KINGDOM OF LESOTHO

THE NATIONAL ACTION PLAN ON ANTIMICROBIAL RESISTANCE 2021-2026

MARCH 2021

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ABBREVIATIONS AND ACRYNOMS

AMR	Antimicrobial resistance
AMU	Antimicrobial use
CHAL	Christian Health Association of Lesotho
DGHS	Director General Health Services
DVO	District Veterinary Officer
DVPH	Director Veterinary Public Health
DWA	Department of Water Affairs
FAO	Food and Agriculture Organization of the United Nations
GAP	Global Action Plan
GHSA	Global Health Security Agenda
HRM	Human Resources Manager
IDSR	Integrated Disease Surveillance and Response
IHR	International Health Regulations
IPC	Infection prevention Control
M&E	Monitoring and Evaluation
MAFS	Ministry of Agriculture and Food Security
MDP	Ministry of Development
MOF	Ministry of Finance
MOH	Ministry of Health
NHTC	National Health Training College
NRL	National Reference Laboratory
NUL	National University of Lesotho
OIE	World Organization for Animal Health
PHN	Public Health Nurse
PPT	Principal Pharmacy Technician
PRO	Public Relations Officer
PU	Planning Unit
SCPO	Senior Crop Production Officer
SPHCC	Senior Primary Health Care Coordinator
SVO	Senior Veterinary Officer
WHA	World Health Assembly
WHO	World Health Organization

KEY DEFINITIONS

Antimicrobial: an agent such as a drug that destroys or inhibits the growth of a microorganism (National Department of Health, 2014)

Antimicrobial Resistance: The ability of a microorganism to withstand treatment with an antimicrobial drug (National Department of Health, 2014)

Strategic Objective: This is the aim that should be achieved by the project during the years of its implementation (WHO, 2015)

Strategic Intervention: This is the key health measure that will contribute to achieving at least one objective. It includes several activities and sub-activities that need to be developed and/or implemented (WHO, 2015)

Key activity: This is the action that contributes to implementing a strategic intervention (WHO, 2015)

Sub activity: An activity making up part of a larger activity

Indicator: Is a quantitative metric that provides information to monitor performance, measure achievement and determine accountability (UNAIDS)

Target: The objective a program/intervention is working towards, expressed as a measurable value; the desired value for an indicator at a particular point in time.

Logical Framework: Management tool used to improve the design of interventions.

Surveillance: Ongoing systematic collection, analysis, and interpretation of outcome specific data for use in planning, implementing and evaluating public health policies and practices (WHO, 2006)

Cost element: Economic value or price of resources that are sacrificed for attaining a particular objective.

Operational Plan: process of planning strategic goals and objectives to technical goals and objectives.

ACKNOWLEDGEMENTS

The National Multi-sectoral Committee on Antimicrobial Resistance (AMR) wishes to acknowledge the significant support from the collaborating ministries towards development of Lesotho National Action Plan (LNAP) on AMR. The contributions from academia, through National University of Lesotho, National Health Training College and Lesotho Agricultural College are highly recognized, throughout the process. The efforts from development partners cannot be overlooked. Gratitude is extended to WHO, FAO and OIE for continued technical and financial support from the inception phase of the process until production of final LNAP with cost estimates.

The multi sectoral AMR Technical Working Groups (TWGs) are also acknowledged for technical expertise in the development of the plan, through active involvement and participation in the successive workshops held from the beginning up to the end. A special thanks is extended to the following AMR Regional Experts who facilitated in-country workshops aimed at spearheading the AMR Situational Analysis as part of developing the NAP on AMR for Lesotho.

- Dr. Walter Fuller, AMR Technical Expert- WHO Africa Regional Office, Brazzaville
- Dr. Emmanuel Kabali, AMR Technical Officer at Food and Agriculture Organization- FAO SFS
- Dr. Olafur Valsson, AMR Programme Officer-World Organization for Animal Health (OIE) Southern Regional Office
- Dr. Sekesai Zinyowera, WHO- AMR Consultant
- Kapona Otridah- AMR Coordinator Zambia

The authors would like to specifically thank Honorable Ministers and the Principal Secretaries for the participating ministries in the development of NAP. Their leadership and support since the inception of AMR initiative in Lesotho is highly valued and recognized.

FOREWORD

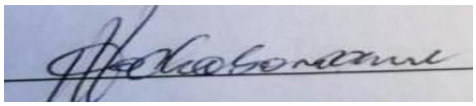
Lesotho has a National Multi-Sectoral Steering Committee (NMSC) on Antimicrobial resistance (AMR) that provides a strategic direction towards combating antimicrobial resistance in Lesotho as recommended in the Global and regional agenda on AMR. The committee comprises of Principal Secretaries from collaborating Ministries namely Ministry of Health (MOH), Ministry of Agriculture, and Food Security (MAFS), Ministry of Tourism Environment and Culture, Ministry of Water, Ministry of Finance (MOF) as well as Implementing and Development Partners to Government of Lesotho.

In response to the Global agenda, Lesotho has therefore put efforts in place to develop a 5-year costed multi-sectoral action plan on AMR, to be implemented from 2020/21 to 2025/26 fiscal year. The plan provides a description of key interventions on the subject of human health, animal health, plants and environment required to combat AMR in Lesotho. The LNAP is further guided by instruments such as World Health Assembly (WHA) resolutions, 2001 Global Strategy on AMR, Africa CDC Framework for AMR 2018-2023, World Organization for Animal Health (OIE) Strategy on Antimicrobial Resistance (2016), FAO-WHO-OIE Manual for Development of National Action Plans on AMR, The National Health Policy, (NHP 2017) and Environment Act 2008.

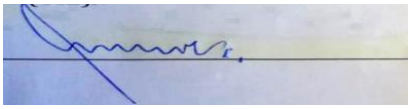
The objectives outlined in the plan address each of the objectives in the global action plan and have been expressed in the current plan according to the following domains; 1) Education and Awareness 2) Surveillance and Research 3) Hygiene, Infection Prevention and Control 4) Antimicrobial Use and Regulation and 5) Investment, Research & Development (R&D) on AMR. The plan further defines the financial resources required for undertaking each of the proposed objectives, strategic interventions and underlying key activities. With a total of about **M 270,853,622 million (US$16,928,351)** required for financing the plan, we call for active involvement of all stakeholders in resource mobilization as well as mapping for all the resources that the Government of Lesotho (GOL) and her partners would have to inject for implementation.

The plan further sets out the mechanism for accountability through the use of Monitoring and Evaluation (M&E) framework which is developed as part of the country's National Action Plan. The M&E framework aligns to the Global monitoring framework for AMR and Sustainable Development Goals (SDGs) indicator Framework on AMR. As such, we urge all the implementing agencies and partners to commit towards continual availability of timely information and knowledge exchange for effective accountability of results.

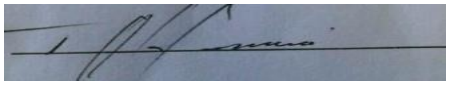
Finally, the NMSC on AMR commits to work collaboratively with the line ministries to ensure integration of the NAP into the annual work plans for different ministries as a sustainable measure and effective stakeholders' engagement in the process of implementation. We wish you all, a successful resource mobilization and hence implementation.



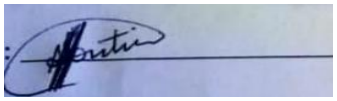
Hon. Minister of Health
Selibe Mochoboroane



Hon. Minister of Water
Mohlomi Moleko

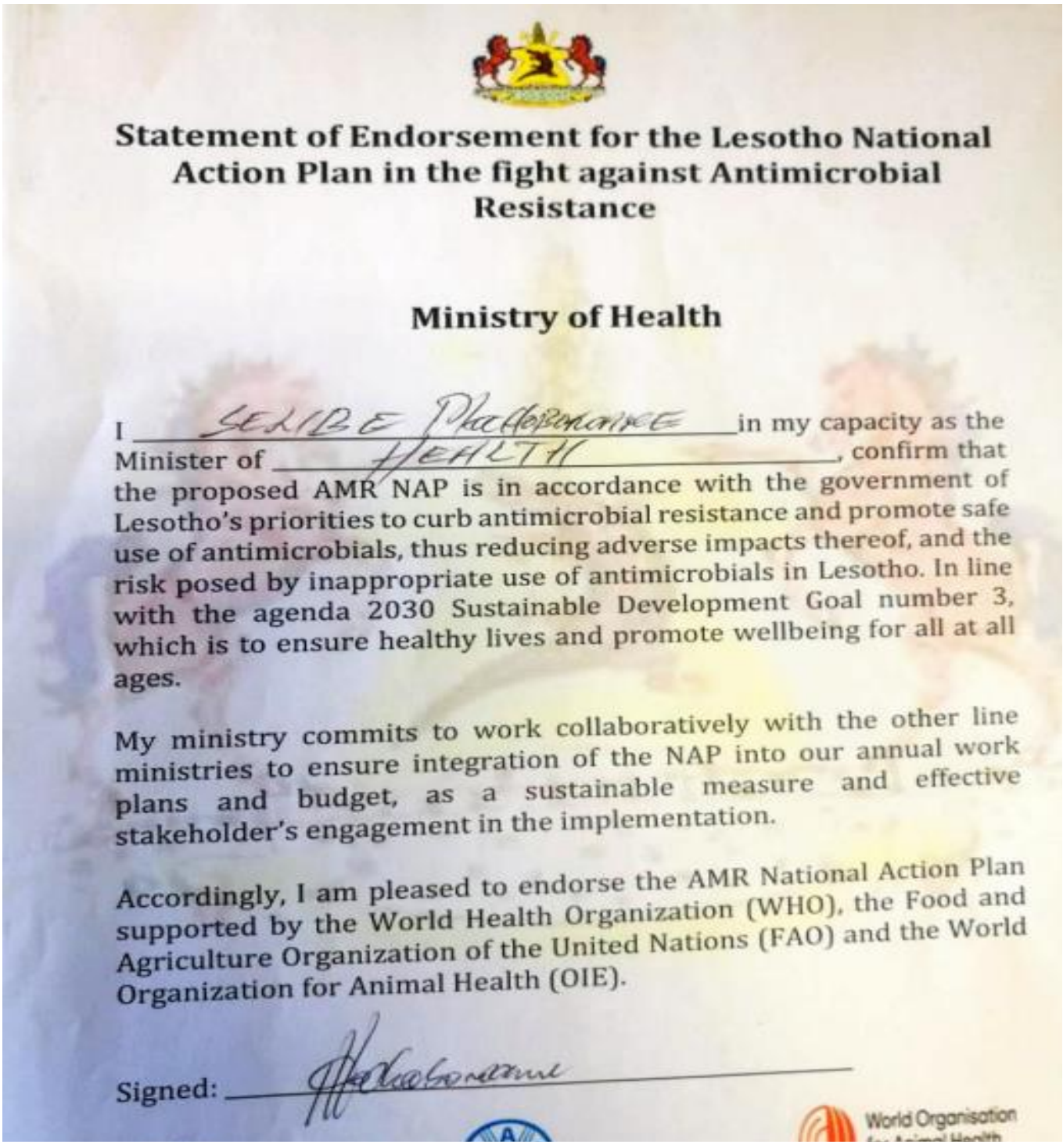


Hon. Minister of Agriculture, Food Security and Nutrition
Thabo Mofosi



Hon. Minister of Tourism Environment and Culture
Letsema John Adonts'i

STATEMENTS OF COMMITMENTS



Statement of Endorsement for the Lesotho National Action Plan in the fight against Antimicrobial Resistance

Ministry of Health

I SELIBE Phalatsane in my capacity as the Minister of HEALTH, confirm that the proposed AMR NAP is in accordance with the government of Lesotho's priorities to curb antimicrobial resistance and promote safe use of antimicrobials, thus reducing adverse impacts thereof, and the risk posed by inappropriate use of antimicrobials in Lesotho. In line with the agenda 2030 Sustainable Development Goal number 3, which is to ensure healthy lives and promote wellbeing for all at all ages.

