REPUBLIC OF KENYA

NATIONAL ACTION PLAN ON PREVENTION AND CONTAINMENT OF ANTIMICROBIAL RESISTANCE

2017 -2022

JUNE 2017

National Action Plan for the Prevention and Containment of Antimicrobial Resistance, Nairobi, Kenya: Government of Kenya, June 2017.

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ACRONYMS AND ABBREVIATIONS

AMR	Antimicrobial Resistance
AMU	Antimicrobial Use
ANALABS	Analytical Laboratories
APH	Agriculture and Public Health
APIs	Active Pharmaceutical Ingredients
ASAL	Arid and Semi-Arid Land
ASM	American Society of Microbiology
ASTs	Antimicrobial Susceptibility Testing
AU-IBAR	African Union Inter-Africa Bureau of Animal resources
CBO	Community Based Organization
CDC	Centre for Disease Control and Prevention
CME	Continuous Medical Education
COMESA	Common Market for Eastern and Southern Africa
CPD	Continuous Professional Development
ESBL	Extended Spectrum B-Lactamase
FAO	Food and Agriculture Organization
FBO	Faith Based Organization
GAP	Global Action Plan
GARP-K	Global Antimicrobial Resistance Partnership-Kenya
GDP	Gross Domestic Product
GFN	Global Foodborne Infection Network
GPPP	Good Pharmaceutical Procurement Practices
HCP	Health Care Provider
HCW	Health Care Worker
I CIPE	International Centre for Insect Physiology
ICT	Information and Communication Technology
ILRI	International Livestock Research Institute
IPC	Infection Prevention and Control
IPM	Integrated Pest Management
KAP	Knowledge Attitudes and Practices
KEBS	Kenya Bureau of Standards
KEML	Kenya Essential Medicines List
KEMRI	Kenya Medical Research Institute

KEPHIS	Kenya Plant Health Inspectorate Services
KICD	Kenya Institute of Curriculum Development
KFDA	Kenya Food and Drug Authority
KVB	Kenya Veterinary Board
MALF	Ministry of Agriculture Livestock and Fisheries
MAR	Multiple Antibiotic Resistance
MENR	Ministry of Environment and Natural Resources
MoH	Ministry of Health
MOEST	Ministry of Education Science and Technology
MRSA	Methicillin Resistant *Staphylococcus aureus*
NACOSTI	National Council of Science and Technology
NAP	National Action Plan
NASAC	National Antimicrobial Stewardship Advisory Committee
NASIC	National Antimicrobial Stewardship Inter-agency Committee
NEMA	National Environmental Management Authority
NGO	Non-Governmental Organization
NMRA	National Medicines Regulatory Authority
NMRL	National Microbiology Reference Laboratory
NPHLS	National Public Health Laboratories
NQCL	National Quality Control Laboratories
NTS	Non- typhoidal Salmonella
OIE	World Organization for Animal Health
POE	Ports of Entry
PPB	Pharmacy and Poisons Board
QA	Quality Assurance
QC	Quality Control
RDTs	Rapid Diagnostic Tests
SDA	State Department of Agriculture
SDL	State Department of Livestock
SOPs	Standard Operating Procedure
STGs	Standard Treatment Guidelines
TWG	Technical Working Group
UoN	University of Nairobi
WG	Working Group
WHO	World Health Organization

FOREWORD

Antimicrobial resistance (AMR) is a global threat that requires urgent collaborative action within and among countries. AMR occurs when a microorganism develops resistance to an antimicrobial drug to which it was previously sensitive. Bacteria, viruses, fungi and parasites that become resistant are able to withstand the effects of antimicrobials (e.g. antibiotics, antivirals, antimalarials, antifungals). This makes standard treatments ineffective and facilitates the spread of drug resistant infections, thus rendering the community vulnerable.

The Global Action Plan (GAP) on AMR was adopted in 2015 by all countries through decisions in the World Health Assembly, the FAO Governing Conference and the World Assembly of OIE Delegates. This followed reports of alarming rates of resistance to hospital and community-acquired infections as well as reports of resistance in agriculture, livestock and fisheries. Countries agreed to have a national action plan on AMR that is consistent with the Global Action Plan, and to implement relevant policies and plans to prevent, control and monitor AMR.

Having recognized the looming crisis, the Government has prioritized the prevention and containment of AMR, through a 'One Health' platform that embraces interdisciplinary collaborations and communications in all aspects of health care for humans, animals and the environment. The Ministry of Health and the Ministry of Agriculture, Livestock and Fisheries are leading the initiative, through the National Antimicrobial Stewardship Advisory Committee (NASAC), coordinating the efforts of the MOH, MALF, research, academia, civil society and other stakeholders.

A country situation analysis concluded in March 2016, focusing on the human health, animal health, fisheries and agriculture sectors, indicated that Kenya is already experiencing high levels of antibiotic resistance. However, the rate or speed of increase of such resistance is unknown, because there has been no systematic AMR surveillance. In addition, some critical aspects of AMR control are inadequate, for example regulatory systems and structures, including the necessary enabling legislation.

The ongoing constitutional reforms in all sectors present a key opportunity for embedding AMR roles and responsibilities within existing institutions, or into the mandates of new institutions that are slated for creation or restructuring. Therefore, this National Action Plan (NAP) to Combat Antimicrobial Resistance in Kenya is informed by the situation analysis and the ongoing reforms, as well as the emerging evidence and lessons on AMR from other parts of the world. The NAP aims to provide a coherent policy framework and priority actions to contain the emergence and spread of AMR, through the following strategic objectives:

- To improve awareness and understanding of antimicrobial resistance through effective communication, education and training
- To strengthen the knowledge and evidence base through surveillance and research
- To reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures
- To optimize the use of antimicrobial medicines in human and animal health
- To develop an economic case for sustainable investment that takes into account the needs of the country and investment into new medicines, diagnostics, tools, vaccines and other interventions.

In order for Kenya to realize these objectives, everyone needs to act with utmost urgency to avert the AMR crisis. Without such integrated action, all the hard-won gains for health will be eroded, and diseases that were easy to treat will once again kill—a dire and present threat to this generation, and generations to come.

Because the AMR threat is multidisciplinary, intersectoral and global, successful implementation of this Action Plan requires strong Government commitment and collaborative actions across the sectors and with our international partners. This Action Plan outlines the key AMR roles and responsibilities, and calls on everyone to act now, to avert the threat of AMR in Kenya and the world.

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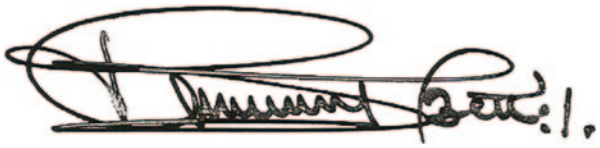

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PREFACE

Antimicrobial resistance (AMR) is resistance of a microorganism to an antimicrobial drug to which it was previously sensitive. Bacteria, viruses, fungi and parasites that become resistant are able to withstand the effects of antimicrobials (e.g. antibiotics, antivirals, antimalarials, antifungals). This makes standard treatments ineffective and the community vulnerable as drug resistant infections can spread.

The Ministry of Health and the Ministry of Agriculture, Livestock, Fisheries and Blue Economy are committed to exercising stewardship in the implementation of this National Action Plan (NAP) on prevention and containment of AMR. This is in line with the National policy on prevention and containment of AMR. The NAP is anchored on the following key strategic objectives: to improve awareness and understanding of antimicrobial resistance; to strengthen knowledge through surveillance and research; to reduce the incidence of infection; to optimize the use of antimicrobial agents; and to ensure sustainable investment in countering antimicrobial resistance.

This is the first NAP on the Prevention and Containment of AMR in Kenya. It has been developed based on the National Policy on Prevention and Containment of AMR and the recommendations of the situation analysis on AMR conducted in 2011 and updated in 2016. This strategy provides a regulatory and implementation framework to establish and strengthen systems to contain the emergence and spread of AMR. Implementation of this strategy will require substantial funding and high-level political commitment. Because AMR is a multidisciplinary and intersectoral issue, successful implementation of this strategy will require effective coordination and collaboration among different sectors.

