments that organize and regulate public research. Universities, private sector research institutions, non-governmental organizations engaged in technology development and deployment, and regional and international agricultural research institutions based in Kenya are administered by different laws. The patchwork nature of these legal instruments shows the uncoordinated nature of the legal framework and the subsequent risks of confusion, duplication of effort and misallocation of resources.
14. In its various policies, the Government of Kenya recognizes the critical role agricultural technology development and application can play in transforming and modernizing the agricultural sector and in spearheading overall economic development. In the *Agricultural Sector Development Strategy 2010–2020* (ASDS), the Government recognizes the need for rationalizing, streamlining and enhancing coordination of agricultural services to position the agricultural sector to be the key driver for delivering the 10 percent annual economic growth envisaged under the economic pillar of *Vision 2030*. In the Constitution, agricultural research is placed under the responsibility of the National Government, while services to farmers through agricultural extension are placed under the county governments.
15. This National Agricultural Research System Policy seeks to streamline, rationalize and put in a system that is consultative, efficient, effective, and takes into account economies of scale to not only utilize the current scientific, human and physical capacities but also positions Kenya as hub for agricultural research and development in the region.
16. The objective of the NARS policy is to reform the Kenyan agricultural research system into a dynamic, innovative, responsive and well-coordinated system driven by a common vision and goal. The policy seeks to: (i) shift policy focus from institutions development towards problem-solving and impact-driven research agenda; (ii) fast-track national adoption of available technologies and knowledge; (iii) enhance capacity to access and adopt knowledge and appropriate technologies available world-wide; (iv) recognize the important role played by the private sector and non-state institutions; and (v) restructure the system to be better coordinated to efficiently use the existing capacity and develop to become a regional hub for agricultural innovations and knowledge base.
17. It is expected that the reform process prompted by the policy will be related and synchronized with transformation processes that are taking place in the fields of agricultural education, training and extension, as well as in other scientific fields. The policy will thus create an enabling environment for a vibrant agricultural research industry that contributes to the overarching national policies on economic growth and wealth creation, poverty reduction and gender equity.



18. Technological, economic, social and political drivers influencing agricultural research and its institutions have changed significantly over the past decade. The demand for new knowledge and technologies is changing rapidly because society in general and the agricultural sector in particular are dynamic. The private sector has become an increasingly important player. The information communication technology (ICT) revolution has broadened access to knowledge and information. Agricultural development is increasingly concerned with diversification, adding value, capturing markets, enhancing incomes, and addressing gender parity. Besides, greater attention is being given to improving product quality and food safety and equity in economic growth, while limiting the negative effects on the environment. Thus, agricultural research today is required to tackle problems that go beyond production. Further, research managers, policy makers and agricultural development practitioners have recognized that technology development and transfer are not linear and predictable processes. In addition, efficiency considerations demand that physical and human resources be rationalized, pooled and shared. The successful adoption and application of research results require an interactive and integrated approach in order to better link production to market.
19. In Kenya, publicly funded research institutions, universities, private sector, regional and international research institutions currently operate without a common vision and strategic framework. In this situation there is a lack of cohesion, leading to dispersion of efforts and inefficient use of resources, as well as limited impacts. In order to address these shortcomings, there is a need to establish a national institutional framework that captures the complementarities of the diverse actors in the agricultural research and development enterprise. It is for this reason that the Science and Technology Act (Cap 250) was revised in 1979 to establish the building blocks—KARI, KEFRI, KMFRI and KIRDI—of a NARS. However, this attempt to strengthen and organize the NARS did not lead to systematic rationalization, integration and alignment of the various programs with national goals. The

key players, particularly the producers, private sector, universities, NGOs and civil society, still remain largely on the margins. The transaction costs attached to such a fragmented system are very high.

20. Further, the shift in global agricultural research towards integrated agricultural research for development, the emphasis on demand-driven research and the increasing role of the private sector call for major adjustments in the organization and management of research. To adapt to the above-mentioned processes of change, the Kenyan agricultural research system must be reformed into a dynamic, innovative, responsive and well-coordinated system driven by a common vision and goal. The reform process must also establish a symbiotic relationship and be synchronized with the transformations taking place in the fields of agricultural education, training and extension, as well as in other scientific and development fields.
21. For agricultural reforms to take off smoothly, the following changes will be required:
 - Shift policy focus from institutional development towards problem-solving and impact-driven research agenda;
 - Fast-track national adoption of available technologies and knowledge;
 - Employ a bottom-up strategy by relating to stakeholders in simple and effective terms, and communicating and working in partnership;
 - Comprehend, translate and integrate local issues and global challenges requiring research solutions;
 - Access, borrow and adopt knowledge and appropriate technologies that are available worldwide;
 - Involve and recognize the important role played by intermediary organizations (NGOs, CBOs);
 - Appreciate the interconnectedness among competitiveness, collaboration and capacity building.