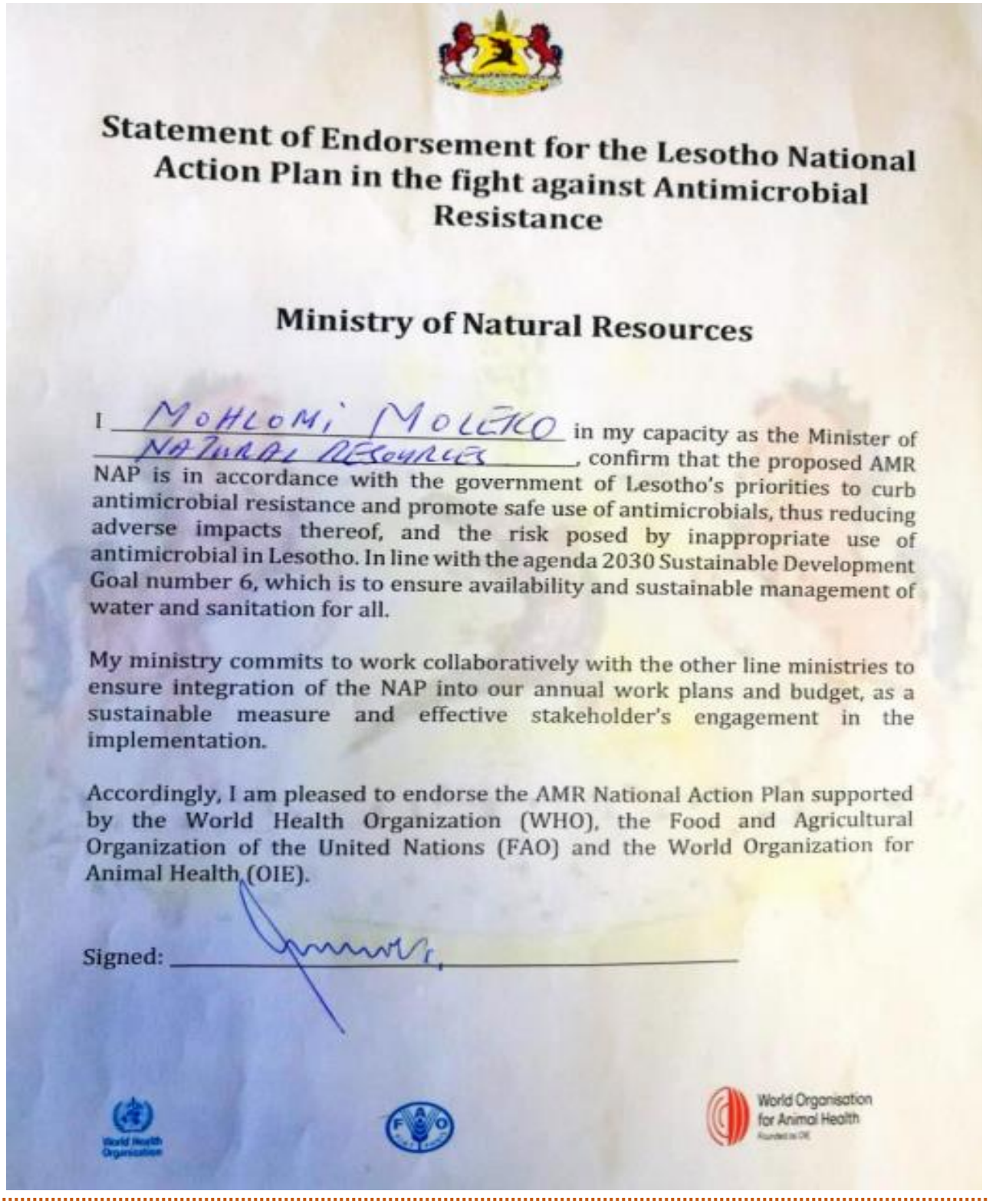
My ministry commits to work collaboratively with the other line ministries to ensure integration of the NAP into our annual work plans and budget, as a sustainable measure and effective stakeholder's engagement in the implementation.

Accordingly, I am pleased to endorse the AMR National Action Plan supported by the World Health Organization (WHO), the Food and Agriculture Organization of the United Nations (FAO) and the World Organization for Animal Health (OIE).

Signed: _____

World Organisation

Figure 1: Ministry of Health Commitment



Statement of Endorsement for the Lesotho National Action Plan in the fight against Antimicrobial Resistance

Ministry of Natural Resources

I MOHLOMI MOLEKO in my capacity as the Minister of NATURAL RESOURCES, confirm that the proposed AMR NAP is in accordance with the government of Lesotho's priorities to curb antimicrobial resistance and promote safe use of antimicrobials, thus reducing adverse impacts thereof, and the risk posed by inappropriate use of antimicrobial in Lesotho. In line with the agenda 2030 Sustainable Development Goal number 6, which is to ensure availability and sustainable management of water and sanitation for all.

My ministry commits to work collaboratively with the other line ministries to ensure integration of the NAP into our annual work plans and budget, as a sustainable measure and effective stakeholder's engagement in the implementation.

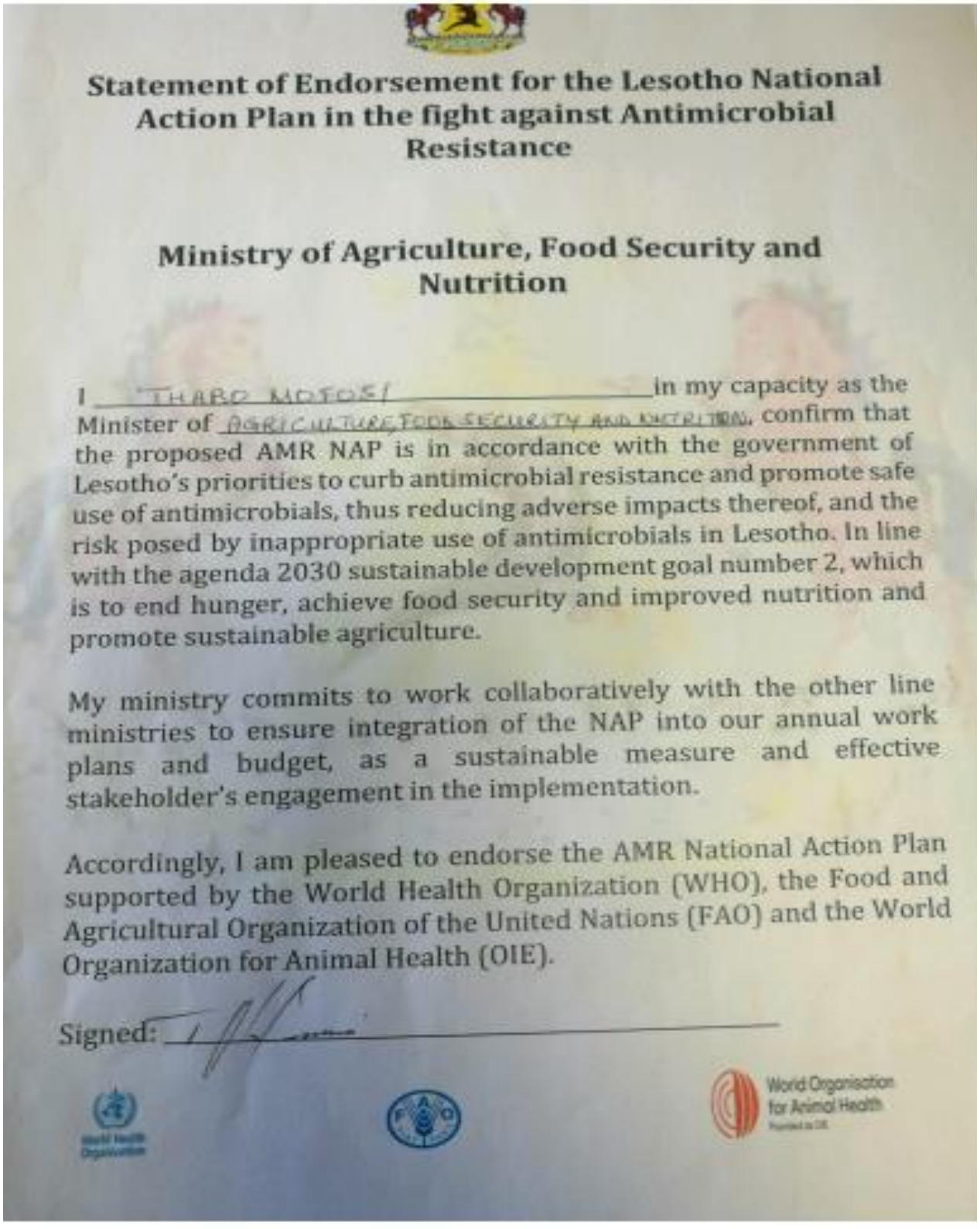
Accordingly, I am pleased to endorse the AMR National Action Plan supported by the World Health Organization (WHO), the Food and Agricultural Organization of the United Nations (FAO) and the World Organization for Animal Health (OIE).

Signed: _____

World Health Organization

World Organisation for Animal Health

Figure 2: Ministry of Water Commitment



Statement of Endorsement for the Lesotho National Action Plan in the fight against Antimicrobial Resistance

Ministry of Agriculture, Food Security and Nutrition

I THABO MOTOSI in my capacity as the Minister of AGRICULTURE, FOOD SECURITY AND NUTRITION, confirm that the proposed AMR NAP is in accordance with the government of Lesotho's priorities to curb antimicrobial resistance and promote safe use of antimicrobials, thus reducing adverse impacts thereof, and the risk posed by inappropriate use of antimicrobials in Lesotho. In line with the agenda 2030 sustainable development goal number 2, which is to end hunger, achieve food security and improved nutrition and promote sustainable agriculture.