ACKNOWLEDGEMENT

We wish to acknowledge the Cabinet Secretaries for the Ministries responsible for Health and Agriculture for providing support and leadership in the development of this National Action Plan (NAP). We recognize the contribution of the Principal Secretaries for Health, State Department of Agriculture, Livestock, Fisheries and Blue Economy. We thank the Directors of Medical Services, Veterinary Services, Fisheries and Agriculture. We are grateful to the County governments for their invaluable input into this National Action Plan. We appreciate other Ministries, Departments and Agencies for their contribution in the process.

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We appreciate the input from the U.S. Centers for Disease Control and Prevention (CDC- Kenya and Atlanta) and the Center for Disease Dynamics Economics and Policy through Global Antibiotic Resistance Partnership with support. In addition, we thank the WHO for their input in this process.

Finally, we appreciate the tireless efforts of the Technical Working Group comprising of Dr. Rachel Kamau, Dr. Eveline Wesangula, Mr. Stephen Cheruiyot, Dr. Jared Nyakiba, Ms. Susan Githii, Veronica Kamau, Felister Kiberenge, Dr. Allan Azegele, Dr. Jane Lwoyero and Dr. Christopher Wanga, Dr. Nathan Songok, Dr. Naphtali Mwanziki, Ms. Daisy Muriuki Ms. Teresia Karanja, Dr. Linus Ndegwa, and Prof. Samuel Kariuki.

INTRODUCTION

Antimicrobial resistance threatens the very core of modern medicine and the sustainability of an effective, global public health response to the enduring threat from infectious diseases. Effective antimicrobial drugs are a pre-requisite for both preventive and curative measures, protecting patients from potentially fatal diseases and ensuring that complex procedures, such as surgery and chemotherapy, can be provided at low risk. Yet systematic misuse and overuse of these drugs in human medicine and food production have put every nation at risk. This action plan underscores the need for an effective "one health" approach involving coordination among numerous international sectors and actors, including human and veterinary medicine, agriculture, finance, environment, and well-informed consumers. The action plan recognizes and addresses both the variable resources counties have to combat antimicrobial resistance and the economic factors that discourage the development of new antimicrobials through research and development.

Antimicrobial resistance affects all areas of health, involves many sectors and has an impact on the whole of society. Overuse and misuse/abuse of the antimicrobial agents in both human and veterinary practices have been documented to be responsible for the current crisis. In Kenya as the human population grows, increased use of antimicrobials to enhance food production may occur. This may result in commensurate increase in resistance to commonly-used antimicrobials, a scenario that does not bode well for treatment and management of infections in both humans and animals.

Findings from studies and reports have shown a rising trend in AMR in key Gram positive and Gram negative bacterial pathogens including methicillin resistant *Staphylococcus aureus* (5–10%) from hospitalized patients, reduced susceptibility of community acquired pneumococci (19%), multi-drug resistant extended spectrum beta lactamase producing *Salmonella Typhimurium* (65%) and *Vibrio cholerae* (68%) has been observed from outbreaks in Kenya. With increasing resistance to flouroquinolones also reported in typhoid outbreaks (25%), we have few antimicrobials options for treatment of these infections in resource limited settings.

In view of the growing trends in AMR worldwide, the World Organization for Animal Health (OIE), the World Health Organization (WHO) and the Food and Agriculture Organization (FAO) adopted the Global Action Plan to combat AMR (GAP-AMR) during the general assembly in May 2015. The GAP-AMR recommended a multi-sectoral approach from a One Health perspective, and sets out five strategic objectives: to improve awareness and understanding of AMR; to strengthen knowledge through surveillance and research; to reduce the incidence of infection; to optimize the use of antimicrobial agents; and to ensure sustainable investment in countering AMR.

This National Action Plan (2017–2022) provides a common framework for action by all stakeholders in Kenya from different sectors, including human health, animal health, agriculture, fisheries and environmental sectors together with the civil society in managing and implementing appropriate AMR control activities, while being part of a collective strategy to meet the overall goal.

The goal of this National Action Plan is to ensure, for as long as possible, continuity of successful treatment and prevention of infectious diseases with effective and safe medicines that are quality-assured, used in a responsible way, and accessible to all who need them. To achieve this it is important to:

1. Increase public knowledge and understanding of AMR and use of antimicrobials, particularly in those involved in healthcare, nursing care, food, and livestock production and aquaculture;
2. Understand the state of AMR emergence and prevalence, and use of antimicrobials (including surveillance and monitoring), and to assess the risk based on the understanding;
3. Enhance proper infection prevention and control (IPC);
4. Ensure antimicrobial stewardship (AMS) in order to reduce antimicrobial-resistant organisms; and
5. Accelerate research on the mechanism of AMR emergence and transmission, and its impact on social economy, and promote R&D for new preventive, diagnostic, and therapeutic technologies in order to ensure the continued availability of effective preventive, diagnostic, and therapeutic treatments for antimicrobial-resistant infections.

Kenya has been tackling AMR issues since 2009 and this experience puts Kenya in the position to take leadership especially in African countries. The following priority measures over the next five years (2017–2022) were developed in this perspective. Relevant ministries, agencies, and organizations should engage in a common effort to undertake these measures under One Health approach.

OPERATIONAL FRAMEWORK

In its aim of promoting countermeasures on antimicrobial resistance (AMR), this National Action Plan (NAP) is structured around Strategic objectives in the following five areas: (1) Public Awareness and Education, (2) Surveillance and Monitoring, (3) Infection Prevention and Control, (4) Appropriate Use of Antimicrobials, and (5) Research and Development, these are in line with the five strategic objectives set out by the Global Action Plan on AMR, The National Action Plan is organized around these objectives to facilitate collaborative action by the Kenyan Government, in partnership with development partners, individuals, and organizations aiming to strengthen healthcare, public health, veterinary medicine, agriculture, food safety, and research and manufacturing.

Strategic interventions to achieve these objectives and specific actions to implement the strategies are presented for each objective as set out in **Table 1**.

Table 1. Five Strategic Issues and Objectives for Countermeasures on AMR

Strategic Issue	Strategic Objective
1. Public Awareness and Education	Improve public awareness and understanding, and promote education and training of professionals
2. Surveillance and Monitoring	Continuously monitor antimicrobial resistance and use of antimicrobials, and appropriately understand the trends and spread of antimicrobial resistance
3. Infection Prevention and Control	Prevent the spread of antimicrobial-resistant organisms by implementing appropriate infection prevention and control measures
4. Appropriate Use of Antimicrobials	Promote appropriate use of antimicrobials in the fields of healthcare, livestock production, agriculture and aquaculture
5. Research and Development	Promote research on antimicrobial resistance and foster research and development to secure the means to prevent, diagnose and treat the antimicrobial-resistant infections

The strategies to achieve the above objectives are described in subsequent sections with their purposes, background, specific actions, related ministries, agencies, and institutions for the actions, and indices to evaluate the actions.

KENYAN GOVERNMENTS' COMMITMENT TO IMPLEMENTING THE NATIONAL ACTION PLAN

The Kenyan government will lead and consolidate the efforts by individual programs or institutions through the development of policies, strategies and legal frameworks towards combating AMR. These efforts will encompass the different government departments and the private and non-governmental sectors. A commitment from all these stakeholders will allow for the simultaneously achievement of set targets and for more resources to be generated. The government will collaborate with the civil societies to raise awareness and disseminate information about AMR to the general public.

NATIONAL GOVERNMENT COORDINATION MECHANISMS

The Ministries responsible for Health and Livestock, Fisheries & Crops will jointly establish the multi-sectoral AMR Secretariat hosted at the Ministry responsible for Health to coordinate the AMR agenda. Institutions that will play leading roles in the implementation of this Policy include National and County Ministries, Departments and Agencies responsible for Health, Agriculture (Crop, Livestock and Fisheries) and parastatals.