2. THE POLICY OBJECTIVES



22. In the context of the historical background and rationale, Kenya's *Vision 2030* and the ASDS, this NARS policy is designed to achieve the following objectives:
- Establish an integrated national agricultural research system that guides and supports the development of an innovative, commercially oriented, and modern agricultural sector;
 - Harness the best science, technology and indigenous knowledge in accordance with professional ethics and scientific judgment, for implementing the agreed research agenda;
 - Promote an effective delivery system that facilitates prompt application of agricultural research results and services;
 - Institutionalize participatory planning, priority setting, programming, and monitoring and evaluation for an agreed national research agenda;
 - Design a novel funding mechanism for agricultural research that ensures adequacy, predictability and sustainability of research;
 - Formulate a comprehensive framework for partnership building and consultation, and collaboration with stakeholders;

- Develop a systemwide framework for planning, managing and sharing physical resources;
 - Develop a systemwide framework for planning, developing, managing and utilizing human resources efficiently and effectively;
 - Develop a systemwide knowledge management and ICT policy, strategy and infrastructure for increased information sharing; and
 - Provide the legal framework for the NARS.
23. The foregoing elaborate the policy statement that will guide the process of achieving these objectives

Structures and Governance

Policy Statement: The Government of Kenya shall establish a National Agricultural Research System to create, guide and coordinate a diverse set of entities engaged in agricultural technology development and deployment.

24. The name of the proposed national agricultural research system shall be the Kenya Agricultural Research Organization (KARO). KARO shall be a body corporate registered in Kenya. It shall operate as an interactive and interdependent network of autonomous bodies, committed to a common goal. The following are the major components of KARO:
25. The Board shall be the apex body of KARO charged with the administration, functioning and development of agricultural research throughout the country. The Board shall establish an Executive Committee (a Bureau) with executive power to carry out duties between Board sessions.
26. The Secretariat shall be the executive arm of KARO and work under the direction and guidance of the Board.
27. The Scientific and Technical Committee shall be an independent advisory body to the Board, the Secretariat and the various institutes of KARO.
28. The Agricultural Research Fund shall be the principal funding arm of KARO.

29. The Implementing Institutes shall be the institutions entrusted with executing the KARO research agenda.
30. *The National Implementing entities* shall be drawn from the following existing organizations:
- Parastatal research institutes established under the Science and Technology Act of 1979 (Cap 250);
 - State corporations research institutes registered under the Companies Act (Cap 448) as well as the research wing of private corporations operating under the same umbrella Act;
 - Public and private universities established under the Universities Act.
31. KARO shall therefore comprise the following organizations:
- Six new semi-autonomous, publicly funded institutes organized along commodity lines. These are: (i) **food crops**, (ii) **horticulture**, (iii) **industrial crops**, (iv) **livestock**, (v) **forestry** and **environment**, and (vi) **fisheries**. These new entities shall be the product of the consolidation and rationalization of the existing research institutions of state corporations listed above.
 - Three new semi-autonomous, publicly funded research institutes with horizontal responsibilities centered on water resources management; semi-arid and rangelands; biotechnology
 - A centre dedicated to genetic resources
32. The Kenya Industrial Research and Development Institute (KIRDI) shall keep its horizontal functions and provide cross-cutting services to all institutions.
33. KARO shall also put in place Virtual Research Platforms to handle emerging and cross-cutting issues. These platforms shall provide a forum for scientists based in various programs to address issues that cut across the food, natural resource and livelihood systems. The platforms aim also at fostering vertical coordination along commodity value chains and horizontal integration among promising and sustainable crop, livestock, fish, and forest production. Other platforms may include agribusiness and market systems, socio-economic, bioethics, ecosystems resilience, integrated natural resources management and climate change, mechanization and energy, and health and nutrition.
34. The Associated Implementing Entities shall comprise:
- all Kenya-based international, regional and sub-regional agricultural and allied science research institutions operating under Host Country Agreements based on the provisions of the Geneva Convention.

- all faculties of agriculture and allied disciplines of public and private universities engaged in research, training and extension; all agricultural research wings of the private sector; and
 - all NGOs active in innovative technology development and deployment.
35. In light of the provisions of the Constitution and ongoing reforms in the agricultural sector, the proposed reforms will have the following implications:
- Research will remain a national responsibility, while extension will be a county-based function; KARO and its semi-autonomous institutes will hold national research responsibilities and have lean governance structures;
 - The current network of research and training centers, stations and sub-stations will be integrated and rationalized on agro-ecological bases in order to cover the research needs of all the counties.
 - The principles of subsidiarity and equity will be applied in this process; NARS and the National Agricultural Sector Extension Programme (NASEP) policy interfaces and integration will be effective at the counties.
 - Institutional capacity and financial resources of counties will be enhanced in order to empower communities and end-users in research agenda setting and technology transfer processes.
36. KARO shall establish platforms to communicate and/or enter into working partnerships with a broad range of parties outside the Organization. The parties can be either stakeholders or business parties or both. The overall objectives of these platforms are to serve as interfaces for raising awareness, entry points to KARO's planning and programming processes, and venues to identify and promote public and private sector partnerships. The design and management of these platforms shall be informed by KARO's information, communication and knowledge management policy as well as its programming and priority setting agenda.
37. **Technology and Innovation Resource Center** which will be a publicly-funded entity aimed at linking technology, markets and industrial development. Where and when appropriate, the Center will facilitate commercialization of research outputs, technology incubation prior to conversion into industrial products, and market exploration and development through targeted training, funding and infrastructure, as well as formulation of a conducive regulatory framework.
38. **Consultative Platforms** that are independent entities bringing together KARO members, stakeholders and partners at all appropriate levels.
39. **A Scientific Forum** that will be a venue for sharing and discussing research findings.