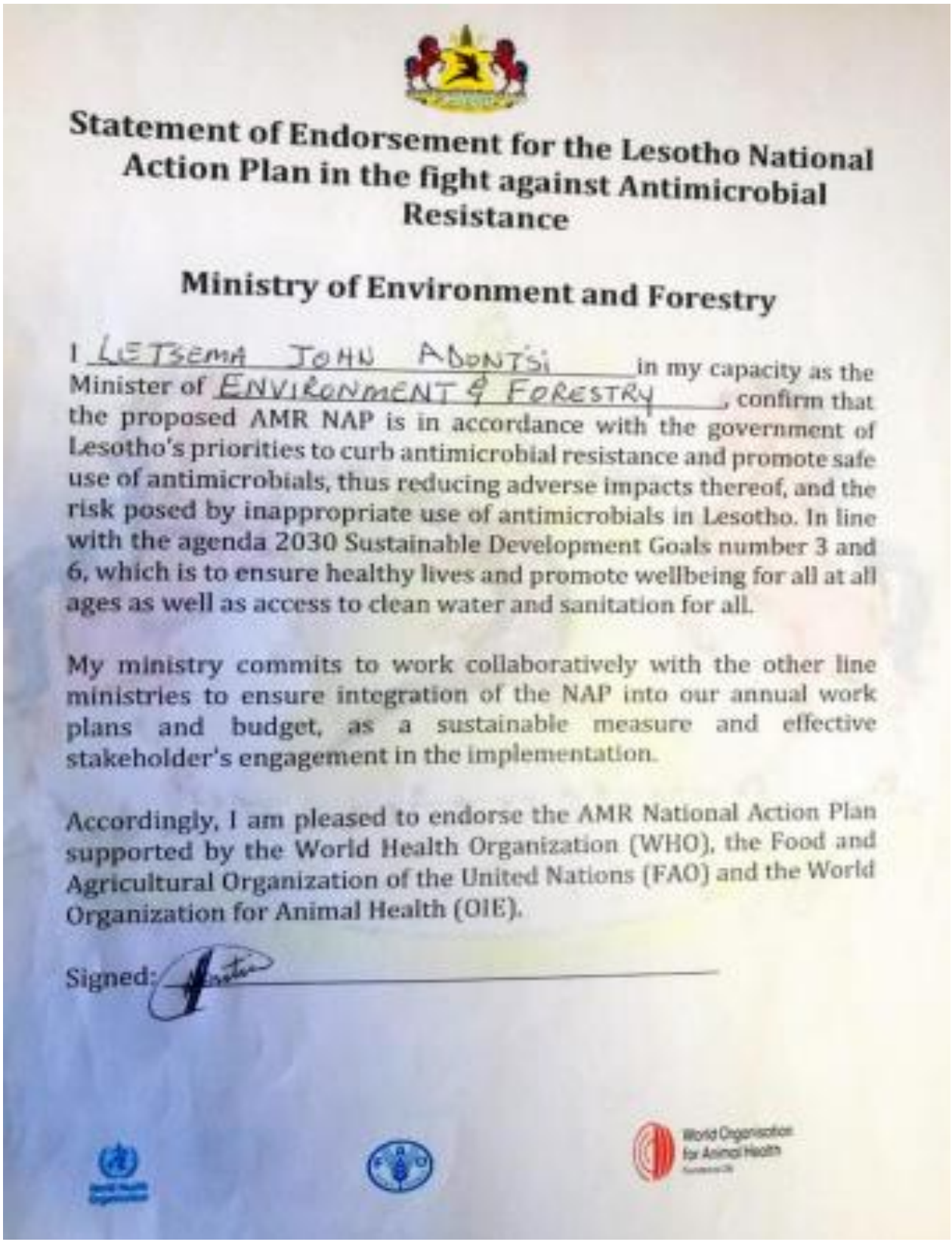
My ministry commits to work collaboratively with the other line ministries to ensure integration of the NAP into our annual work plans and budget, as a sustainable measure and effective stakeholder's engagement in the implementation.

Accordingly, I am pleased to endorse the AMR National Action Plan supported by the World Health Organization (WHO), the Food and Agricultural Organization of the United Nations (FAO) and the World Organization for Animal Health (OIE).

Signed: _____

World Organisation for Animal Health

Figure 3: Ministry of Agriculture, Food Security and Nutrition



Statement of Endorsement for the Lesotho National Action Plan in the fight against Antimicrobial Resistance

Ministry of Environment and Forestry

I LETSEMA JOHN ADONTSI in my capacity as the Minister of ENVIRONMENT & FORESTRY, confirm that the proposed AMR NAP is in accordance with the government of Lesotho's priorities to curb antimicrobial resistance and promote safe use of antimicrobials, thus reducing adverse impacts thereof, and the risk posed by inappropriate use of antimicrobials in Lesotho. In line with the agenda 2030 Sustainable Development Goals number 3 and 6, which is to ensure healthy lives and promote wellbeing for all at all ages as well as access to clean water and sanitation for all.

My ministry commits to work collaboratively with the other line ministries to ensure integration of the NAP into our annual work plans and budget, as a sustainable measure and effective stakeholder's engagement in the implementation.

Accordingly, I am pleased to endorse the AMR National Action Plan supported by the World Health Organization (WHO), the Food and Agricultural Organization of the United Nations (FAO) and the World Organization for Animal Health (OIE).

Signed: _____

World Organisation for Animal Health

Figure 4: Ministry of Tourism, Environment and Culture

EXECUTIVE SUMMARY

The Government of Lesotho took an initiative to develop a 5-year multi-sectorial National Action Plan on AMR (2020/21-2024/25) as a response to the Global agenda on combating antimicrobial resistance globally, regionally and at local settings. The development process was led by a National Multi-Sectoral Steering Committee (NMSC) with the support from development partners. The process began with AMR situational analysis where local data on on-going interventions was collected, analyzed and therefore used as a basis for developing the National Action Plan. The plan will be implemented in accordance with 'One health approach'; a strategic approach in bringing together all relevant sectors[1] and disciplines across the human, animal and environment in order to achieve better health outcomes.

Development process

The process was initiated in 2019 with conducting of situational analysis on AMR in Lesotho, and was completed with a 2 stage validation process conducted in November 2019 and August 2020, prior to endorsement. The product is guided by global, regional and local instruments such as World Health Assembly (WHA) resolutions, 2001 Global Strategy on AMR, Africa CDC Framework for AMR 2018-2023, World Organization for Animal Health (OIE) Strategy on Antimicrobial Resistance (2016), FAO-WHO-OIE Manual for Development of National Action Plans on AMR, National Health Policy (NHP 2017), National Strategic Development Plan (NSDP II 2018/19-2023), National Health Strategic Plan (2019-2023), Water and Sewage Company (WASCO), Water Safety Plan 2017 and Environment Act- 2008.

The multidisciplinary inter-ministerial Technical Working Groups (TWGs) on different thematic areas (Education and Awareness, Surveillance and Research, Hygiene, Infection Prevention and Control, Use of antimicrobials, Research and Development) were formed and mandated to provide technical expertise in the development of the plan. Technical and financial support to the TWGs was sought from the tripartite (WHO-FAO-OIE) through facilitation of workshops since the inception phase. The tripartite support further aimed at building the capacity of the country in developing sound and implementable action plan using one health approach. The oversight role in the development process was executed by the National Steering Committee (NSC) and its supporting arm known as National Multi-sectorial Steering Committee (NMSC).

Implementation arrangements and accountability

The NSC and NMSC will provide the overall coordination, leadership and strategic approach towards continuous resource mobilization throughout the implementation. The line ministries attached to specific interventions in the plan will be responsible for implementation and reporting on progress to the NMSC and NSC. The TWGs in each thematic area, will serve as link between the

[1] World Organization on Animal Health (OIE), defines relevant sectors as those sectors, disciplines, stakeholders, or ministries that are essential to addressing the health threat to be addressed using a multi-sectoral, One Health approach.

NMSC, NSC and the line ministries responsible for implementing the interventions specific to each Ministry. Guided by monitoring and Evaluation Framework for the plan, structured reports on progress towards implementation will be sought from the implementing agencies for onward sharing with the NSC, NMSC and other stakeholders.

Strategic elements (Objectives, Strategic Interventions and Key activities)

The five strategic objectives from the Global Action Plan (GAP) agreed at the World Health Assembly in May 2015, were adopted to formulate the country's objectives which are defined in the plan as the Strategic Objectives (SOs) as listed below;

- **SO1:** Improve awareness and understanding of antimicrobial resistance through effective communication, education and training.
- **SO2:** To strengthen knowledge and evidence-base through surveillance and research
- **SO3:** To reduce the incidence of infection through effective hygiene and IPC measures
- **SO4:** To optimize the use of antimicrobial medicines in human and animal health
- **SO5**: To develop the economic case for sustainable investment that takes account of the national needs and to increase investment in new medicines, diagnostic tools, vaccines and other interventions.

In line with the Logical Framework Approach (LFA), the plan provides the Strategic Interventions (SIs) for achieving each Strategic Objective (SO), key activities for achieving each Strategic intervention and sub-activities linked with each key activity. Nearly 20 strategic interventions and 75 underlying key activities have been proposed for the duration of the Plan. The table below provides the quantitative summary of the strategic elements.

Table 1: Strategic Objectives, interventions, and activities-A quantitative summary

Thematic Area	SO#	Strategic Interventions	No. of SIs	No. of key activities
Education and Awareness	**1**	1.1-1.3	3	11
Surveillance and Research	**2**	2.1-2.4	6	22
Hygiene, Infection Prevention and Control	**3**	3.1-3.5	5	18
Antimicrobial Use	**4**	4.1-4.5	5	20
Investment, Research and Development	**5**	5.1	1	4

Financial resource requirements

The National Action Plan on AMR was costed using the Activity Based Costing (IBC) approach, where the cost of all the inputs were defined, categorized according to the overall strategic objectives, strategic interventions, key activities and sub-activities,. The aggregated indicative costs therefore showed that nearly LSL **270,853,622** Million (US$16,928,351) is required across 5 thematic areas

to support implementation during a 5 year period. A larger proportion of budget (LSL 156.8 Million (US$9,818,443) is required in the first year of implementation accounting for more than 50% of the total cost estimates. The costs were further disaggregated by the thematic areas (equivalence of strategic objectives) and the analysis has revealed that hygiene, infection prevention and control constitutes a higher proportion of the total costs estimates (37%) among the 5 thematic areas for the duration of the plan, with more resources required in the first year of implementation. Generally, it is further noted that higher costs in the first year of implementation is due to acquisition of new diagnostic tools on AMR, initiation of new projects under hygiene, infection prevention and control , development of policy and regulatory frameworks, and strengthening of country Monitoring and Evaluation system for accountability of results at national, regional and global level. The table below provides a summary of indicative costs over a five year period.

Table 2: Total cost of Lesotho NAP on AMR YR1 (2020/21)-YR5 (2024/25)

Total Cost of Lesotho NAP-AMR 2020 -2025 by Program Areas LSL(Millions)						
Program Areas	**2020/21**	**2021/22**	**2022/23**	**2023/24**	**2024/25**	**Total Yr1-Yr5**
Education and Awareness	3,657,850	1,506,088	1,307,106	1,068,328	1,134,714	8,674,087
Surveillance and Research	16,331,800	15,998,641	16,516,199	16,674,224	12,624,769	78,145,633
Hygiene, Infection prevention and control	92,528,830	1,684,022	2,934,281	1,279,508	3,171,027	101,597,668
Antimicrobial use and regulation	43,728,400	9,925,492	3,707,973	8,120,597	14,275,859	79,758,321
Investment, Research & Development	581,200	448,288	899,226	591,640	157,559	2,677,913
Grand Total	**156,828,080**	**29,562,531**	**25,364,786**	**27,734,298**	**31,363,927**	**270,853,622**

Monitoring and Evaluation of the Plan

In order to ensure accountability throughout implementation, the M&E framework was developed with a One Health perspective to reflect the inter-sectorial nature of AMR, as guided by 2017 WHO framework on Monitoring and Evaluation of AMR National Action Plans. Other instruments that guided the process for developing the framework include; The 2019 WHO, FAO and OIE Monitoring and Evaluation of the Global Action Plan on antimicrobial resistance; Africa CDC Framework for AMR 2018-23 and The 2018 Report on AMR indicators and Sustainable Development Goals.

Monitoring Progress

A total of 39 indicators have been selected to monitor progress towards implementation of 5 Strategic Objectives, 20 strategic interventions, 75 key activities and their underlying sub activities.