The ministries responsible for health, livestock, crops and fisheries will implement this Policy and associated Strategic and Action Plans in a "One-Health" approach.

The lead ministries will establish a National Antimicrobial Stewardship Interagency Committee (NASIC). NASIC will be governed through a Steering Committee (SC) and a Technical Committee (TC).

NASIC Steering Committee (NASIC-SC)

The NASIC-SC will comprise of Principal Secretaries of relevant ministries and two representatives of the Council of Governors. The NASIC-SC will be responsible for policy direction, resource mobilization, budget and work plan approvals.

1. **Co-Chairs:** Ministry of Health (MOH) and Ministry of Agriculture Livestock, Fisheries & Blue Economy (MALF)
2. **Members:** Ministry of Education Science and Technology (MOEST) Ministry of Environment and Natural Resources (MENR), the National Treasury & the Ministry of Industry, Trade and Cooperatives
3. The Committee may co-opt any department, bureau, office, agency, or instruments of the government, and request the county governments and private sector for assistance as the circumstances may require.

Terms of Reference for the Steering Committee:

- Policy direction
- Approval of budgets
- Approval of work plans
- Resource mobilization

NASIC Technical Committee (NASIC-TC)

The NASIC-TC will comprise of Technical Directors of relevant ministries and experts. The NASIC-TC will be responsible for technical oversight, overseeing the implementation of the National Policy for AMR. It shall also ensure close coordination with other relevant stakeholders.

Terms of Reference for the Technical Committee:

- Formulate, monitor and evaluate implementation of the national action plan.
- Collaborate and coordinate with government agencies, private and non-state actors.
- Mobilize human and financial resources to support the plan through regular budget allocations and mainstreaming of activities within core programmatic areas.
- Promulgate guidelines, make recommendations on rules and regulations, as well as possible penalties and sanctions for violations in accordance with existing laws, as may be necessary, related, or consistent with the purpose, intent, and objective of this National Action Plan.
- Submit to the steering committee regular status reports, budgets, policy proposals on the implementation of the national action plan.
- Establish thematic area advisory groups and technical working groups to facilitate effective implementation of the NAP.
- Perform other functions and activities as may be assigned by the steering committee.

The NASIC will meet quarterly. The responsible Principal Secretaries will select a ***chairperson*** on the basis of his or her expertise in leadership. Rotation of the chair among the Ministry of Health and the Ministry of Agriculture Livestock and Fisheries should be considered.

NASIC will have a mechanism (with appropriate records) to ensure that its members have no conflicts of interests and that the work of the committee in the interests of public health is *transparent*. The NASIC shall review its composition annually to ensure representation of all relevant sectors and stakeholders. **Table 2** indicates the actions to be taken by NASIC to support the operationalization of the NAP.

AMR Secretariat

The NASIC will be supported by an appropriately resourced ***secretariat*** based at the MOH, responsible for the logistics of meetings; minute-taking; preparation and circulation of documents (e.g. background papers, reports and advisory notes to ministers); and storage and archiving. The head of the secretariat will be the national AMR focal point.

Roles and Responsibilities of the AMR Secretariat:

- Link the two levels of the NASIC at the National and County levels.
- Coordinate policy implementation at the National and County Governments
- Ensure continuous national, county and international stakeholder engagement
- Representing the national AMR in meetings, conferences, stakeholder meetings and other relevant national and international forums.
- Engage technical advisors and support the functions of TWGs.

Composition of the Secretariat:

The AMR Secretariat should be composed of members representing the relevant sectors, notably human health, animal health and production and the food and environment sectors. Representatives should be given sufficient authority by their institutions to make decisions.

COUNTY GOVERNMENT COORDINATION MECHANISMS

At the County Government, the lead Departments (Health and Agriculture) will establish a **County Antimicrobial Stewardship Interagency Committee (CASIC)**. CASIC will comprise of County Executive Committee members, County Chief Officers of relevant Departments Technical County Directors and experts. The CASIC will be responsible for approving budgets and work plans, resource mobilization and implementation of the NAP at the county level.

Terms of Reference for the CASIC:

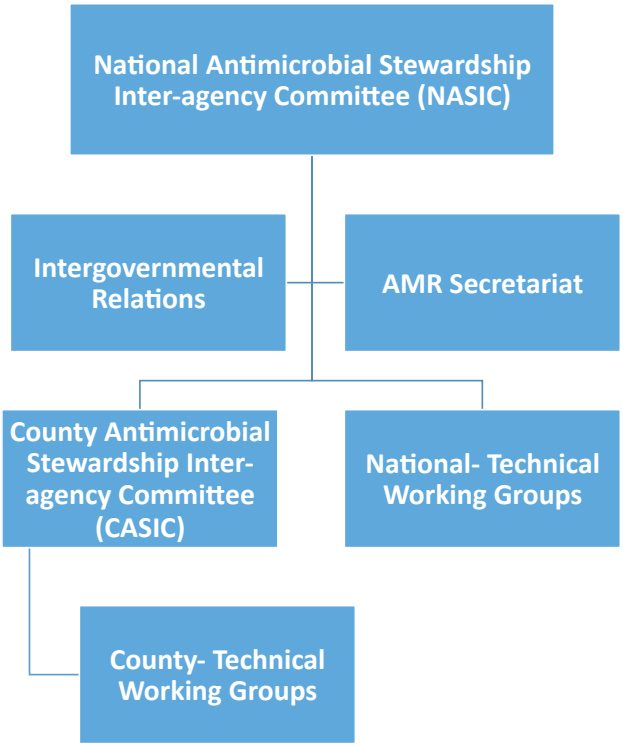
- Monitor and evaluate the implementation of the national action plan at the county level for the prevention and containment of AMR;
- Mobilize human and financial resources to support the plan through regular budget allocations, mainstreaming of activities within core programmatic areas.
- Enforce guidelines, rules and regulations in accordance with existing laws, as may be necessary, related, incidental, or consistent with the purpose, intent, and objective of this National Action Plan.
- Submit to the CASIC regular status reports, budgets, policy proposals on the implementation of the national plan
- Collaborate and coordinate with the county and national government and non-state actors

NATIONAL AND COUNTY GOVERNMENT COORDINATION MECHANISMS

The role of the Intergovernmental Relations.

The Intergovernmental Relations Act, 2012 establishes several intergovernmental structures, which serve to facilitate greater intergovernmental cooperation and consultation under the devolved government model. The national government and county governments will use these structures to agree on implementation of the National Action Plan.

Figure 1. Structure for Coordination Mechanism



PARTNERSHIPS AND IMPLEMENTATION

The implementation of this National Action Plan shall be guided by key institutional coordination and legal framework operating at different levels of the governance system in the country. This will require the sustained, coordinated, and complementary efforts of individuals and groups around the locally and globally, including public and private sector partners, healthcare providers, healthcare leaders, veterinarians, agriculture industry leaders, manufacturers, policymakers, and patients.

Table 2. Strategic Interventions to Operationalize the National Action Plan

Strategic Intervention	Action Description	Deliverables	Timeframe	Responsible Agencies
Develop a National action plan and Monitoring and Evaluation Framework from a One Health approach	Convene NASIC to launch the AMR National Action Plan Brief MOH/MALF and agencies on AMR	Appoint NASIC members Generate report of launch	2017	MoH/MALF
	Develop an M&E framework for the AMR National Action Plan	M&E Framework developed	2017	MoH/MALF
	Develop an AMR communication strategy	Implement Communication Strategy	2017	MoH/MALF
Mobilize resources and promote internal and external networking	Submit project proposals to international organizations or relevant funding agencies	Secure funding from government proposals submitted	2017–2022	MOH/MALF

STRATEGIC OBJECTIVES

STRATEGIC OBJECTIVE 1: IMPROVE AWARENESS & UNDERSTANDING OF AMR THROUGH EFFECTIVE COMMUNICATION, EDUCATION & TRAINING

Potential Measure of Outcome: extent of reduction in national human consumption of antibiotics and reduction in the volume of antibiotic use in food production.