Formulation and Rationalization of the Research Agenda

Policy Statement: The research agenda shall be formulated to focus on impact-driven national priorities consistent with sectoral policies and strategies for sustainable agricultural development

40. Despite the existence of important knowledge and technology packages developed by the agricultural research community, most commodities handled by the poor have failed to show substantial socio-economic impact. Problems lie, partly, on the emphasis accorded to productivity increase with little attention given to product delivery at the market, and environmental concerns. For a drought-prone country and rainfed-dependent agriculture, it is surprising to note the little attention is given to water resource management in terms of access, storage, and efficient use. There are also imbalances in program content and geographical focus. Too little attention continues to be devoted to market and social research, and to agriculture, health and nutrition interfaces. Agricultural research has largely focused on medium- to high-potential areas, with minimal thrust to arid and semi-arid zones. The research agenda does not address in a holistic manner, issues pertaining to rangeland concerns, policy and institutional development, regional and international trade, mechanization and energy, environmental management and in particular mitigation of biodiversity losses, and adaptation to changes in climate.
41. To address these shortcomings, some entities are embracing the concept of an 'Innovation Systems Framework' within which the agricultural product value chain and the Integrated Agricultural Research for Development (IAR4D) are included. This new approach seeks to (i) promote vertical coordination and horizontal integration within and among commodities, (ii) fill in the missing nodes in the value chain continuum, and (iii) improve linkages among research, education and extension. In Kenya, successes recorded in some areas such as horticulture, tea, banana, and dairy production show that in commercial commodities where the stakeholders are systematically consulted, the research agenda can be better focused and deliver impact. The ingredients of success are the linking of research products to markets while organizing producers and providing effective extension services throughout the value chain continuum.
42. Thus, current research efforts need to be reorganized and focused on nationally agreed research priorities. The imbalances noted in program content, skills, gender and geographical distribution must be corrected through systemwide, coordinated and participatory research planning processes and human resources development plans. The redefined research agenda should give priority to arid lands and rangeland management, water resources management,

climate change mitigation and adaptation, market access and development, biotechnology, genetic resources, value addition, and technology delivery and adoption. It should also give attention to issues at the interface between livestock and wildlife management. It should continue to cover sustainable use and conservation of natural resources (land, forest, flora and fauna) as well as diversification and intensification of production that can spur economic growth and wealth creation, in particular within the segment of poor producers. The existing agricultural farmer training institutions could be harnessed for adaptive research.

Research Planning and Priority Setting Systems

Policy Statement: Research planning, programming and priority setting shall be undertaken with common and effective instruments that foster coordination and harmony while linking research activities to outputs, outcomes and impacts.

43. Planning and priority setting are about giving order to research activities in ways that are most consistent with objectives and available resources. The current approaches to planning, programming and priority setting are by individual institutes or entities. Most of the planning processes show a dysfunctional link between priority setting and resource allocation. This disconnect is related to the lack of transparency and checks and balance mechanisms within the planning-quality assurance continuum. Under these circumstances it is impossible to attain the common objective of reducing poverty, enhancing livelihoods and ensuring sustainable management of the natural resource base.
44. To achieve coherence and harmony, it is important for the proposed system to adopt common processes and methodologies for program planning, performance monitoring and reporting. KARO's planning process shall start from the policy directions provided by the Board. The Secretariat will provide coordination to ensure that the objectives, activities, resources, outputs and outcomes are linked. It would, further ensure that the process is cohesive and realistic, yet participatory and transparent. 'Feedback and feed-forward' mechanisms should be put in place at the national, county, community and village levels to ensure a demand-driven research agenda.
45. The institutional capacities of counties will be developed or enhanced to ensure an effective bottom-up planning process. However, proper care should be taken to ensure a balance between strategic and adaptive research capacities. The harmonized planning system can thus create a common front for anticipatory and proactive agenda setting, while harnessing

the best knowledge and technologies for its implementation. Such a system would ensure better accountability since reporting would be uniform. Similarly, common performance standards can be applied across the system. The planning process should be synchronized with national planning and budgeting mechanisms.

Human Resources

Policy Statement: A critical mass of qualified and motivated professionals committed to the national development agenda shall be built through a vibrant human resources policy that provides a conducive environment and accords a high priority to gender balance.