Six (6) indicators are at impact level, 15 at outcome while the remaining (18) will be used to track the processes. The data collection methods for generating data on selected indicators will be based on the existing ministerial routine data collection platforms. This includes the use of District Health Information System_2 (DHIS2) used in the MOH, Laboratory Management Information System (LMIS) in the MOH and Integrated Financial Management Information System used across collaborating Ministries.

Evaluation

Using information generated from monitoring, programme evaluations will be conducted at mid-way (between year 2 and year 3) and by the end of year 5 to measure the impact of proposed interventions in the implementation framework. It is also proposed that the baseline assessment on newly proposed indicators will be conducted and such information will serve as a guide towards routine monitoring, and programme evaluations (mid-term and end term).

Limitations

- Due to unavailability of Lesotho specific data (through research) on AMR related interventions, there is no enough evidence on the country's current situation on AMR.
- Unavailability of global targets on AMR, from which the country could draw own targets.
- AMR is a missing topic in the global agenda on Sustainable Development Goals and hence difficulty for the country to ensure proper alignment of M&E for AMR with existing country level M&E frameworks drawn in line with the SDGs Framework.
- Unavailability of baseline information for majority of indicators proposed indicators could affect mid-term review and reporting based on targets in the first year of implementation.
- There was no standard price used by Government on cost of items for procurement purpose. Therefore other cost estimates emanates from already costed strategic plans for the country.
- The costing did not have information on the available financial resources, hence funding gap could not be easily determined.

CHAPTER I – INTRODUCTION

Emergence of antimicrobial resistance is a result of the use, overuse and misuse of antimicrobials both in humans and animals. The current National Action Plan on Antimicrobial Resistance (NAP-AMR) details the country's response towards global initiative in combating Antimicrobial resistance. The plan sets out the multi-sectoral key interventions that will be undertaken over a 5 year period (2020/21-2024/25) in an attempt to prevent and contain antimicrobial resistance in the country.

1.1 Global context

There is a global consensus in the literature that Antimicrobial resistant (AMR) organisms are increasingly threatening to render existing treatments ineffective against many infectious diseases. Conceptually, the drug resistant strains of fungi, bacteria, parasites, and viruses prolong illness, increase case-fatality, facilitate transmission, and increase treatment costs. According to 2018-2023 Africa CDC Framework for AMR, globally drug resistance causes an estimated 700,000 deaths each year and if remains unattended to, could result in over 10 million deaths per year with over 100 trillion USD as a lost output due to AMR by the year 2050 (African Union, 2018)

Following the 51st World Health Assembly resolution on Antimicrobial Resistance in 1998, efforts were put in place by WHO to develop the 2001 Global Strategy on AMR. The strategy aimed to provide a framework of interventions for all member states in order to; stimulate the prevention of infection; slow the emergence of resistance and reduce the spread of resistant microorganisms; reduce the impact of resistance on health and health care costs, while improving access to existing agents and encouraging the development of new agents.

The 2001 WHO Global Strategy on AMR depicts that deaths from acute respiratory infections, diarrheal diseases, measles, AIDS, malaria and tuberculosis account for more than 85% of the mortality from infection worldwide. Resistance to first-line drugs in the pathogens causing these diseases ranges from zero to almost 100%. The 2010 WHO Global Report on Surveillance and response shows that, about 440 000 new cases of multidrug-resistant tuberculosis emerge annually, leading to at least 150 000 deaths per year.

In cognizant of the need for global response on AMR, and recalling further the resolutions from 39th, 47th, 51st, 54th , 58th, 60th, and 67thWorld Health Assembly (WHA)[2] meetings the 68th WHA adopted the Global Action Plan on AMR and further urged Member States to: 1) Implement the proposed actions for Member States in the global action plan 2) Adapt the global action plan in to the

[2]WHA39.27 and WHA47.13 on the rational use of drugs, resolution, WHA51.17 on emerging and other communicable diseases: antimicrobial resistance, resolution, WHA54.14 on global health security: epidemic alert and response, resolution, WHA58.27 on improving the containment of antimicrobial resistance, resolution, WHA60.16 on progress in the rational use of medicines and resolution and WHA67.25 on antimicrobial resistance

countries' contexts; (3) Mobilize human and financial resources through domestic, bilateral and multilateral channels for implementation of plans and strategies in line with the global action plan on AMR.

1.2 Regional context

Recently, sub-Saharan Africa (sSA) has been identified as the region with the most limited implementation of antimicrobial surveillance strategies, alongside limited infection prevention and control programmes (Williams PCM, Isaacs D, Berkley JA., 2018). The problem of AMR in sSA is set against a background of an ongoing high incidence of acute respiratory infections, diarrhoeal diseases, parasitic and invasive bacterial infections as well as chronic conditions such as HIV, tuberculosis and malnutrition which increase the demand for both preventative and therapeutic antimicrobials (Williams PCM, Isaacs D, Berkley JA., 2018). Since 2006, the African Region has witnessed the increasing emergence of multidrug-resistant TB (MDR-TB) and extensively drug-resistant TB (XDRTB) which is a severe form of drug resistant TB (Ndihokubwayo JB et al, 2013). A study conducted in Lesotho in 2015 among 984/3441 (28.6%) persons who had data available for analysis showed that MDR-TB was present in 24/773 (3.1%) of new and 25/195 (12.8%) of retreatment TB cases (Maama-Maime LB, Mareka M, Ershova JV, et al, 2015). It was further concluded that 81/773 (10.5%) of the new TB patient isolates in Lesotho had *M. tuberculosis* isolates resistant to at least isoniazid or rifampin.

HIV Drug Resistance is a type of AMR and minimizing the emergence and transmission of drug-resistant HIV is a critical global response to AMR (WHO, 2019). The 2013 report on surveys conducted at sentinel clinics providing ART in several countries in the African Region estimated that HIV resistance to all drug classes was less than 5% and this is likely to increase as more patients are placed on treatment (Ndihokubwayo JB et al, 2013). Generally, NNRTI resistance have been greatest in eastern and southern Africa, where the prevalence of pre-treatment NNRTI resistance was found to be above 10% (WHO, Preventing and responding to HIV drug-resistance in the African Region: regional action plan 2019-2023., 2019). In response the WHO Global Action Plan on HIVDR (2017–2021) was developed to align with the WHO Global Action Plan on AMR as part of the global effort to address AMR.

Evidence from the 2018 study on HIV DR conducted in Lesotho has shown the overall prevalence of any ARV drug resistance of 17.6%, which was higher among women (19.0%) than men (14.7%). The youngest group, ages 18-24 years, had the highest drug resistance prevalence (24.1%) and the oldest group (>= 45) had lowest prevalence at 14% (ICAP, 2018). Despite unavailability of data on mortality rates attributable to AMR in Lesotho, comparative analysis of estimated deaths by 2050 due to AMR revealed 390,000 annual deaths in Europe, 4,730,000 in Asia, 22,000 in Oceania, 317,000 in North America and approximately 4,150,000 in the African region (UK Government , 2014). In the 2014 report on global economic impact of antimicrobial resistance prepared by KPMG LLP, mortality rates for resistance to TB treatment was 28.3% in the African region higher than in

America 15.9%, Eastern Mediterranean 20.1%, Europe 23.9%, South East Asia 25.4%, and Western Pacific 16.3%.

1.3 Policy and Strategic fit: Highlights on AMR and Sustainable Development Goals (SDGs) Agenda 2030

Availability of a healthy, educated, and skilled workforce has been emphasized in the 2018/23 National Strategic Development Plan (NSDP) II as key drivers in enhancing productivity and attracting private investment (Government of Lesotho, 2018). The development of NSDP II has taken in to consideration the 2030 Agenda on Sustainable Development Goals during its development. It is argued in the literature that achieving majority of Sustainable Development Goals (SDGs) is dependent on addressing antimicrobial resistance effectively. It is believed that with effective antimicrobials, maternal, neonatal and childhood deaths can be prevented and epidemics of communicable diseases, such as HIV gonorrhea and tuberculosis, can also be managed (D. Jasovsky et al, 2016).

1.3.1 Sustainable Development Goal # 3: Ensure healthy lives and promote wellbeing for all at all ages

The global statistics shows that about 214,000 neonatal sepsis deaths annually are directly attributable to drug-resistant pathogens and this severely impacts on plans to reduce neonatal mortality to less than 12 per 1,000 live births under SDG target 3.2[3] (Laxminarayan R, Matsoso P, Pant S, Brower C, Røttingen JA, Klugman K, et al 2016, 2016). It is further revealed that emerging resistance to treatments for communicable diseases such as HIV and tuberculosis (TB), will create significant obstacles for the achievement of SDG target 3.3[4].

1.3.2 Sustainable Development Goal # 6: Ensure availability and sustainable management of water and sanitation for all.

As antibiotic residues can be carried by water and through sediments and soil, gradients of different antibiotic concentrations will form, and even very low antibiotic concentrations may be enough to select for highly resistant bacteria. Lack of access to clean water and sanitation also facilitates the spread of bacterial diseases, leading to increased morbidity and mortality, especially in children.

Despite these implications of SDGs and targets on AMR, some of the findings conclude that; Generally, AMR remains a missing topic in the Sustainable Development Goals (Cars D and Jasovsky O, 2014). Complementary to the finding, the 2018 analytic support by McKinsey & Company has

[3] **Target 3.2 :** By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1000 live births and under-5 mortality to at least as low as 25 per 1000 live births.
[4] **Target 3.3:** By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases

shown that there was not any explicit mention of AMR in the SDG's beyond the preamble and not a single indicator is specific for tracking AMR. It is also mentioned that around 40% of indicators in the SDGs are only relevant for antimicrobial resistance. The report further recommends on the following actions to better anchor AMR within the SDGs; (1) Leveraging existing indicators and engaging with custodial agencies to anchor AMR in implementation (2) Leveraging on existing indicators and explicitly calling out AMR and (3) Adding new AMR-specific indicators to existing Monitoring and Evaluation Frameworks.

1.4 Organization of the plan

The plan has been organized into 5 interconnected chapters which provides summary of the rationale behind developing the plan (foundational basis), methodological approaches, strategic goals and objectives and how the interventions will be monitored.

Chapter I; Introduces the plan and provides a summary of the situation analysis looking at global, regional, country context and serves as a rationale for development of the plan.

Chapter II; Provides detailed processes for development of the plan and the main critical instruments employed during the process.

Chapter III; Presents the strategic model that defines the Strategic Objectives (SOs) and their underlying interventions. The interventions are further broken down (in a matrix form) into several key activities which have been assigned indicators for measuring the performance.

Chapter IV; Details the financial resource requirements for operationalizing the strategic interventions. The key activities under each strategic intervention have been costed and their respective costs were used as basis for estimating the total financial resource requirements for the strategy.