Human Health Sector

AMR is a real public health crisis affecting the entire population that is exposed to antimicrobial resistant microorganisms (through human-human transmission, food or other transmission routes). Promotion of nation-wide measures against antimicrobial resistance (AMR) in human health and agriculture requires public awareness and understanding of AMR and antimicrobial use. The current level of public awareness is limited and AMR is not a core component of professional education, training or certification in both human and agricultural courses. Awareness campaigns are on-going through professional associations and stakeholder for a, in limited areas but these need to be scaled up countrywide. Therefore, there is need for increased awareness for the general public and professionals to ensure appropriate use of antimicrobials. However, it is important to develop AMR communication messages tailor made to suit different audiences and develop mechanisms to measure their effectiveness.

There is need for creating awareness in relevant ministries to ensure concerted efforts in combating AMR. These efforts will also be replicated at county level. Combating AMR calls for commitment of national and county governments through resource mobilization and ensuring comprehensive sensitization at grassroots level.

Strategic Intervention	Activity	Deliverables	Timeframe	Implementing Organization(s)
1.1 Increase national AMR awareness through public communication programmes targeting the different audiences in human health & practice, including participation in an annual world antibiotic awareness campaign.	1.1.1. Undertake KAP on the effectiveness of existing IEC materials	Gaps are inventoried	2017	MOH/MALF
	1.1.2 Develop new and/or revise IEC materials	IEC materials developed	2017–2018	MOH/MALF Professional Bodies Training Institutions
	1.1.3 Develop a communication strategy for AMR	AMR communication strategy developed	2017	MOH/MALF Professional Bodies Training Institutions Stakeholders
	1.1.4. Conduct nationwide AMR awareness campaigns	Nationwide AMR awareness campaigns conducted	2017–2022	MOH/MALF Professional Bodies Training Institutions Stakeholders
1.2 Establish AMR as a core component of professional education, training, certification & development for the health sectors	1.2.1. Perform an AMR needs assessment of healthcare professionals	Needs Assessment conducted	2017	MOH/MALF Professional Bodies Training Institutions
	1.2.2 Develop AMR curriculum for professional education and training	AMR Curriculum developed	2017	MOH/MALF/ MOEST Professional Bodies Training Institutions
	1.2.3 Mainstream AMR modules as a core component of professional education, training for certification	AMR modules incorporated into professional education and training	2017–2022	MOH/MALF/ MOEST Professional Bodies Training Institutions
1.3 Include antimicrobial use & resistance in school curricula to promote better understanding and awareness	1.3.1 Introduce AMR as a core component in the school health programmes within the ministry of Education and Health	AMR introduced as a core component in school health programmes	2018–2022	MOH/MALF/ MOEST Professional Bodies Training Institutions
	1.3.2 Introduce AMR media programmes	AMR media programmes launched	2018–2022	MOH/MALF/ MOEST KICD Professional Bodies Training Institutions

Strategic Intervention	Activity	Deliverables	Timeframe	Implementing Organization(s)
1.4 Capacity build media on AMR	1.4.1 Conduct media trainings on AMR	Media trainings developed and conducted	2017–2022	MOH/MALF/ MOEST/MICT
	1.4.2 Engage media to cover AMR events and occurrences	AMR events covered by media	2017–2022	MOH/MALF/ MOEST/MICT
1.5 Prioritize AMR across key ministries through national risk registers	1.5.1 Establish an interagency committee of the key ministries and agencies	Interagency committee established	2017	MOH/MALF Relevant Agencies
	1.5.2 Develop risk registers with annual reporting	Annual reports generated	2017–2022	MOH/MALF Relevant Agencies
	1.5.3 Conduct annual inter-ministerial AMR risk management workshops	Annual risk management workshops conducted	2018–2022	MOH/MALF Relevant Agencies
1.6 Establish and support multi-sectoral (One-Health) platforms	1.6.1 Establish One Health platforms on AMR at national and county levels.	One Health platforms established at national and county levels	2018–2022	MOH/MALF Relevant Agencies
	1.6.3 Draw up inter-ministerial MOU for conducting operational procedures across the different sectors	MOU for operational procedures developed	2017	MOH/MALF Relevant Agencies

Animal Health and Crop Sector

Antimicrobials for human and animal use can be accessed without prescription. With this regard, there is need to educate the farmers, animal keepers and the general public to enforce behavior change. Reducing the emergence and spread of antimicrobial resistance (AMR) requires antimicrobial stewardship (AMS) and infection prevention and control (IPC) among professionals. Behavior change based on increased knowledge and understanding of AMR is critical in addition to the strengthening regulations in this sector.

Many farmers do not practice infection prevention measures in animals and crops and may resort to unnecessary use of antimicrobials; hence the need to emphasize adoption of good agricultural practices during sensitization campaigns. Agriculture input manufacturers should be sensitized to eliminate unnecessary use of antimicrobials during processing especially of animal feeds.

Strategic Intervention	Activity	Deliverables	Timeframe	Implementing Organization(s)
1.1 Promote Public Awareness, Knowledge and Understanding of AMR	1.1.1 Develop a communication strategy on AMR	Communication strategy and implementation framework developed	2017	MALF
	1.1.2 Undertake KAP on the effectiveness of existing IEC materials	Gaps inventoried	2017	MALF Development partners
	1.1.3 Develop AMU and AMR information tailor made to suit different target groups	Adequate materials developed for the different target groups	2017	MOH/MALF/ MOEST Professional Bodies Training Institutions Stakeholders
	1.1.4 Develop tools for communication and awareness on AMU and AMR	Communication tools developed	2017–2022	MOH/MALF/ MOEST Professional Bodies Training Institutions Stakeholders
	1.1.5 Create awareness on AMU and AMR through varied communication methodologies	Increase AMR communication fora	2017–2022	MOH/MALF/ MOEST Professional Bodies Training Institutions Stakeholders
	1.1.6 Disseminate AMU and AMR information to farmers, stakeholders, and general public	(Indicator) Number of counties involved and persons reached calculated	2017–2022	MOH/MALF/ MOEST Professional Bodies Training Institutions Stakeholders

Strategic Intervention	Activity	Deliverables	Timeframe	Implementing Organization(s)
1.2 Promote Education and Training on AMR of Professionals Involved in Related Fields	1.2.1 Facilitate capacity building for professionals engaged in AMR activities	Professionals trained on AMR	2017–2022	MOH/MALF/ MOEST Professional Bodies Training Institutions Stakeholders
	1.2.2 Curriculum development for AMR training in universities, training institutions and schools	AMR curricula developed and incorporated	2017–2022	MOH/MALF/ MOEST KICD Professional Bodies Training Institutions Stakeholders
	1.2.3 Enhance multisectoral collaboration and allocate budgetary support towards "One Health Approach" at all levels of government	Interagency rendered operational with financial support	2017–2022	MOH/MALF/ MOEST Professional Bodies Training Institutions Stakeholders

STRATEGIC OBJECTIVE 2: STRENGTHEN THE KNOWLEDGE & EVIDENCE BASE THROUGH SURVEILLANCE & RESEARCH

Potential Measure of Effectiveness: extent of reduction in the prevalence of antimicrobial resistance based on data collected through integrated programs for surveillance of antimicrobial resistance.

Human Health Sector

Establishing surveillance systems to detect and report resistant pathogens as well as the consumption of antimicrobials plays a critical role in developing evidence-based policies and guidelines to control/ limit overuse of antimicrobials which is a major driver of AMR. In Kenya surveillance and research on AMR is dependent on local research institutions, training institutions, health facilities and international research partners. More detailed surveillance has historically been limited to enteric pathogens which cause diarrheal diseases and significant mortality and morbidity in children. This data is insufficient to facilitate implementation of robust interventions. While the country cannot wait for all the data to initiate actions, data collection can be undertaken alongside risk mitigation.