46. The quality of science-based outputs and outcomes is dependent on the skills and competence of professional and technical staff. Currently, a large number of scientists and support staff, especially in public research institutions and universities, is engaged in agricultural research in Kenya. However, this resource capacity is characterized by an uncoordinated approach to human resource development. It also lacks a harmonized, long-term human resource development strategy and plan for building a critical mass of professionals trained and equipped to handle local and contemporary problems at the national level. The lack of a central database on human resources, common policy and management tools makes it difficult to harness the best from the existing human resource capital. The prevailing situation is characterized by poor and widely varying schemes of service, as well as the lack of an attractive and reward system. This is a handicap to skills upgrading and staff mobility. It is worth noting that the ratio of researchers to population in Sub-Saharan Africa of (70: 1) is still low in relation to the needs and challenges faced by a country such as Kenya. The same argument applies to the ratio of support staff to scientists. Comparably, India NARS comprises of 12,000 PhD degree holders, yet the system has adequate funding. Reversing the current brain drain as well as correcting the distorted pyramid age of scientists, are among the top challenges facing the agricultural research system.
47. Thus, the country needs to develop a human resource development policy and long-term plan that make provisions for (i) continuous investment in training in order to create a critical mass of researchers in any given field, improve the gender balance, and minimize the intergeneration inequity; (ii) nurturing a culture for excellence

and recognition that is attractive and exciting for investors; (iii) developing an attractive scheme of service for better job security and subsequent staff mobility. Improving the ratio between scientific staff and farmers/producers must also be a key objective; and (iv) linking postgraduate training at all universities with funding opportunities in agricultural sector-related departments.

Infrastructure and Physical Facilities

Policy Statement: Adequate physical resources shall be developed through harmonized and coordinated planning, procurement and maintenance mechanisms that promote sharing and cost-effective utilization of support services.

48. Overall there are substantial physical resources such as laboratories, office space, equipment, land, plant and animal gene banks that support ongoing research efforts. However, the state of these resources varies greatly between and among institutes. Physical resource constraints are particularly acute in institutions operating in the arid and rangelands and, to some extent, in some agricultural faculties in universities. The acquisition, distribution and utilization of physical resources, particularly laboratory and field equipment and information and communication technology facilities, are managed in less prudent and uncoordinated fashion leading to inefficient use of the assets. The situation is exacerbated by the paucity of recurrent expenditure, coupled with a poor culture of maintenance. Many of the existing facilities are not regularly maintained or upgraded due to shortage of funds. A number of institutes have invested in very expensive equipment to conduct specialized analyses. It is not uncommon to find that the same type of analysis is conducted in many of the institutes in an uncoordinated manner that does not factor in economies of scale. Since scientific equipment is expensive, keeps changing fast and is costly to maintain, a well-coordinated NARS will operate more efficiently by adopting a strategic approach to the management of these resources.
49. The high cost of purchasing and maintaining some specialized equipment calls for a streamlined and centrally coordinated procurement and management approach. Substantial savings are likely to be realized and at the same time better services would be offered to clients. Suffice it to mention that adequate physical resources attract good people and position an organization to be more competitive in an environment of scarce resources.

Financial Resources

Policy Statement: A versatile and sustainable funding system shall be developed to effectively harness resources from domestic, external, public and private sources.

50. Agricultural research in Kenya has been largely funded by the public. Government funding has been directed primarily to maintaining the core functions of public research institutes. Over recent years, foreign assistance has taken an increased share in funding both core functions and stand-alone projects. Private sector funding remains low mainly because of the absence of clear legislation and incentive mechanisms for costs and benefit sharing. There is wide variability among institutes with respect to their capacity to access funding opportunities. The universities in the country face formidable challenges of raising adequate funds for research activities.
51. The overall funding base for agricultural research remains fragile and unsustainable. Resource mobilization and management have become daunting concerns of institutes engaged in science and technology throughout the world because of the unfavorable global financial environment, increased competition for scarce resources, and demand for transparency and accountability. In many developing countries, the research community faces an image problem (ivory tower syndrome), which makes it difficult to advocate for increased government funding and attract more non-traditional domestic and external financial support. Kenya is no exception. Indeed, the challenge of securing adequate, predictable and sustainable funding is daunting in Kenya, but there are no sustainable alternatives to increased public funding.
52. The governments of developed and emerging economies should provide the bulk of the funding needed to address national research priorities geared to food security, wealth creation, and environment protection. Public funding can and should be complemented by resources drawn from traditional and innovative non-public funding mechanisms. There are for example, a number of philanthropic or market-based funding opportunities that could easily be tapped into, provided that the research system opens up and develops an ‘image of development driver’. Universities have the golden opportunity of creating chairs that can be funded by industry. The Government in turn can use tax holidays for companies or individuals that channel their resources towards research.
53. Thus, there is a need to develop a systematic strategy for sustainable funding which focuses on (i) building strategic alliances with stakeholders for the purpose of advocating increased funding; (ii) institutionalizing procedures and modalities that promote transparency and

accountability in the management of resources; and (iii) creating a conducive environment that attracts innovative funding. Such a policy should be closely linked to the communication strategy that is put in place. The establishment of a Trust Fund could provide the financial stability and security needed for long-term planning and execution of the new research agenda.

Knowledge, Information and Communication Systems

Policy Statement: An integrated information and communication technology system and knowledge management strategy shall be put in place to process, store, share and manage knowledge, and place it at the disposal of all actors in the value chains.