Chapter V; Elaborates process for Monitoring and Evaluation of the plan. The chapter categorizes the Key Performance Indicators required for effective monitoring

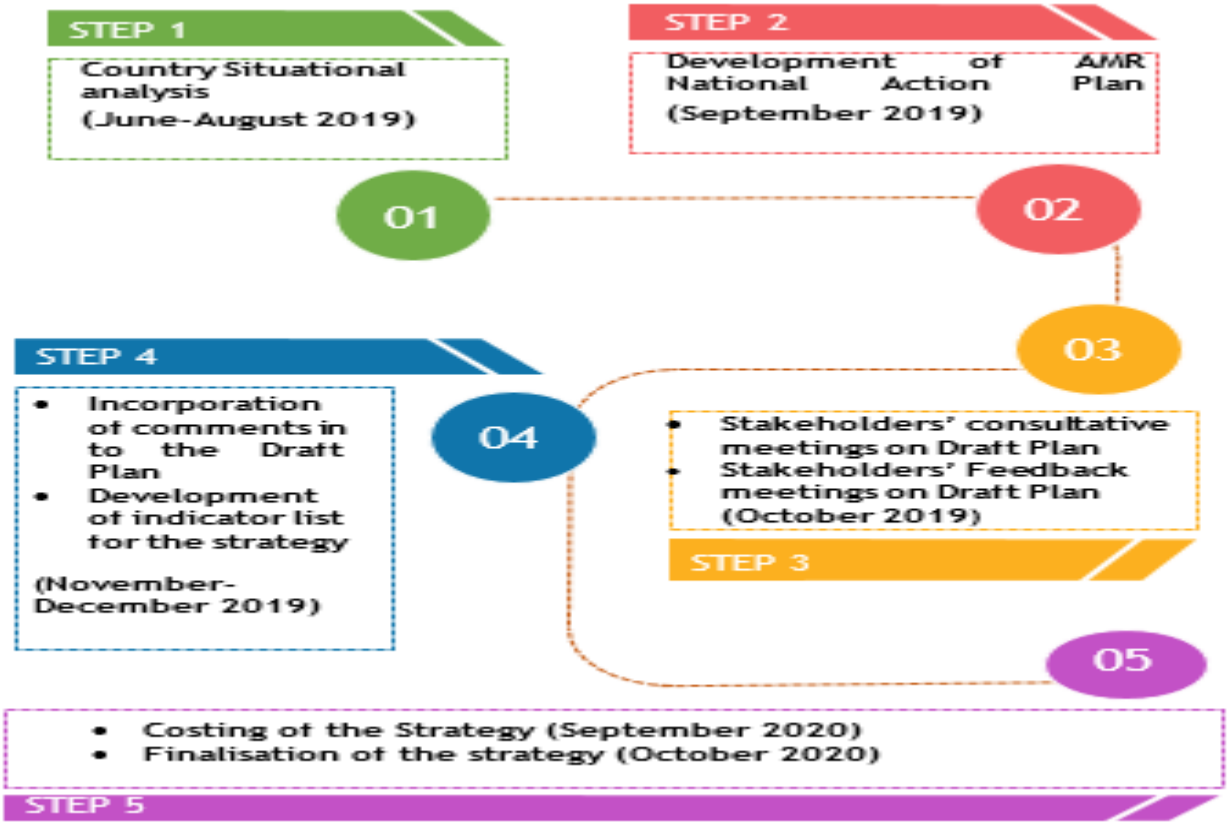
Annexure; Provides detailed information about other components of the plan which were not part of analysis, but serve as important point of reference.

CHAPTER II –DEVELOPING THE PLAN (PROCESSES AND METHODS)

2.1 The process

The development process started with the assessment of the country's status on AMR (situational analysis) conducted in June 2019, and was completed with costing of planned interventions in September 2020. The figure below details some steps that were key in the development of the costed plan.

Figure 5: Development process for Lesotho NAP



2.2 The Tripartite support

The development processes were supported technically and financially by World Health Organization (WHO), the Food and Agriculture Organization (FAO) and the World Organization for Animal Health (OIE). The Organizations have joined hands to form a tripartite and developed a harmonized approach to minimize the emergence and spread of AMR globally. The tripartite support aimed at building capacity of the country in the development of AMR action plan, promote ownership and provide technical guidance in the alignment of the plan with Global and Regional commitments on preventing the spread of AMR.

2.3 The methods

2.3.1 The instruments

Desk review of local data on the country's situation on AMR was conducted to inform the key strategic interventions in combating the spread of AMR in the country. Policy and strategic frameworks at global, regional, and at country level were employed and used as the main instruments to guide the development of the plan. The documents that were used include; WHA resolutions, the 2001 Global Strategy on AMR, Africa CDC Framework for AMR 2018-2023, Lesotho National Strategic Development Plan 2018/19-2022/23, The National Health Policy (NHP) 2011, and the National Health Strategic Plans (2019-2023), 2016 Antimicrobial Resistance Manual for developing National Action Plans, Water and Sewage Company (WASCO) Water Safety Plan 2017, Environment Act 2008.

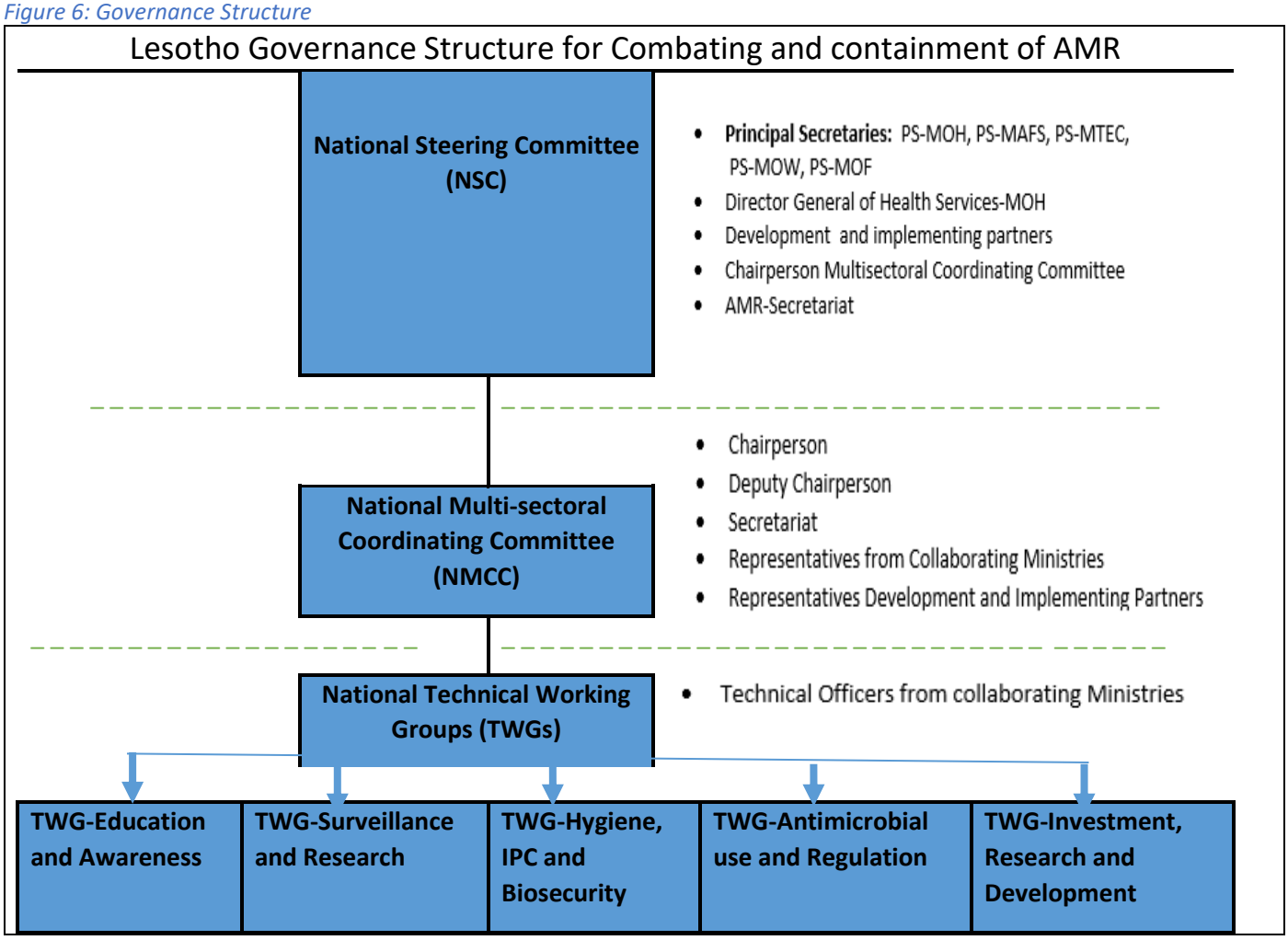
2.3.2 Interactive working sessions and stakeholders' feedback meetings

Support was solicited from WHO, FAO and OIE through facilitation of workshops on; situational analysis (5 days), development of zero draft plan (5 days), further refinement of the plan including consensus building meeting on elements of the plan (5 days), and costing of the plan (5) days. The recommendations from the stakeholders' consensus meetings, and other consultative meetings with managers in different sectors were therefore incorporated into the draft plan during the costing session. Further consultations with TWGs were conducted to ensure that recommended interventions were feasible and relevant to the collaborating sectors.

2.4 Governance

In line with 'One Health Approach' towards containment of AMR, Lesotho has formed a National Steering Committee-consisting of Principal Secretaries (PSs) from the collaborating ministries to provide a stewardship in the development and implementation of the country's National Action Plan. The committee also includes the development and implementing partners, Director General of Health Services, Chairperson of Multi Sectoral Coordination Committee and AMR Secretariat. The Ministries involved are; Ministry of Health (MOH), Ministry of Agriculture and Food Security (MAFS), Ministry of Water, and Ministry of Tourism Environment and Culture. A Multi-Sectoral National Coordinating Committee was also formed to serve as a link between the stewards and the implementing structures which are coordinated through established TWGs. The inter-ministerial collaboration is governed by Memorandum of Understanding (MOU) which commits the Principal Secretaries to collaborate in the prevention, control and monitoring of AMR in Lesotho. The figure below depicts the structures within which the AMR NAP will be governed;

Figure 6: Governance Structure



CHAPTER III – KEY STRATEGIC ELEMENTS

3.1 The Goal

The overarching goal of the plan is to contribute towards reduction of morbidity and mortality due to antimicrobial resistance in human and animal. The goal will be achieved through the 5 Strategic objectives outlined below. The plan further defines the Strategic Interventions (SIs) linked to each of the 5 objectives.

3.2 Strategic Objectives (SOs)

Strategic Objective 1: Improve awareness and understanding of antimicrobial resistance through effective communication, education and training.

Understanding of antimicrobial use, resistance prevention and containment can be achieved only through raising awareness, effective communication, coordination, collaboration, education and training. The key interventions outlined in details in the strategic planning matrix are as follows:

SI 1.1) Establish evidence based public communication programs targeting audiences in the human, animal health and plant production sectors

SI 1.2) Develop communication strategies, messages and materials to promote AMR awareness

SI 1.3) Develop and pilot a one Health AMR related curriculum and skills content.

Strategic Objective 2: To strengthen knowledge and evidence-base through surveillance and research

The plan has proposed the following strategic interventions in order to achieve the objective;

SI 2.1) Strengthen laboratories capacity to detect, and analyze AMR at all sectors

SI 2.2) Strengthen quality management systems to provide consistent diagnostic standards by National Reference Laboratories and other potential laboratories.

SI 2.3) Build One Health antimicrobial resistance surveillance system that integrates data sharing from human, water, environment and agricultural sectors

SI 2.4) Foster Multi-sectoral collaboration for research implementation in various aspects of Antimicrobial use and resistance in humans, animals and plants.

Strategic Objective 3: To reduce the incidence of infection through effective hygiene and IPC measures

In order to achieve the objective, the country has put forth the following strategic interventions which are summarized in matrix form in the next chapter. These are:

SI 3.1) Strengthen biosecurity measures on hatcheries, farms, aquaculture establishments, slaughter houses, and food processing establishments for pathogen risk reduction.