Building the capacity of health professionals and laboratories that take part in the process of surveillance enable reliable and robust diagnostic testing and proper data to be reported. With proper information and sharing of surveillance studies across borders, targeted approaches and treatment strategies may be developed to limit the spread and emergence of pathogens with AMR.

Outcomes of this Objective:

1. Creation of a national public health network (a National Network of antimicrobial resistance county laboratories) for resistance testing, a specimen repository for resistant bacterial strains, and a National Database of Resistant Pathogens
2. Routine reporting of antibiotic use and resistance data to National Coordinating Center by hospitals
3. Routine testing of zoonotic and animal pathogens for antibiotic susceptibility at regional veterinary investigation laboratories, using standardized testing methods and data sharing practices

Strategic Intervention	Activity	Deliverables	Timeframe	Implementing Organization(s)
2.1 Develop a National One-Health Surveillance system to Combat Resistance	2.1.1. Identify and establish a national reference center with the ability to systematically collect & analyze data	National Reference Center Established	2017	MOH/MALF NPHLS NMRA
	2.1.2 Create a national public health laboratory network.	National public health lab network developed	2017	MOH/MALF NPHLS NMRA
	2.1.3 Develop an integrated information management system for AMR	Integrated information management system established	2018	MOH/MALF NPHLS NMRA
	2.1.4 Develop AMR surveillance strategy	Surveillance Strategy Published	2017	MOH/MALF NPHLS NMRA
	2.1.5. Collect existing data on AMR status in Kenya	Report of AMR status published	2017	MOH/MALF NPHLS NMRA KEMRI

Strategic Intervention	Activity	Deliverables	Timeframe	Implementing Organization(s)
2.2 Standardize Methods of Laboratory Testing and Strengthen Testing Functions of Antimicrobial Resistance at Public and Private Laboratories	2.2.1 Assess the AMR capacity in the existing NPHL, and other relevant public and private laboratories	Report on AMR capacity in the existing laboratories published	2017	MOH/MALF NPHLS NMRA
	2.2.2 Expand and strengthen the national and county infrastructure for public health surveillance	Infrastructure for public health surveillance improved	2017–2022	MOH
	2.2.2 Develop or review relevant SOPs for AMR tests	Relevant SOPs for AMR tests in use	2017	MOH/MALF NPHLS NMRA
	2.2.4 Conduct international and local training of technical personnel on monitoring, surveillance, testing methods and laboratory operations, including compliance to accreditation standards	Technical personnel trained	2017–2022	MOH/MALF NPHLS NMRA Agencies
2.3 Implement Integrated One Health Surveillance Including Humans, Animals, Food, and the Environment	2.3.1 Launch the 'One Health' National Antimicrobial Stewardship Interagency Committee (NASIC)	NASIC Launched	2017	MOH/MALF/ MENR NPHLS NMRA
	2.3.2 Convene inter-sectoral coordination meetings	Inter-sectoral coordination meetings held	2017–2022	MOH/MALF/ MENR
	2.3.3 Participate in regional and international forums on AMR	Reports of regional and international forums disseminated	2017–2022	MOH/MALF/ MENR
	2.3.4 Develop an IT platform to enhance sharing/ communicating data on AMR to stakeholders	AMR IT platform for information sharing established	2018	MOH/MALF/ MENR WHO/OIE/FAO

Strategic Intervention	Activity	Deliverables	Timeframe	Implementing Organization(s)
2.4 Promote Research	2.4.1 Identify AMR research agenda	Research agenda identified	2018	MOH/MALF/ MENR
	2.4.2 Promote the use of laboratory data for clinical decision making	Laboratory data used for decision making	2018–2022	MOH/MALF/ MENR NMRA Research Institutions Agencies

Animal Health and Crop Sector

The extent and impact of AMR in the agricultural sector is not yet well defined. The judicious use of antimicrobials in food-producing animals is a critical step in lessening the AMR patterns seen in human medicine. This necessitates the establishment of an effective monitoring system to monitor trends in AMR from the point of slaughter to processing of animals, as well as the implementation of surveillance systems focusing on AMR mitigation strategies in animals.

Strategic Intervention	Activity	Deliverables	Timeframe	Implementing Organization(s)
2.1 Develop a national AMR surveillance system	2.1.1 Identify and define a national data repository and management centre	National AMR data repository and management centre established	2017	MALF Development Partners
	2.1.2 Develop an integrated information management system for AMU and AMR in food producing animals	AMU and AMR integrated management system developed	2017	MALF Development Partners
	2.1.3 Conduct data collection, sampling, testing, and analysis of antimicrobial drug residue in animals and the environment	Data collected, samples tested and analysis done	2018–2022	MALF Development Partners
	2.1.4 Develop a national surveillance plan based on WHO/FAO Codex Alimentarius for AMU and AMR data collection	National surveillance plan developed	2017	MALF Development Partners
	2.1.5 Collect and collate existing data on AMR status in Kenya from key stakeholders	Results of current AMR data in the country documented	2017	MALF
	2.1.6 Sensitize stakeholders on the status report (baseline)	Baseline status of AMR disseminated	2017	MALF

Strategic Intervention	Activity	Deliverables	Timeframe	Implementing Organization(s)
2.2 Improve the capacities of health personnel, hospitals and laboratories	2.2.1 Identify MALF national and county laboratories for AMR surveillance and monitoring	Laboratory designated for AMR	2018–2022	MALF
	2.2.2 Develop, expand, and maintain capacity in national and county veterinary and food safety laboratories to conduct antibiotic susceptibility testing and characterize select zoonotic and animal pathogens.	(Indicator) Number of laboratories developed with capacity to undertake AST	2018–2022	MALF
	2.2.3 Conduct international and local training of technical personnel on monitoring, surveillance, testing methods and laboratory operations, including compliance to accreditation standards	Competencies acquired	2018–2022	MALF Development Partners
2.3 Standardize Methods of Laboratory Testing of Antimicrobial Resistance	2.3.1 Assess the AMR capacity in the existing veterinary investigation laboratories (VILs), KEPHIS, PCPB and other relevant private laboratories	Capacity gaps identified	2018–2022	MALF Development Partners
	2.3.2 Develop or review relevant SOPs for standard tests	(Indicator) Improved repeatability of test results	2017	MALF
	2.3.3 Standardize the methods used in testing laboratories for livestock, farm-raised aquatic animals and pets.	(Indicator) Increased uniformity in test results	2018–2022	MALF Partners
	2.3.4 Provide training for internal quality control for tests	Competence for quality control achieved	2019–2022	MALF Development Partners
	2.3.5 Sample and test isolates for antibiotic susceptibility based on internationally accepted standards	Test Method Validated	2018–2022	MALF Development Partners

Strategic Intervention	Activity	Deliverables	Timeframe	Implementing Organization(s)
2.4 Promote Research	2.4.1 Commission a baseline survey on uptake of the use of clinical laboratory examinations which enhance AMS	Clinical practices that enhance antimicrobial stewardship established	2017–2022	MALF Research Institutions Agencies Development Partners
	2.4.2 Identify AMR research agenda in Kenya	Priority AMR Research Agenda in the country identified	2018	MALF Partners

STRATEGIC OBJECTIVE 3: REDUCE THE INCIDENCE OF INFECTION THROUGH EFFECTIVE SANITATION, HYGIENE AND IPC MEASURES

Potential Measure of Effectiveness: extent of reduction in the prevalence of preventable infections, and in particular the incidence of drug resistant infections in health care settings.

Human Health Sector

Better hygiene and infection prevention control are essential to limit the development and spread of antimicrobial-resistant infections and multidrug-resistant bacteria. To prevent transmission of AMR infections infection prevention and control, biosecurity, sanitation, hand washing, food and water safety and animal hygiene must be core components of infectious disease prevention. Vaccination, where appropriate as an infection prevention measure, should be encouraged. Prophylactic use of antibiotics in humans and animals, to prevent the acquisition and spread of diseases, and their use as a growth stimulant, promotes the development of AMR. Infection prevention and control including surveillance of health care associated infections (HAIs) should be institutionalized and strengthen. Kenya currently has IPC Policy, Strategy, Guidelines and Basic Training Course in place. This NAP supports the Implementation of the IPC Strategic Plan to reduce the incidence of infections and demand for antimicrobials and subsequently reduce AMR.