54. A major function of the NARS is to effectively use information and communication technology (ICT). One of the most important assets of the NARS is its knowledge built over the years by its staff and partners. Since modern agriculture is knowledge intensive, the way the NARS acquires, stores, processes and manages knowledge calls for effective collaboration with the various units and partners. In Kenya, the lack of appropriate policy and infrastructure for ICT and knowledge management has been identified as one of the main causes for low technology uptake and the broadening gap between knowledge and application.
55. Most of the available knowledge is disseminated through scientific forums such as conferences and journals. Yet indigenous and traditional technical knowledge are underused. This is due to the absence of appropriate mechanisms to identify, document, protect, manage and use knowledge effectively.
56. Furthermore, there is the lack of a culture of borrowing and applying the wealth of knowledge and technology in the public domain that is easily accessible through the internet. Currently, information is disseminated to end users through the conventional linear method of information used in extension service. This model has limitations. Thus, more appropriate formats and user-friendly methods of sharing knowledge with stakeholders, especially producers and industry, need to be developed.
57. The challenging aspects of ICT for the Kenyan NARS are to develop (i) a strategy and tools that facilitate access, processing, storing, sharing and application of existing information



and knowledge; (ii) suitable infrastructure that helps to close the current digital divide; and (iii) nodes of excellence in various types of knowledge. In this respect, universities are poised to play a major role. The NARS communication and information strategy should be a fully fledged component of the agricultural sector-wide communication strategy. It should build proper links with the National Agricultural Sector Extension Policy (NASEP)'s plan on information and communication as well as similar provisions made in other research-related sectors.

Monitoring and Evaluation, Quality Control and Impact Assessment

Policy Statement: Systemwide monitoring, evaluation, and quality control and impact assessment mechanisms shall be established to improve performance and accountability as well as the culture of learning.

58. The credibility of the NARS will depend on the relevance and quality as well as the ability of its products and services to create impact on the ground. To achieve this objective, systemic quality control and impact assessment of its activities must be institutionalized throughout the system. Instruments for checks and balances must be developed and a culture of learning promoted.
59. Likewise, impact culture must be inculcated in the organization, and impact assessment should become a key component in the design of any project or program. However, it should be recognized that the attribution of impact goes beyond the remit of the NARS. Linkages with education, training and extension are paramount.

60. Once harmonized methodologies and instruments for quality assurance are adopted throughout the system, the current variations among implementing units will be minimized. Some examples of instruments are a common logical framework, performance measurement indicators, and unified methodologies for assessing impact. Similarly the adoption of common monitoring and evaluation procedures, including the use of internal and external expertise, would go a long way towards bringing harmony. Tools for impact assessment developed by various national and international organizations should be consulted and used as appropriate.

Dissemination and Technology Deployment

Policy Statement: A functional technology development and delivery system that facilitates prompt and effective application of agricultural research results and services shall be instituted.

61. The NARS policy's primary responsibility is the development of research products and services. Many technologies that can enhance productivity and product development exist but have remained on the shelves. The situation is exacerbated by the growing gap between research and extension due to the lack of appropriate extension methodologies and functional mechanisms. The NASEP has defined new objectives and provided directions for an improved delivery of technology to the end-users. It is important that the NARS policy develops complementarities with NASEP and contributes to addressing the outstanding challenge of ensuring effective community engagement and linkages to markets.
62. In this respect, the NARS should contribute to building capacity for brokering and deploying knowledge and technology to end-users. In close collaboration with extension, education and training services, the NARS should also develop and test new extension and training methodologies and approaches that respond to the evolving challenges of agricultural transformation. The ultimate national agricultural research and education system concept which integrates research, education and extension should overcome the present shortcomings by engaging multiple players, particularly the private sector, NGOs and universities.

Partnership and Collaboration

Policy Statement: Appropriate, relevant and cost-effective partnerships at all levels shall be nurtured to address complex and time-bound programs/projects based on comparative advantages.

63. Partnerships will be built to achieve either better products or the same products at less cost or less time. Partnerships bring various teams together to address complex and difficult issues that no single organization can handle on its own. Such partnerships bear a high degree of success and can facilitate uptake of new technology.
64. Partnerships must be forged at all levels among and between (i) national implementing institutes; (ii) domestic private sector research entities; (iii) universities and academia; (iv) producers and related organizations; (v) public and private international research organizations; (vi) academic, research and development organizations operating at sub-regional and regional levels such as ASARECA, NEPAD–CAADP, African Academy of Sciences; and (vi) professional bodies supporting and promoting agricultural research and partnerships. However, partnerships can be costly if not well managed; hence the need to adopt partnerships derived from best practices that deliver technology products to end users.



3. LEGAL AND REGULATORY FRAMEWORK FOR THE NARS POLICY



Policy Statement: To ensure coherence, consistency and synergy in the legal framework codifying agricultural research in Kenya, the Agricultural Act and the State Corporations Act will be reviewed to (i) conform to the Science and Technology Act and other related acts (ii) reflect institutional and financial autonomy, and National Coordination Authority of the newly created National Agricultural Research System Policy and (iii) provide appropriate linkages with partners within and outside the system.