SI 3.2) Strengthen ports of entry control mechanisms to reduce trans-boundary of human, animal and plant disease occurrence transmission

SI 3.3) Accelerate vaccination campaigns to enhance prevention and control of diseases and infections in human and animal health

Strategic Objective 4: To optimize the use of antimicrobial medicines in human and animal health

Strategic interventions:

SI 4.1) Establish antimicrobial stewardship programs specific and sustainable

SI 4.2) Promote the use of Policies and Legal framework on antimicrobials for humans and animals.

SI 4.3) Optimize access and availability of quality antimicrobials and diagnostics for human, animal and plant use

SI 4.4) Promote optimal prescribing and dispensing in humans and animals

SI 4.5) Conduct post-marketing surveillance on antimicrobials

Strategic Objective 5: Increase R&D on new medicines, diagnostics, vaccines and other interventions related to priority pathogens

Strategic interventions:

SI 5.1) Strengthen the research base to generate reliable data for planning and sustainable financing on alternative medicines and alleviation of the AMR burden

3.3 Key activities

Using the logical framework approach outlined in Chapter V, the plan outlines the key activities connecting to each of the strategic interventions. The key activities will be implemented over a 5 year period and have been annualized for ease of monitoring the strategic interventions.

Key performance indicators at outcome level have been defined under each strategic intervention to enable Monitoring and Evaluation of the strategy. A detailed description of such indicators is provided in Chapter V.

3.4 Strategic planning matrices

The strategic planning matrix below follows the logical framework and provides a summary of Strategic Objectives, underlying interventions for each objective and the key activities to be performed for achieving each intervention.

Matrix 3.4.1: SO1-Improve awareness and understanding of antimicrobial resistance through effective communication, education and training.

Table 3: Strategic Planning Matrix- Strategic Objective 1

EDUCATION AND AWARENESS	**STRATEGIC INTERVENTIONS 1.1: Establish evidence based public communication programs targeting audiences in the human, animal health and plant production sectors**								
	KEY ACTIVITIES	EXPECTED OUTPUT	INDICATOR	RESPONSIBLE AGENCY	TIMELINES IN YEARS				
					YR1	YR2	YR3	YR4	YR5
	1.1.1 Undertake baseline study (KAP) on AMR awareness, in the general populace and professionals in relevant sectors (animal, human health, crops, and environment.)	Baseline study on AMR undertaken	Baseline study report	TWG-E&A	X				
	1.1.2 Develop and disseminate national communication strategy for AMR	Developed National Communication Strategy for AMR	Availability of National Communication Strategy for AMR	TWG-E&A	X	X			
	STRATEGIC INTERVENTIONS 1.2 Develop communication strategies, messages and materials to promote AMR awareness								
	1.2.1. Adopt IEC materials to the Lesotho context and language	IEC materials adopted	Number of IEC materials	TWG-E&A		X			
	1.2.1 Develop and disseminate IEC materials for diverse stakeholders in human, animal and environmental health sectors	IEC materials developed	Number of IEC materials disseminated	TWG-E&A		X			
	1.2.2. Conduct advocacy and sensitization meetings for parliamentarians, local government, chiefs at national, district and chiefdom levels non-governmental organizations, Civil Society Organizations	Advocacy and sensitization meeting conducted	Number of meetings conducted	TWG-E&A	X	X	X	X	X
	1.2.3. Conduct awareness campaigns amongst stakeholders, including during WAAW	Awareness campaigns amongst stakeholders conducted	Number of campaigns held	TWG-E&A	X	X	X	X	X
	1.2.4. Capacitate media on reporting on AMR and dissemination of key messages.	Media trainings and briefings held	Number of trainings conducted	TWG-E&A	X	X	X	X	X
	1.2.5. Commemorate Antimicrobial Awareness Week	WAAW Commemorated	Availability of WAAW report	TWG-E&A	X	X	X	X	X
	STRATEGIC INTERVENTIONS 1.3 Develop and pilot a One Health AMR related curriculum and skills content								

	1.3.1. Advocate for the integration of AMR and related topics in formal and informal education at all levels	AMR and related topics included in curriculum	Number of meetings held	TWG-E&A	X	X	X	X	X
	1.3.2. Engage professional registration bodies for inclusion of AMR CPE as pre-requisite for retention	CPE a pre-requisite for Retention	Number of Professional bodies engaged	TWG-E&A	X	X	X	X	X
	1.3.3 Conduct in-service training programs on AMR for professionals in the human health, veterinary, environmental and agricultural	In-services training conducted	Number of trainings conducted	TWG-E&A	X	X	X	X	X

Matrix 3.4.2: SO2-To strengthen knowledge and evidence-base through surveillance and research

Table 4: Strategic Planning Matrix-Strategic Objective 2

SURVEILLANCE AND RESEARCH	**STRATEGIC INTERVENTION 2.1: Strengthen laboratories capacity to detect, and analyse AMR at all sectors**								
	KEY ACTIVITIES	EXPECTED OUTPUT	INDICATOR	RESPONSIBLE AGENCY	TIMELINES IN YEARS				
					YR1	YR2	YR3	YR4	YR5
	2.1.1 Procure diagnostic equipment and supplies for antimicrobial determination	Diagnostic equipment and supplies procured	Availability of equipment and supplies	TWG-Surveillance & Research	X	X	X		
	2.1.2 Capacitate laboratory and pharmacy professionals on detection and analysis of AMR and reporting of antimicrobial medicines consumption &/ use patterns	Laboratory and pharmacy Professionals trained	Number of people trained		X	X	X	X	X
	STRATEGIC INTERVENTIONS 2.2: Strengthen quality management systems to provide consistent diagnostic standards by all laboratories.								
	2.2.1Develop collaboration mechanisms between the national and external laboratories on AMR diagnostics	Collaboration mechanisms developed		TWG-Surveillance & Research	X	X	X	X	X
	2.2.2Develop/adopt quality management system guidelines in all laboratories	Quality management guidelines developed	Availability of quality management guidelines		X	X	X	X	X
	2.2.3 Advocate for use of approved (WHO, OIE-FAO) SOPs for optimal detection of AMR	Availability of SOPs	Availability of SOPs		X	X	X	X	X
	KEY ACTIVITIES	EXPECTED OUTPUT	INDICATOR	RESPONSIBLE AGENCY	TIMELINES IN YEARS				
					YR1	YR2	YR3	YR4	YR5

	STRATEGIC INTERVENTIONS 2.3: Build One Health antimicrobial resistance surveillance system that integrates data sharing from human, water, environment and agricultural sectors								
	2.3.1 Establish multi-sectoral AMR surveillance reporting and information sharing system	Multi-sectoral AMR surveillance system established	Availability of Multi-sectoral AMR surveillance system	TWG-Surveillance & Research	X	X	X	X	X
	2.3.2 Advocate for incorporation of AMR issues into DHIS2	AMR issues incorporated in DHIS2	Availability of AMR indicators in DHIS2	TWG-Surveillance & Research	X	X	X	X	X
	2.3.3 Develop national guidelines for surveillance systems	Surveillance System Guideline developed	Availability of guidelines	TWG-Surveillance & Research		X	X		
	2.3.4 Develop reporting frameworks for AMR	Reporting frameworks developed	Availability of Reporting frameworks	TWG-Surveillance & Research	X	X	X	X	X
	2.3.5 Develop Mechanisms to participate in Global Antimicrobial Resistance (GLASS)	Mechanisms developed		TWG-Surveillance & Research	X	X	X	X	X
	2.3.6 Develop and adopt standards for antibiotic residues in waste generated from farms, factories, human health care, veterinary care	Standards adopted and developed	Availability of standards	TWG-Surveillance & Research				X	
	Strategic Intervention 2.4 Promote Multi-sectoral collaboration for research implementation in various aspects of Antimicrobial use and resistance in humans, animals and plants								
	2.4.1 Develop AMR research agenda for incorporation into research agendas of all relevant sectors (humans, water, environment and agriculture)	AMR agenda incorporated into sectoral Research agenda	Availability of AMR in sectoral Research agenda	TWG-Surveillance & Research				X	
	2.4.2 Advocate for academic institutional research on AMR	AMR research topics incorporated in academia	Number of academic research studies conducted	TWG-Surveillance & Research				X	X
	2.4.3 Capacitate practitioners (professionals) on basic and operational research in antimicrobial use and resistance	Capacity building conducted	Number of people trained	TWG-Surveillance & Research				X	X
	2.4.4 Establish platform (conference or symposium) for regular information sharing on antimicrobial resistance research.	Information sharing platform established	Number of dissemination for a held	TWG-Surveillance & Research				X	X

Matrix 3.4.3: SO3- To reduce the incidence of infection through effective hygiene and IPC measures

Table 5: Strategic Planning matrix-Strategic Objective 3

STRATEGIC INTERVENTION 3.1 Strengthen biosecurity measures on hatcheries, farms, aquaculture establishments, slaughter houses, and food processing establishments for pathogen risk reduction									
IPC, HYGIENE, SANITATION AND BIOSECURITY	KEY ACTIVITIES	EXPECTED OUTPUT	INDICATOR	RESPONSIBLE AGENCY	TIMELINES IN YEARS				
					YR1	YR2	YR3	YR4	YR5
	3.1.1 Conduct situation analysis of sanitary and phytosanitary measure and biosecurity	Situation analysis conducted	Availability of Situation analysis report	TWG - IPC	X	X			
	3.1.2 Develop guidelines and protocols for biosecurity measures for pathogen risk reduction	Guidelines and protocols for biosecurity measures developed	Availability of guidelines and protocols for biosecurity measures	TWG - IPC	X	X	X		
	3.1.3 Capacitate Famers on biosecurity measures for pathogen risk reduction	Famers capacitated	Number of famers trained	TWG - IPC	X	X	X	X	X
	STRATEGIC INTERVENTION 3.2 : Strengthen ports of entry control mechanisms to reduce trans-boundary of human, animal and plant disease occurrence transmission								
	3.2.1 Develop integrated Protocols, guidelines and reporting framework on animal trans-boundary animal/plant disease occurrence transmission	Integrated tool developed	Availability of integrated protocols	TWG - IPC	X	X			
	3.2.2 Advocate for recruitment of border control officers at all designated ports of entries	Border control officers recruited	Number of border control officers	TWG - IPC	X	X	X	X	X
	3.2.3 Strengthen border patrols	Border patrols officers deployed		TWG - IPC	X	X	X	X	X
	STRATEGIC INTERVENTION 3.3 Accelerate Vaccination Campaigns to enhance prevention and control of diseases and infections in human and animal health								
	3.3.1 Review vaccination programs in animal and human health	Vaccination programs reviewed	Availability of reviewed programs	TWG - IPC	X				
	3.3.2. Intensify sensitization of people on the use of preventive medication (Vaccines).	Sensitization Meetings Held	Number of meetings held	TWG - IPC	X	X	X	X	X