Strategic Intervention	Activity	Deliverables	Timeframe	Implementing Organization(s)
3.1 Implement the National IPC Strategy	3.1.1 Promote hand hygiene in healthcare facilities	(Indicator) Improved adherence to hand hygiene	2017–2022	MOH Training Institutions Professional Bodies
	3.1.2 Incorporate IPC as mandatory component in CPD offered by health regulatory bodies accredited and registered CPD providers	IPC incorporated as a mandatory CPD component	2017–2022	MOH Training Institutions Professional Bodies
	3.1.3 Incorporate IPC into in-service trainings for healthcare workers	IPC incorporated into in-service training	2017–2022	MOH Training Institutions Professional Bodies
3.2 Develop & strengthen national policies and standards of practice on IPC	3.2.1 Develop and review SOPs and job aids on HAIs prevention based on the IPC guidelines	SOPs and job aids for HAIs prevention in use	2017–2018	MOH Stakeholders
	3.2.2 Develop an online training course on IPC and HAIs surveillance	Online training launched	2017–2022	MOH Training Institutions Stakeholders
	3.2.3 Train healthcare workers on IPC	Healthcare workers skilled in IPC	2017–2022	MOH Training Institutions Stakeholders
	3.2.4 Establish a national HAI surveillance system	Reports on HAIs surveillance are generated	2018	MOH NHIF
	3.2.5 Develop and/or review existing accreditation and quality assurance standards to ensure that they appropriately support compliance with reporting HAIs	Accredited health facilities reporting on HAIs	2018	MOH NHIF

Animal Health and Crop Sector

Promote Infection Prevention and Control in Livestock Production, Aquaculture, Veterinary Medicine and Food Chain

Improving the level of husbandry, hygiene management and maintaining the health condition of livestock are extremely important elements of controlling the occurrence and selection of antimicrobial resistant organisms leading to the prevention of the occurrence of infectious diseases in animals, to secure safety production of animal products, as well as to reduce instances of using veterinary antibiotics. They are also highly important from the viewpoint of reducing production costs.

During food processing and distribution processes, promote countermeasures to reduce contamination with Antimicrobial Resistant Organisms and other microorganisms as well as to prevent food poisoning from occurring by promoting HACCP (Hazard Analysis and Critical Control Point).

In all fields of livestock, farm-raised aquatic animals and pets, appropriate vaccination is important to prevent infectious diseases, in addition to thorough hygienic management.

Reduce Environmental Contamination

Studies have indicated that antibiotics can contaminate the environment through three principal channels: animal waste, human waste and manufacturing waste containing active pharmaceutical ingredients. This can result in soil, crops and water sources contamination and facilitate the development of antimicrobial resistance amongst the pathogens with which they interact creating environmental reservoirs of antimicrobial resistant bacteria. This calls for adequate treatment of waste products released into the local environment, limiting the sale and use of by products that could contain antimicrobials like manure from animals treated with antimicrobials. Public awareness on proper disposal of antimicrobials and treatment of hospital waste will be beneficial in reducing the burden of antimicrobial resistant pathogens in the waste water.

Strategic Intervention	Activity	Deliverables	Timeframe	Implementing Organization(s)
3.1 Implement & strengthen hygiene, & Food safety measures in food value chains and the environment	3.1.1 Promote and sensitize all actors along the food value chains on importance of infection prevention, control, hygiene, existing standards, guidelines and regulations	Increased compliance to food safety measures and conformity to standards in food value chains	2017–2022	MALF Development Partners
	3.1.2 Identify and develop interventions for the high risk food value chains where high AMU predispose to AMR	Reduced AMU and exposure to AMR	2018–2022	MALF Development Partners
	3.1.3 Develop and disseminate guidelines on effective agricultural , pharmaceutical industrial, hospital and human waste management	Reduced AMR organisms in the environment Treated effluent from pharmaceutical industries	2018–2022	MALF MOH MENR Development Partners
3.2 Include hygiene & IPC as core (mandatory) components of training & education for veterinary professionals and in their CPD and accreditation/ registration	3.2.1 Incorporate hygiene, good agricultural, surgical, veterinary and aquaculture practices as mandatory components in CPD offered by KVB accredited and registered CPD providers	Professional competence enhanced	2017–2022	MALF KVB

Strategic Intervention	Activity	Deliverables	Timeframe	Implementing Organization(s)
3.3 Strengthen animal health & agricultural practices through implementation of regulations and international standards such as OIE, Codex and IPPC.	3.3.1 Develop and roll out guidelines on good agricultural, hygienic, surgical, veterinary and aquaculture practices based on international standards and regulations.	Behavioral change in agricultural, hygienic, surgical, veterinary and aquaculture practices.	2017–2022	MALF Development Partners
	3.3.2 Develop training modules and train TOTs on good veterinary, agricultural, aquaculture, hygienic practices in the country	Training modules developed. Increased pool of resource persons on AMR	2018–2022	MALF Development Partners
	3.3.3 Train on good veterinary, agricultural, aquaculture, hygienic practices in various food value chains including risk based measures.	Reduced risk of spread of AMR in agricultural, veterinary and aquaculture practices.	2018–2022	MALF Development Partners
3.4 Facilitate HACCP for food processing and the distribution process	3.4.1 Train public and private sector personnel on HACCP	Adoption of HACCP by food processing industry	2018–2022	MALF Development Partners
	3.4.2 Identify and promote use of rapid test kits for hygiene surveillance in food establishments.	Reduced foodborne disease outbreaks and reduced AMU	2018–2022	MALF
	3.4.3 Assess agricultural processes and establishments based on biosecurity and food safety standards for conformity	Increased conformity of establishments to biosecurity and food safety standards	2017–2022	MALF
	3.4.4 Assess agricultural processes and establishments on biosecurity and food safety measures for compliance	Increased compliance of establishments to biosecurity and food safety regulation	2017–2022	MALF

Strategic Intervention	Activity	Deliverables	Timeframe	Implementing Organization(s)
3.5 Facilitate vaccination as a way of reducing animal infections	3.5.1 Sensitize county governments and farmers on the importance of vaccination in livestock, aquaculture and pets	Reduction in AMU in animal health	2018–2022	MALF Development Partners
	3.5.2 Sensitize on proper vaccine handling, use and storage	Reduction in use of antimicrobials	2018–2022	MALF Development Partners
3.6 Facilitate animal identification and traceability	3.6.1 Enforce traceability along the value chain through animal identification and farm registration	Targeted interventions implemented to reduce AMR and enhance food safety	2018–2022	DVS Development Partners
	3.6.2 Sensitize farmers on animal identification and traceability	Targeted interventions implemented to reduce AMR and enhance food safety	2018–2022	DVS Stakeholders Development partners
	3.6.3 Review the existing legal framework relevant to animal identification and traceability	Updated legal framework for animal identification and traceability	2018–2022	DVS
3.7 Facilitate crop identification and traceability	3.7.1 Provide training on plant identification and traceability to control plant diseases	Improve plant health through plant identification and traceability	2018–2022	SDA Development Partners
3.8 Facilitate organic farming	3.8.1 Create awareness and sensitize farmers on the benefits of organic farming	Reduction in use of antimicrobials in farming	2018–2022	MALF Development Partners
	3.8.2 Assess and certify organic farms	Increased numbers of farms conforming to organic farming requirements	2019–2022	MALF Development Partners

STRATEGIC OBJECTIVE 4: OPTIMIZE THE USE OF ANTIMICROBIALS IN HUMAN AND ANIMAL HEALTH

Potential measure of effectiveness: extent of reduction in National human consumption of antibiotics, the consumption of antibiotics used in food production and the use of medical and veterinary antimicrobial agents for applications other than human and animal health.