65. The quest for an agricultural research policy has been a matter of long-term interest in Kenya. The first attempt to organize the sector was made to service early Kenyan settlers. Later, when establishing the East African High Commission (the predecessor to the East African Community in 1948), the East African Agricultural and Forestry Research Organization (EAAFRO) was formed. After independence, the Kenya Government developed a number of legal, institutional and regulatory frameworks addressing broad national agricultural research concerns. The current legal and regulatory landscape of agricultural research can be described as follows.

66. The Agricultural Act (Cap 318) is the overarching legal umbrella that defines and provides general direction for agricultural development. The specific provision in the Act, which can be related to agricultural research, reads as follows: ‘the conservation of the soil and its fertility to stimulate the development of agricultural land in accordance with the accepted practices of good land management and good husbandry’.
67. The second formative Act addressing agricultural research policy is the Science and Technology Act (Cap 250), which should be read in tandem with the State Corporations Act (Cap 446). The Science and Technology Act (Cap 250) is an Act of Parliament that establishes the policy and institutional instruments that provide advice and carry out scientific and technological activities necessary for the proper development of the nation. Part IV, Sections 12–20 of the Act make provisions for the establishment, incorporation and functions of research institutes, as well as the establishment of Boards of Management, management of discoveries and inventions and financial support. The Fourth Schedule of this Act lists the various research institutes, namely the Kenya Agricultural Research Institute (KARI), Kenya Forestry Research Institute (KEFRI) Kenya Industrial Research Institute (KIRDI), Kenya Marine and Fisheries Research Institute (KMFRI), Kenya Medical Research Institute (KEMRI) and Kenya Trypanosomiasis Research Institute (KETRI). It also clearly states their scope of research and applied sciences, as well as linkages with the line ministries for the time being responsible. The State Corporations Act, Cap 446, is the main legislation that is used to establish state corporations. All public agricultural research institutions are incorporated under this Act.
68. The Universities Act 1 regulates the role of all faculties of agriculture and allied disciplines of both public and private universities engaged in research, training and extension. Specific universities have their own Acts that govern their management, while private universities are conferred Charters by the Commission for Higher Education. Similarly, middle-level colleges have specific Acts of Parliament establishing them.
69. National and locally based international agribusiness institutions (with agricultural research wings) are incorporated under the Companies Act. It is worth noting that multinational companies such as Guinness, Delmonte, Nestle, Cadbury, Cargill, Unilever and Coca Cola, among others, carry out research that is not necessarily linked to mainstream government goals. The Coffee Research Foundation, Tea Research Foundation, Kenya Sugar Research Foundation and the National Irrigation Board are among the semi-public institutions incorporated under the Companies Act.
70. NGOs involved in technology development and deployment, such as Plan International, TechnoServe, Africa Harvest and Farm Africa, are registered under the NGO Co-ordination Boards Act No. 19 of 1990.

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71. Kenya-based regional and international agricultural research and allied science institutions such as ILRI, ICRAF and ICIPE, which carry out activities consistent with the NARS and generally the nation's goals, are registered under the jurisdiction of the Ministry of Foreign Affairs and operate under Host Country Agreements codified by the Geneva Convention.



4. RISKS AND BENEFITS



72. KARO shall develop a culture of risk assessment and management to be applied at system, institute/entity and program levels. A risk is defined as anything that can derail and cause damage or loss to the research process, products or stoppage of it. The probability of the hazard or danger entailed should be predictable so that insurance of anticipatory actions can be initiated. At program level, the natural disasters (such as drought, floods, hurricanes, damage by wildlife, etc.), exposure to dangerous items (such as radio-isotopes or delicate items of equipment), loss of research data through sudden death of a scientist or fire and breakdown of equipment (server), are among the frequent common risks faced.
73. At institutional and system levels, uncertainty and risks are associated with (i) managerial capacity, (ii) unpredictability of financial support, (iii) fiduciary issues associated with accountability and good governance, (iv) social and political instability, (v) lack of ineffective regulatory or bio-safety frameworks, etc.
74. Subsequently, KARO shall develop a systemwide risks and risk management policy. The policy shall make provisions for (i) systematic and periodic review of common risks at all levels; (ii) guidelines for risk prevention, mitigation, and control measures; (iii) guidelines for damage, cost, evaluation and compensation.

A Cost-Benefit Analysis

75. Cost-benefit analysis provides empirical evidence on the added value of the new system over time. Using a ‘with policy’ and ‘without policy’ methodological framework, a cost-benefit analysis (CBA) was conducted to assess the economic viability of implementing the proposed NARS policy. This assessment generated net present values (NPVs) and internal rates of return (IRR) which help in assessing whether the proposed NARS policy could make the Kenyan society better off compared to the status quo (existing research organization).
76. The assessment used a discount rate of 9.7 and a discounting period of 30 years to estimate the incremental net benefit of investing in the proposed NARS policy.
77. The results showed that it is economically viable to invest in the proposed NARS policy. If the proposed policy is implemented under the expected economic conditions in the country, it will generate an NPV of KES 160,905 million more than the net benefits of continued investment in the existing policy; the IRR of this incremental net benefit is 48.6 percent. Thus with a positive NPV, implementation of the proposed NARS policy can confidently be supported.