	KEY ACTIVITIES	EXPECTED OUTPUT	INDICATOR	RESPONSIBLE AGENCY	TIMELINES IN YEARS				
					YR1	YR2	YR3	YR4	YR5
IPC, HYGIENE, SANITATION AND BIOSECURITY	3.3.3 Capacitate Professionals on prevention and control of diseases in human and animal	Professionals capacitated	Percentage of professionals capacitated	TWG - IPC	X	X	X	X	X
	3.3.4 Conduct Vaccination Campaign for various health threats	Vaccination campaigns conducted	Percentage of animals and people vaccinated	TWG - IPC	X	X	X	X	X
	STRATEGIC INTERVENTION 3.4 Protect health and environment against AMR								
	3.4.1 Develop legal framework (in line with One-Health Approach)	Legal framework developed	Availability of legal framework	TWG - IPC	X	X			
	3.4.2 Promote Open Defecation Free (ODF) communities	ODF initiative implemented	Number of communities with ODF	TWG - IPC	X	X	X	X	X
	STRATEGIC INTERVENTION 3.5 Develop waste management strategy								
	3.5.1 Establish sewage Pre-Treatment Facilities at hospital level	Sewage Pre-Treatment Facilities established	Availability of sewage Pre-Treatment Facilities	TWG - IPC	X	X	X		
	3.5.2 Develop protocols and guidelines on Pre-Treatment Facilities	Pre-Treatment Facilities developed	Availability of Guidelines	TWG - IPC	X	X	X		
	3.5.3 Establish sewage Pre-Treatment Facilities at hospital level	Sewage Pre-Treatment Facilities established	Percentage of hospitals with Pre-Treatment Facilities	TWG - IPC	X	X	X		
	3.5.4 Develop protocols and guidelines on Pre-Treatment Facilities	Pre-Treatment Facilities developed	Availability of Pre-Treatment Facilities	TWG - IPC	X	X	X	X	X

Matrix 3.4.4: SO 4 -To optimize the use of antimicrobial medicines in human and animal health

Table 6: Strategic Planning matrix-Strategic Objective 4

STRATEGIC INTERVENTIONS 4.1: Establish antimicrobial stewardship programs specific and sustainable									
ANTIMICROBIAL USE AND REGULATION	KEY ACTIVITIES	EXPECTED OUTPUT	INDICATOR	RESPONSIBLE AGENCY	TIMELINES IN YEARS				
					YR1	YR2	YR3	YR4	YR5
	4.1.1. Review the EML &STGs based on antimicrobial resistance data and incorporate AWaRe classification of antibiotics	Reviewed STGs and EML	Availability of updated STGs and EMLs	MOH	X	X			
	4.1.2 Formulate regulations and guidelines for use of veterinary medicine	Regulations and Guidelines developed	Availability of Regulations and Guidelines for Veterinary Medicine	MAFS	X				
	4.1.3 Review existing policy drafts (animal and human health) to include AMR issues	Reviewed policies	Number of policies that incorporate AMR	MOH,MAFS		X	X		
	4.1.4 Resuscitate Therapeutics Committees at National and health facility levels with TORs that incorporate AMR Stewardship activities	Therapeutic committees resuscitated	Percentage of health facilities with functional therapeutic committees	MOH	X				
	4.1.5 Develop and disseminate AMR stewardship guidelines	AMR guidelines developed	Percentage of health facilities with AMR guidelines	MOH	X			X	X
	4.1.6 Establish the one health regulatory Authorities	Regulatory Authority established	Availability of functional one health Regulatory Authority	MOH,MAFS,MTEC,MODP			X		
	4.1.7 Establish pharmaceutical quality control laboratory	Pharmacovigilance guidelines developed	Percentage of health facilities with pharmacovigilance guidelines	MOH	X				
	4.1.8 Develop and Disseminate Pharmacovigilance Guidelines	Pharmacovigilance Guidelines developed and disseminated	Availability of pharmacovigilance guidelines	MOH				X	
	4.1.9 Strengthen AMR Coordination at district level			MOH	X	X	X	X	X

STRATEGIC INTERVENTIONS 4.2 Establish antimicrobial stewardship programs specific and sustainable									
ANTIMICROBIAL USE AND REGULATION	KEY ACTIVITIES	EXPECTED OUTPUT	INDICATOR	RESPONSIBLE AGENCY	TIMELINES IN YEARS				
					YR1	YR2	YR3	YR4	YR5
	4.2.1.1 Advocate for Enactment of the Medicine and Medical device Control Bill	Advocacy for Medicine and Medical device control bill conducted	Availability of Medicines and Medical Device Control Act	MOH	X				
	4.2.1.2 Advocate for enactment of Animal Production, Health and welfare draft bill	Advocacy for Animal Production, health and welfare draft bill conducted	Availability of Animal Production, Health and Welfare Act	MAFS	X				
	Strategic intervention 4.3: Promote the use of Policies and Legal framework on antimicrobials for humans and animals								
	4.3.1 Capacitate healthcare personnel on use of EML and STGs (antimicrobials).	Healthcare personnel *trained on STGs (antimicrobials).*	Percentage of facilities with at least one personnel trained on use of STGs	MOH		X			
	4.3.2 Capacitate Agriculture personnel on use of Animal treatment guidelines.	Agriculture personnel trained on Animal treatment guidelines	Percentage of Agricultural resource centers trained on Animal treatment guidelines	MAFS		X			
	Strategic intervention 4.4: Optimize Access and Availability of quality antimicrobials and diagnostics for human, animal and plant use								
	4.4.1 Revive Veterinary Drug committee	Veterinary Drug Committee revived	Availability of functional Veterinary Drug Committee	MAFS	X			X	X
	4.4.2 Resuscitate Therapeutics Committees at National and health facility levels with TORs	Therapeutics Committees resuscitated	Percentage of health facilities with active Therapeutics Committees	MOH	X				
	Strategic Intervention 4.5: Promote optimal prescribing and dispensing in humans and animals								
	4.5.1. Capacitate Health Personnel on Rational prescribing and dispensing of antimicrobials	Health Personnel capacitated on rational prescribing and dispensing	Percentage of facilities prescribing antimicrobials with at least 80% compliance with the Guidelines	MOH		X			
	Strategic Intervention: 4.6 Conduct post-marketing surveillance on antimicrobials								
	4.6.1 Establish Pharmacovigilance committees (PVCs) at District level.	District Pharmacovigilance committees Established	Percentage of Districts with functional Pharmacovigilance committees	MOH	X				
	4.6.2 Review Pharmacovigilance tools	Pharmacovigilance tools reviewed	Availability of Pharmacovigilance tools	MOH	X	X	X	X	X

Matrix 3.4.5: SO5: To develop the economic case for sustainable investment that takes account of the national needs and increase investment in new medicines, diagnostic tools, vaccines and other interventions

Table 7: Strategic Planning matrix-Strategic Objective 5

STRATEGIC INTERVENTIONS 5.1: Strengthen the research base to generate reliable data for planning and sustainable financing, on alternative medicines and alleviation of the AMR burden									
	KEY ACTIVITIES	EXPECTED OUTPUT	INDICATOR	RESPONSIBLE AGENCY	TIMELINES IN YEARS				
					YR1	YR2	YR3	YR4	YR5
INVESTMENT AND RESAERCH	5.1.1 Advocate for Multi-sectoral collaboration for research on alternative medicines in various aspects of Antimicrobial use and resistance in humans, animals and plants		Number of academic institutions conducting research	TWG-Research and Investment	X				
	5.1.2 Mobilize resources required for research on alternative medicines and for the implementation of the AMR NAPs	Proposals for funding developed	Number of funding proposals developed	TWG-Research and Investment	X	X	X	X	X
	5.1.3 Undertake expenditure tracking analysis in human and animal acquired infections	Expenditure tracking analysis conducted	Availability of Expenditure tracking report	TWG-Research and Investment	X		X		X
	5.1.4 Conduct Out-of-Pocket Expenditure (OOP) on AMU in relation to animal, plant, environment and human health	OOP study conducted	Availability of survey report	TWG-Research and Investment	X		X		X

CHAPTER IV –FINANCIAL RESOURCE REQUIREMENTS

This chapter describes in detail the level of resource requirements for implementation period. It outlines the methodology used in costing the strategy, and the estimates of financial resource requirements for the duration of the strategy. The costs have been determined for each of the 5 key strategies outlined in chapter III.

4.1 Costing approach

The aim of this costing is to provide a broad framework on resource requirements as a means of informing donor and government allocations in support of its implementation. The proposed activities and their underlying sub-activities formed a basis for costing each of the strategic objectives. In obtaining cost estimates for subsequent years, a 6% increase in prices year-on-year basis was assumed. These estimates include costs of developing or updating relevant policies and strategies; developing relevant norms, standards, guidelines and tools.

A desk review of relevant documents such as strategic plans and operational plans from different Ministries were reviewed to gather information of the unit costs of cost drivers identified under each strategic objectives and their underlying interventions. The consolidated costing was reviewed iteratively by TWGs, managers from different ministries who provided technical inputs.

4.1.1 NAP-AMR Costing Process

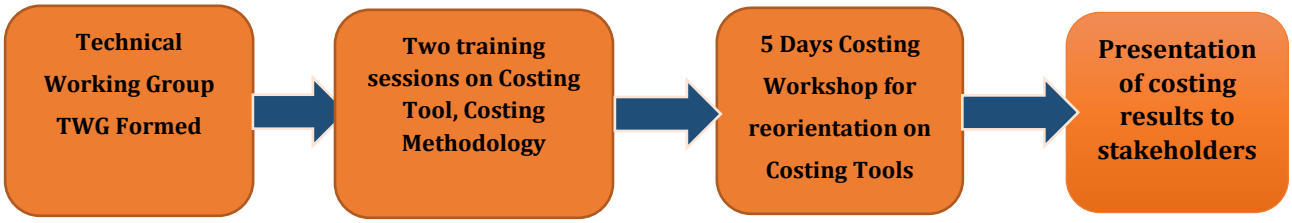


Figure 7: Costing process

4.1.2 Costing Assumptions

- ✓ The US$ rate to local currency of US$1 to LSL16.00
- ✓ An annual inflation rate of 6% for determining cost estimates in the subsequent years

4.1.3 Limitations to the costing approach

- ✓ The costs estimates have not been disaggregated by the levels of implementation such as district and national so as to estimate the financial resource requirements at implementation and policy making level.

- ✓ There was no standard price list used by Government to guide unit costs under budget categories such as office equipment, stationery and meeting packages; therefore other cost emanates from existing costed strategic plans at National and Ministerial level.
- ✓ The costing did not have information on the available resources, hence funding gap could be easily determined.

4.1.4 Estimating resource requirements: Activity Based Costing (ABC) approach

The National Action Plan on Antimicrobial Resistance (NAP-AMR) was costed using Activity Based Costing (ABC) approach. This costing approach is defined as costing and monitoring of activities which involves tracing resource consumption and costing final outputs. Resources are therefore assigned to activities, and activities to cost objects based on consumption estimates (CIMA, 2008). The ABC uses a bottom-up, input-based approach, indicating the cost of all inputs required to achieve the targets for NAP on AMR during the financial years 2020/21 – 2024/25.

The cost over time for all the respective inputs were aggregated into overall costs for individual key activities, strategic interventions and finally aggregated into the Strategic Objectives (SOs) in line with the logical framework used in Chapter III. The estimated resources required for achieving each of the SOs in chapter III provides important details that will initiate debate between GOL and partners on priority setting and effective resource allocation.

4.2 Costing results

A detailed analysis of budget requirement was conducted and the data being disaggregated by SOs and their respective interventions over a 5 year period. The table below provides the summary of cost estimates by SOs.