Human Health Sector

Prudent AMU is vital to sustainable prevention and treatment of microbial diseases. Areas of focus in this strategic objective include: development and implementation of guidelines, enhanced regulation, enhancing human resource capacity, ensuring access to essential antimicrobials as well as strengthening lab diagnostic capacity. Ensuring sustainable access to quality essential antimicrobials is therefore, integral in successfully hampering the development of AMR. Consumption of substandard or counterfeit antimicrobials containing less than the specified amount of the active ingredient, or consuming suboptimal dosage due to lack of supply or limited accessibility to antimicrobials contributes to the emergence of AMR. Strengthening the regulatory measures, tools and activities of the national drug regulatory agency in ensuring the safety, efficacy and quality of medicines from market authorization to post-marketing surveillance will help combat AMR. Efforts must also focus on sustaining an efficient supply chain system towards ensuring the availability or accessibility of quality medicines to all patients at all times with emphasis on appropriate use by both patients and prescribers.

Strategic Intervention	Activity	Deliverables	Timeframe	Implementing Organization(s)
4.1 Develop and review guidelines and strategies to optimize and regulate use of antimicrobials	4.1.1. Generate baseline data on AMU	Report on antimicrobial use	2017–2018	MOH NMRA
	4.1.2 Review the standard treatment guidelines for infectious diseases	Standard treatment guidelines for infectious diseases reviewed	2017–2022	MOH NMTC NMRA
	4.1.3 Develop a centralized surveillance system for antimicrobial consumption	Reports for antimicrobial consumption generated	2017–2018	MOH NMRA
	4.1.4 Develop guidelines and training modules for antimicrobial stewardship programs (ASP) in healthcare settings	Guidelines and training modules on ASP in use	2017	MOH Stakeholders
	4.1.5 Integrate ASP in accreditation systems and quality standards in health care facilities	ASP included in accreditation system	2018	MOH NMRA NHIF

Strategic Intervention	Activity	Deliverables	Timeframe	Implementing Organization(s)
4.2 Implement ASP guidelines	4.2.1 Disseminate guidelines to the relevant healthcare staff	ASP guidelines disseminated and implemented	2017–2022	MOH Stakeholders
	4.2.2 Enforce compliance to guidelines in terms of purchasing, prescribing and dispensing of antimicrobials.	(Indicator) Increased appropriate use of antimicrobials	2017–2022	MOH, NMRA Professional Associations Councils, Health Service Regulators, NHIF, Insurance Regulators, Financing Regulators-focused on what to reimburse
	4.2.3 Monitor compliance to guidelines in terms of purchasing, prescribing and dispensing of antimicrobials	Generate reports on compliance to guidelines	2017–2022	MOH, NMRA Professional Associations Councils, Health Service Regulators, NHIF, Insurance Regulators, Financing Regulators-focused on what to reimburse
	4.2.4 Mandatory reporting of antimicrobial consumption and sales by health care facilities	Increased compliance to reporting antimicrobial consumption	2017–2022	MOH NMRA
	4.2.5 Establishment of Antimicrobial Stewardship Program (AMS) in hospitals	Antimicrobial Stewardship Programs in Place	2018–2022	MOH County Governments

Strategic Intervention	Activity	Deliverables	Timeframe	Implementing Organization(s)
4.3 Improve the registration, marketing authorization and post-marketing surveillance of antimicrobials	4.3.1 Conduct joint monitoring missions to undertake efficient market and post market surveillance	Access to quality antimicrobials assured	2017–2022	MOH NMRA
	4.3.2 Enhance post marketing surveillance of antimicrobial products in healthcare	Quality antimicrobials available	2017–2022	MOH/MALF NMRA
	4.3.3 Streamline process of reviewing and releasing marketing authorization for new antibiotics that address priority infectious diseases in the country	Efficient system of market authorization for new antibiotics	2017–2022	MOH/MALF NMRA
	4.3.4 Ensure that distribution, prescribing and dispensing of antimicrobials is only carried out by licensed healthcare professionals and facilities.	Only licensed health care professionals and facilities handling antimicrobials	2017–2022	MOH NMRA
	4.3.5 Review healthcare laws and regulations related to AMU	Healthcare laws and regulations reviewed to incorporate AMR	2017–2022	MOH NMRA
	4.3.6 Conduct continuous monitoring of restricted and unregistered antimicrobials	Register updated with restricted and unregistered antimicrobials	2017–2022	MOH NMRA
	4.3.7 Identification of antimicrobials classified as critical for use in humans	List of critical antimicrobials developed	2017	MOH/ MALF NMRA
	4.3.8 Rationalization and harmonization of regulatory control over the manufacture and use of antibiotics in animals	Harmonized regulatory control on manufacture and use of antimicrobials in animals	2017–2019	MOH/MALF NMRA

Strategic Intervention	Activity	Deliverables	Timeframe	Implementing Organization(s)
4.4 Foster an enabling environment for the rational use of medicines	4.4.1 Strict regulation of promotion and marketing of antimicrobials for human and veterinary us	Regulated promotion and marketing of antimicrobials	2017–2022	MOH/MALF NMRA
4.5 Deployment of technical staff to support prudent use of antimicrobials	4.5.1 Assess human resources needs and develop a staffing plan	Gaps in human resources identified	2017–2018	MOH
	4.5.2 Recruit, train and deploy appropriate staff	Appropriate Staff deployed	2017–2022	MOH
4.6 Ensure access to essential antimicrobial agents	4.6.1 Ensure continuous availability of essential antimicrobials in healthcare facilities across the country.	Uninterrupted supply of essential antimicrobials	2017–2022	MOH KEMSA Stakeholders
	4.6.2 Ensure a sustainable financial mechanism for essential antimicrobials.	Accurate forecasting and budgetary allocation for essential antimicrobials	2017–2022	MOH KEMSA
4.7 Strengthen Quality Control capacity	4.7.1 Enhance laboratory capacity to monitor the quality of antimicrobial agents	Quality antimicrobial agents available	2017–2022	MOH NMRA

Animal Health and Crop Sector

Antimicrobials are important in protecting the health and welfare of livestock and enhance the efficient production of safe food. On the other hand, their use always involves a risk of selecting antimicrobial resistant bacteria that might bring adverse effects to human medicine, veterinary medicine, and food safety.
The local demand for animal food products such as milk, meat, fish and eggs, is bound to increase. This increased demand for animal protein engenders complex intensive production systems that results to an increase in the use of antimicrobial agents.

The OIE, Codex Alimentarius Commission and other international organizations have formulated guidelines concerning the use of veterinary Antimicrobials. Appropriate use of veterinary antimicrobials will be ensured through various regulatory systems based on applicable laws.

Strategic Intervention	Activity	Deliverables	Timeframe	Implementing Organization(s)
4.1 Develop strategies to optimize and regulate use of antimicrobials	4.1.1. Undertake baseline study on AMU in animals, fish and plants in the country	Antimicrobial consumption data established	2017–2022	MALF Stakeholders NMRA
	4.1.2 Develop a database of registered antimicrobials, including quantitative production and importation	Database of registered antimicrobials established	2017	MALF NMRA
	4.1.3 Develop National AMU Guidelines in animals, fish and plants.	Optimized AMU in livestock and crops	2017–2018	MALF Stakeholders NMRA Development Partners
	4.1.4 Review National AMU guidelines	Published guidelines reviewed	2018–2019	MALF NMRA Development Partners
4.2 Improve the registration, marketing authorization and post-marketing surveillance of antimicrobials	4.2.1 Develop SOPs for the process of review and release of marketing authorization for antimicrobials	Register of approved Antimicrobials established	2017–2018	MOH/MALF NMRA
	4.2.2 Undertake quality assurance of veterinary antimicrobial agents in the market	Successful treatment of infectious diseases	2017–2022	MALF NMRA
	4.2.3 Undertake active surveillance of unregistered antimicrobials in animals	Unauthorized antimicrobials eliminated from the market	2017–2022	MALF NMRA