Implementation Framework of the NARS Policy

78. The implementation of this policy shall be coordinated by the Agricultural Sector Coordination Unit (ASCU), which will also spearhead the preparation of its implementation framework (the National Agricultural Research Systems Policy Implementation Framework [NARSP-IF] and funding of the strategies to be prepared for implementing this policy).
79. The implementation framework shall stipulate monitorable targets and milestones to be realized over time. This policy document shall be reviewed at least once in five years at the concurrence of key stakeholders as coordinated by the sector ministries.

Annex I: GLOSSARY

Agriculture

Cultivation and use of land (whether or not covered by water) for any purpose of husbandry including all types of plant production (cereal culture, horticulture, legumes, roots and tubers, etc.); animal production (dairy farming; bee keeping and breeding; and livestock breeding and keeping; conserving and keeping game animals), fisheries (marine and freshwater, including aquaculture); and forest production (woody and non-woody products including all forms of agroforestry).

Agricultural knowledge and information system

An institutional arrangement linking the sources of knowledge and information that all actors in the agricultural product value chain can access and use. It includes: indigenous knowledge and practices; technical knowledge and information generated through modern research activities; knowledge and information accessed through education institutions and extension systems or otherwise available through publications and the electronic media and related technologies or infrastructure.

Agricultural product value chain

The full range of activities that are required to transform an agricultural product from conception to consumers and all the way to disposal after use.

Agricultural research

Investigative process of creating, improving and accumulating agricultural knowledge, technologies and innovations through the value chain approach. It includes research required to better understand the process or the environment necessary for producing an agricultural product with the objective of advancing agriculture and protecting the environment.

Client

In the context of this policy, a client is any person or entity involved in or concerned with all activities related to sustainable agricultural production and agribusiness enterprise.

Innovation

An innovation is any new idea, technology or process that helps to enhance responsiveness and competitiveness of the agricultural sector. An innovation system brings together public and agricultural private sector research institutions, universities, non-profit organizations, producer groups, civil society organizations, private companies engaged in integrated agricultural research activities for development.

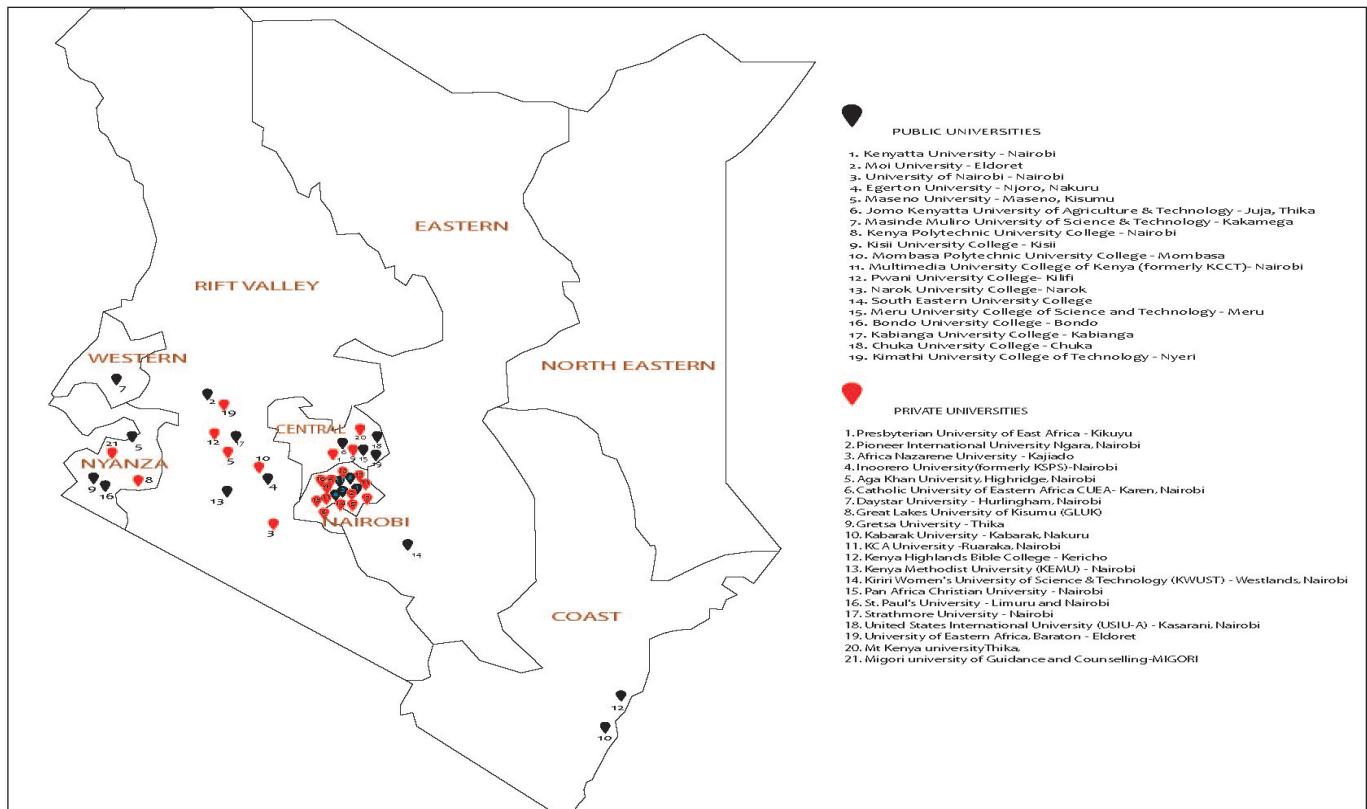
National Agricultural Research System (NARS)

The National Agricultural Research System (NARS) is the organization of entities responsible for planning, coordinating and executing research that contributes to developing the agricultural system and maintaining the natural resource base.