Strategic Intervention	Activity	Deliverables	Timeframe	Implementing Organization(s)
4.3 Develop tools to verify compliance to prudent use of antimicrobials	4.3.1 Develop SOPs for licensing of importers and exporters of antimicrobials.	Register of authorized dealers established	2017–2022	MALF
	4.3.2 Develop SOPs for licensing of antimicrobials manufacturers	Register of approved manufacturers established.	2017–2022	MALF
	4.3.3 Develop antimicrobial prescription registers	Patterns of antimicrobial use established	2017–2022	MALF
4.4 Capacity building of staff to support prudent use of antimicrobials	4.4.1 Undertake assessment of human resource needs	Human resource gaps identified	2018–2019	MALF PSC
	4.4.2 Develop a training plan	Competent staff deployed	2018–2019	MALF PSC Stakeholders
4.5 Ensure access to essential antimicrobial agents	4.5.1 Develop a platform of partnerships with healthcare professionals, organization, and consumer groups	Essential antimicrobials available where and when required.	2019	MALF Stakeholders
	4.5.2 Undertake review of regulations related to access to antimicrobials, especially in the distribution and sale.	Controlled access to essential antimicrobials.	2019	MALF NMRA Legislature

STRATEGIC OBJECTIVE 5: DEVELOP AN ECONOMIC CASE FOR SUSTAINABLE INVESTMENT THAT TAKES ACCOUNT OF THE NEEDS OF KENYA, AND INCREASE INVESTMENT IN NEW MEDICINES, DIAGNOSTIC TOOLS, VACCINES AND OTHER INTERVENTIONS

Potential measure of effectiveness: extent of increase in sustainable investment in capacity to counter antimicrobial resistance for all countries, including investment in developing of new medicines and diagnostics.

Human Health Sector

Research is required on trends in resistance, practices and attitudes driving resistance in Kenya to inform appropriate interventions. In addition to investment in the discovery and development of new antimicrobials, diagnostic tools and vaccines, is required. Research and development of new antimicrobials though perceived as a less attractive business investment than that of medicines for chronic diseases, can provide opportunities for feeding the animicrobial pipeline. Research and investment in diagnostic tools and improved vaccines can contribute to the overall reduction in AMU.

Strategic Intervention	Activity	Deliverables	Timeframe	Implementing Organization(s)
5.1 Promote Research on Public Awareness/ Education on Antimicrobial Resistance, Infection Prevention and Control, and Antimicrobial Stewardship	5.1.1 Commission surveys on people's knowledge, attitudes and practices to assess the impact of activities aimed at public awareness-raising and education	Increased knowledge and awareness on AMR	2017–2022	MOH Stakeholders
5.2 Promote Research And Development for New Methods For Prevention, Diagnosis Treatment and Animal Vaccines and Promote the Cooperation Of Industry, Academia And Government	5.2.1 Create an enabling environment for public and private sector to undertake antimicrobial research and development of new antimicrobials and diagnostics.	Increased collaboration between public and private sector on research	2017–2022	MOH NACOSTI Research Institutions KEVEVAPI
	5.2.2 Advocate for the use of new rapid diagnostic tools (RDTs) for identification of causal organisms and AMR	Improved management of infectious diseases	2017–2022	MOH Research Institutions Stakeholders
5.3 Develop plans to secure and apply the required financing	5.3.1 Prepare and submit medium term expenditure framework (MTEF) for the AMR program.	AMR budgeted in the MTEF	2017–2022	MOH/MALF/ MENR NASIC management committee (NASIC-MC)

Animal Health and Crop Sector

The causes, effects and impacts of AMR in the animal sector entail a better and deeper knowledge of the phenomena's complexity. Veterinary antimicrobial consumption needs be further assessed in order to determine the correlation of AMR in both animal and human health in the country. Moreover, toxicological studies need to be performed to establish the safety of veterinary drug residues in the human diet, as well in the human intestinal flora. Researches are needed to enhance the development of effective strategies and alternatives to combat AMR in food-producing animals.

Investment in the development of new antimicrobials, as well as in diagnostic tools and vaccines, is required. Research and development of new antimicrobialss though perceived as a less attractive business investment than that of medicines for chronic diseases, can provide opportunities for addressing the AMR challenge. Research and investment in diagnostic tools and improved vaccines can contribute to the overall reduction in AMU. To implement policies for combating antimicrobial resistance (AMR), it is important not only to accumulate existing scientific evidence and incorporate it into public health measures, but also to create new scientific evidence in Kenya and share it with society and the international community.

Strategic Intervention	Activity	Deliverables	Timeframe	Implementing Organization(s)
5.1 Promote Research on Public Awareness/ Education on Antimicrobial Resistance, Infection Prevention and Control, and Antimicrobial Stewardship	5.1.1 Commission surveys on people's knowledge, attitudes and practices to assess the impact of activities aimed at public awareness-raising and education	Gaps in KAP identified	2019–2022	MALF Partners
	5.1.2 Commission research concerning changes in the resistance following the discontinuation of use of antibiotics for animals, and secondary risks	Status of resistance pathogens established	2019–2022	MALF Partners

Strategic Intervention	Activity	Deliverables	Timeframe	Implementing Organization(s)
5.2 Promote Research And Development Of New Methods For Prevention, Diagnosis and Treatment and Promote The Cooperation Of Industry, Academia And Government	5.2.1 Promote the research and development of new vaccines to reduce incidence of infectious diseases in animals	New vaccines developed	2019–2022	MALF Partners
	5.2.2 Promote research and development on new preventive approaches that do not induce the emergence of antibiotic resistance organisms	Guidelines and protocols on antimicrobial use developed	2019–2022	MALF Partners
	5.2.3 Promote the use of rapid diagnostic tools for identification of causal organisms and AMR, which contribute to antimicrobial stewardship and AMR containment measures;	Empirical treatment of AMR infections undertaken in animal health practice	2018–2022	MALF Partners
	5.2.4 Promote use of simplified test methods that contribute to the prudent use of veterinary antibiotics at farm level.	Prudent use of veterinary antibiotics occurring at farm level	2018–2022	MALF Partners
	5.2.5 Review the procedure for registration of new medicine targeting antimicrobial resistant infections	Reduction in treatment failures	2019–2022	MALF Partners

Strategic Intervention	Activity	Deliverables	Timeframe	Implementing Organization(s)
5.3 Develop plans to secure and apply the required financing	5.3.1 Prepare a medium term expenditure framework for the AMR program.	Budget for the 5 year NAP developed	2017	MALF
	5.3.2 Submit budget to NASIC steering committee for approval	Annual budget approved	2017	MALF
	5.3.3 NASIC-SC lobbies for inclusion of AMR program in National budget estimates with the relevant parliamentary committee	AMR expenditure estimates captured in national budget	2017	MALF
	5.3.4 Identify funding gaps for priority activities	Priority activities and funding requirements established	2017–2022	MALF
	5.3.5 Develop funding plans for each priority activity	Proposals for priority activities developed	2017–2022	MALF
	5.3.6 Submit funding plans to interested partners	Sources of funding identified and proposals submitted	2017–2022	MALF Partners

MONITORING AND EVALUATION

Upon the official adoption of this National Action Plan, the AMR TWG shall develop a Monitoring & Evaluation Framework that includes targets and outlines the National Policy review process. A Monitoring and Evaluation framework for the AMR national action plan is critical in measuring the impact of proposed interventions. This Framework will be developed for each activity bearing a monitoring indicator to be measured in the process of its implementation. The framework will incorporate both objective and outcome indicators. Responsible Ministries/ Departments/Agencies will monitor and evaluate interventions identified in the NAP. A mid-term review will be done after two years to monitor the implementation of the NAP. End of term evaluation will be conducted in 2021.

In addition, Annual Operational Plans, a Communication and Surveillance Strategy will be developed to support further implementation of the NAP.

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