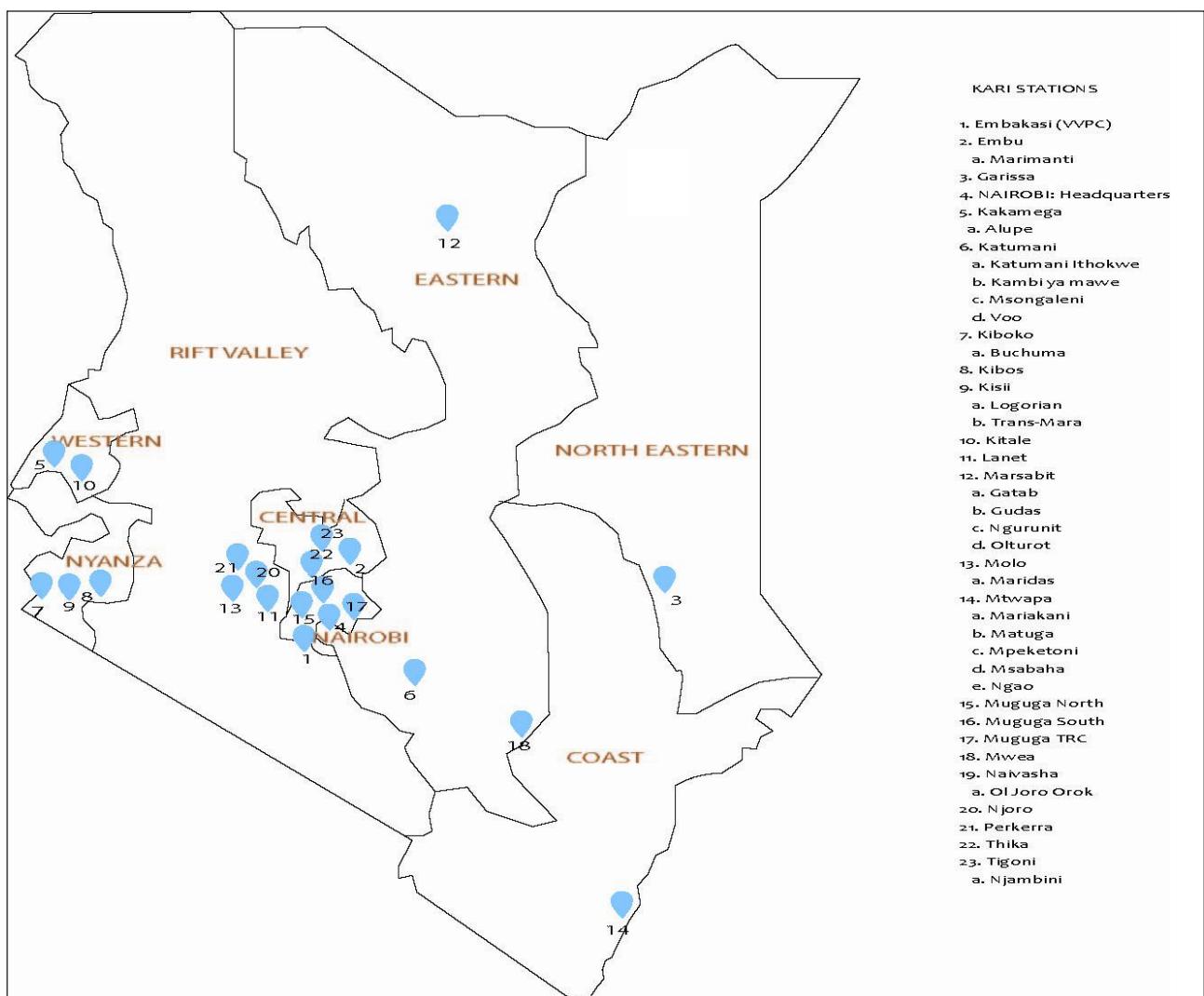
Stakeholder

A stakeholder is any person or organization with a direct or indirect interest in access and application of improved knowledge through agricultural research and development.

Annex II: LOCATION OF PRIVATE AND PUBLIC UNIVERSITIES



Annex III: LOCATION OF KENYA AGRICULTURAL RESEARCH INSTITUTIONS STATIONS



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The land Control Act Cap 302
The Water Act, Cap 372 (as amended by No 8 of 2002)
The Environment Management and Coordination Act No of 1999
The Companies Act Cap 486 (State Corporations)
The Customs and Exercise Act, Cap 472 (COMESA Treaty and Rules made under the Act
The Treaty for East African Co-operation Act 2000
The State Corporation Act 446 (KEPHIS, NTZDC)