Table 8: Estimated budget requirements by Strategic Objectives

Strategic Objectives	Year 1	Year 2	Year 3	Year 4	Year 5	Grand Total
SO(1): Improve awareness and understanding of antimicrobial resistance through effective communication, education and training	3,657,850	1,506,088	1,307,106	1,068,328	1,134,714	8,674,087
SO (2): To strengthen knowledge and evidence-base through surveillance and research	16,331,800	15,998,641	16,516,199	16,674,224	12,624,769	78,145,633
SO (3): To reduce the incidence of infection through effective hygiene and IPC measures	92,528,830	1,684,022	2,934,281	1,279,508	3,171,027	101,597,668
SO(4): To optimize the use of antimicrobial medicines in human and animal health	43,728,400	9,925,492	3,707,973	8,120,597	14,275,859	79,758,321
SO (5): To develop the economic case for sustainable investment and increase investment in new medicines, diagnostic tools, vaccines and other interventions	581,200	448,288	899,226	591,640	157,559	2,677,913
Grand total	**156,828,080**	**29,562,531**	**25,364,786**	**27,734,298**	**31,363,927**	**270,853,622**

The Government of Lesotho requires LSL **270,853,622** Million (US$16,928,351) over a 5-year period in order to implement the strategy and hence achieve the intended targets. The SO3 that addresses issues on hygiene and IPC requires a larger share of the budgets accounting for (38%) of the total proposed budget. The main cost drivers for interventions under SO3 include; Promotion of Open Defecation Free (ODF) communities; Promoting free access to water targeting communities in 10 districts as shown by figure 4 below.

Generally, a bigger proportion of the budget is required during the 1st year of implementation and this is due to initiation of new activities directly related to AMR, review of legal frameworks and implementation of newly proposed projects under SO3 (hygiene and IPC). Figures 3, 4 and table 9 below provides more details of the analysis.

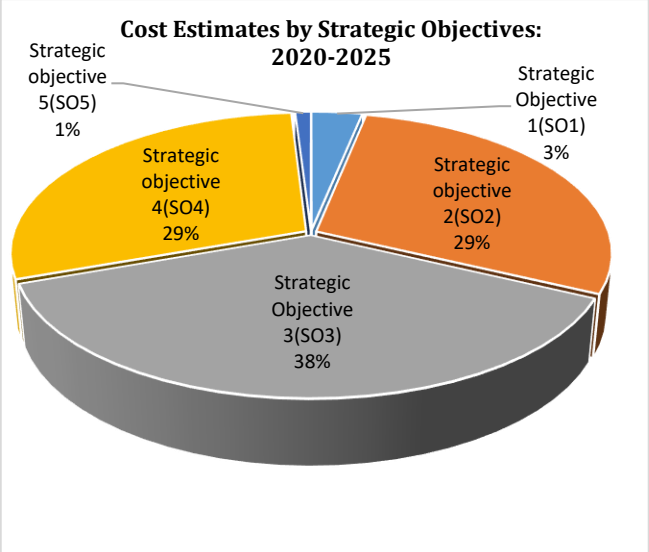


Figure 8: Distribution of cost estimates by strategic interventions

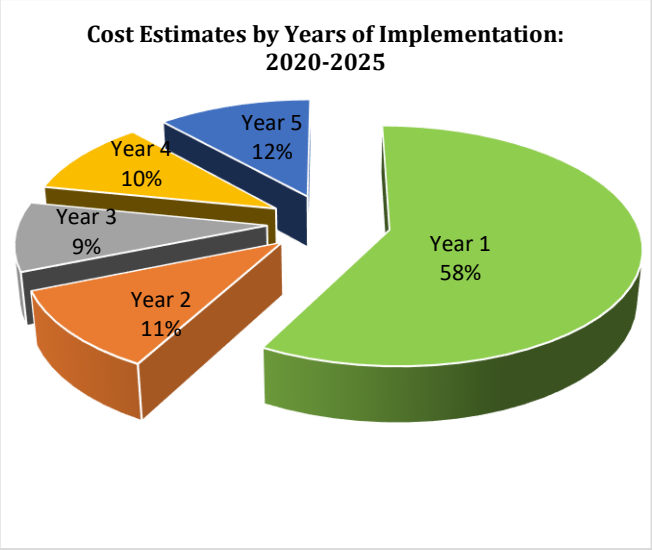


Figure 9: Distribution of cost estimates by years of implementation

Table 1: Distribution of cost estimates by thematic areas

Total Cost of Lesotho NAP-AMR 2020 -2025 by Program Areas LSL(Millions)						
Thematic Areas	**2020/21 FY**	**2021/22 FY**	**2022/23 FY**	**2023/24 FY**	**2024/25 FY**	**Total**
EDUCATION AND AWERENES	3,657,850	1,506,088	1,307,106	1,068,328	1,134,714	8,674,087
SURVELLIANCE AND RESEARCH	16,331,800	15,998,641	16,516,199	16,674,224	12,624,769	78,145,633
HYGIENE AND IPC	92,528,830	1,684,022	2,934,281	1,279,508	3,171,027	101,597,668
AM USE IN ANIMAL AND HUMAN HEALTH	43,728,400	9,925,492	3,707,973	8,120,597	14,275,859	79,758,321
RESEARCH AND INVESTMENT	581,200	448,288	899,226	591,640	157,559	2,677,913
Grand Total	**156,828,080**	**29,562,531**	**25,364,786**	**27,734,298**	**31,363,927**	**270,853,622**

4.2.1 Projected Budget requirements by Strategic Interventions

4.2.1.1 Strategic Interventions 1.1-1.3; Education and Awareness

As reflected in the strategic planning matrix in the previous chapter, 3 strategic interventions have been proposed under Education and Awareness thematic area. These were therefore costed in line with methodology outlined in 4.1.4 above. The table below provides the cost estimates;

Table 2: Estimated budget requirements by strategic interventions-Education and Awareness

Total estimated Budget: 2020 -2025 LSL(Millions)							
Interventions	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Grand Total**	% of Total Cost
SI(1.1):Establish evidence based public communication programs targeting audiences in the human, animal health and Plant Health sectors	2,687,700	0	0	0	0	2,687,700	**31.0%**
SI (1.2) :Develop communication Strategies, messages and materials to promote AMR awareness	516,450	362,000	140,450	148,877	157,810	1,325,587	**15.3%**
SI(1.3): Develop and pilot a "One Health" AMR related Curriculum and Skills content	453,700	1,144,088	1,166,656	919,451	976,905	4,660,800	**53.7%**
Total	**3,657,850**	**1,506,088**	**1,307,106**	**1,068,328**	**1,134,715**	**8,674,087**	

Of the total budget proposed under education and awareness, nearly 53.7% of the estimated budget under Education and awareness is proposed for development and piloting of "One Health" AMR related curriculum as one of the priority strategic interventions. The underlying costed key activities include under this intervention are as follows; integration of AMR and related topics in formal and informal education at all levels; Engagement of professional registration bodies for inclusion of AMR Continuing Professional Education (CPE) as pre-requisite for retention; and implementation of in-service training programs on AMR for professionals in the human health, veterinary, environmental and agricultural.

4.2.1.2 Strategic Interventions 2.1-2.4; Surveillance and Research

There are 4 Strategic Interventions proposed under surveillance and research thematic area. Strategic Interventions (2.3) on establishment of One Health antimicrobial resistance surveillance system that integrates data sharing from human, water, environment and agricultural sectors has been costed in the first year only, requiring around M 754,000. These costs include procurement of equipment such as computers and technical assistance for incorporation of AMR data elements in to the DHIS2 platform.

Table 11: Estimated budget requirements by strategic interventions-Surveillance and Research

Total estimated Budget: 2020 -2025 LSL(Millions)							
Interventions	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Grand Total**	% of Total Cost
SI(2.1 & 2.2): Strengthen laboratories capacity to detect, and analyze AMR at all sectors; Strengthen quality management systems to provide consistent diagnostic standards by all laboratories	10,991,800	11,352,641	12,021,799	11,910,160	12,624,769	**58,901,169**	**75%**
SI(2.3): Build One Health antimicrobial resistance surveillance system that integrates data sharing from human, water, environment and agricultural sectors	754,000	0	0	0	0	**754,000**	**1%**
SI (2.4): Promote Multi-sectoral collaboration for research implementation in various aspects of Antimicrobial use and resistance in humans, animals and plants	4,586,000	4,646,000	4,494,400	4,764,064	0	**18,490,464**	**24%**
Total	**16,331,800**	**15,998,641**	**16,516,199**	**16,674,224**	**12,624,769**	**78,145,633**	

SI 2.1 and 2.2 were aimed at improving the use of diagnostic investigations to guide better management of diseases. The interventions constituted a higher proportion (75%) of the total estimated budget for all activities under surveillance and research.

4.2.1.3 Strategic Interventions 3.1-3.5 Hygiene and IPC

Table 3: Estimated budget requirements by strategic interventions-Hygiene and IPC

Total estimated Budget: 2020 -2025 LSL(Millions)							% of Total Cost
Interventions	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Grand Total**	
SI(3.1): Strengthen biosecurity measures on hatcheries, farms, aquaculture establishments, slaughter houses, and food processing establishments etc., for pathogen risk reduction	1,673,200	651,900	2,418,212	732,475	2,335,519	7,811,306	**7.7%**
SI(3.2): Strengthen ports of entry control mechanisms to reduce trans-boundary of human, animal and plant disease occurrence transmission	207,750	589,784	47,191	50,023	53,024	947,772	**0.9%**
SI(3.3):Accelerate Vaccination Campaigns to enhance prevention and control of diseases and infections in human and animal health	202,500	214,650	227,529	241,181	255,652	1,141,511	**1.1%**
SI(3.4):Protect health and environment against AMR	90,230,580	0	0	0	255,652	90,486,232	**89.1 %**
SI(3.5):Conduct monitoring and supervision of the IPC initiatives	214,800	227,688	241,349	255,830	271,180	1,210,848	**1.2%**
Total	**92,528,830**	**1,684,022**	**2,934,281**	**1,279,509**	**3,171,027**	**101,597,669**	

The table above shows the estimated cost for each Strategic Intervention under Hygiene, Infection Prevention and Control. SI 3.4 aiming at protecting health and environment against AMR accounts for nearly 89% of the total estimated budget for Hygiene and IPC, with most of its financial resources needed in the first and final years of implementation.

4.2.1.4 Strategic Interventions 4.1-4.5; Antimicrobial use in Animal and Human Health

Table 4: Estimated budget requirements by strategic interventions-Antimicrobial use

Total estimated Budget: 2020 -2025 LSL(Millions)							% of Total Cost
Interventions	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Grand Total**	
SI(4.1):.Establish antimicrobial stewardship programs specific and sustainable	13,354,300	5,091,600	2,426,976	5,986,627	10,193,389	**37,052,892**	**46.5%**
SI(4.2): Promote the use of Policies and Legal framework on antimicrobials for humans and animals	1,333,600	2,930,972	578,997	595,877	2,494,212	**7,933,658**	**9.9%**
SI(4.3): Optimize Access and Availability of quality antimicrobials and diagnostics for human, animal and plant use	27,503,100	5,800			0	**27,508,900**	**34.5%**
SI (4.4): Promote optimal prescribing and dispensing in humans and animals	702,000	1,195,120	0	836,093	886,258	**3,619,471**	**4.5%**
SI(4.5): Strengthen post-marketing surveillance on antimicrobials	835,400	702,000	702,000	702,000	702,000	**3,643,400**	**4.6%**
Total	**43,728,400**	**9,925,492**	**3,707,973**	**8,120,597**	**14,275,859**	**79,758,321**	

The table above shows the estimated costs for SI 4.1-SI 4.5 under AM Use in Animal and Human Health (Strategic Objective 4). Close to half of the estimated budget (47%) under this strategic objective is proposed to support establishment of antimicrobial stewardship programs. Similar to other strategic objectives, a larger portion of the proposed budget will be required in the 1st year on implementation.

4.2.1.5 Strategic Intervention 5.1; Research and Investment

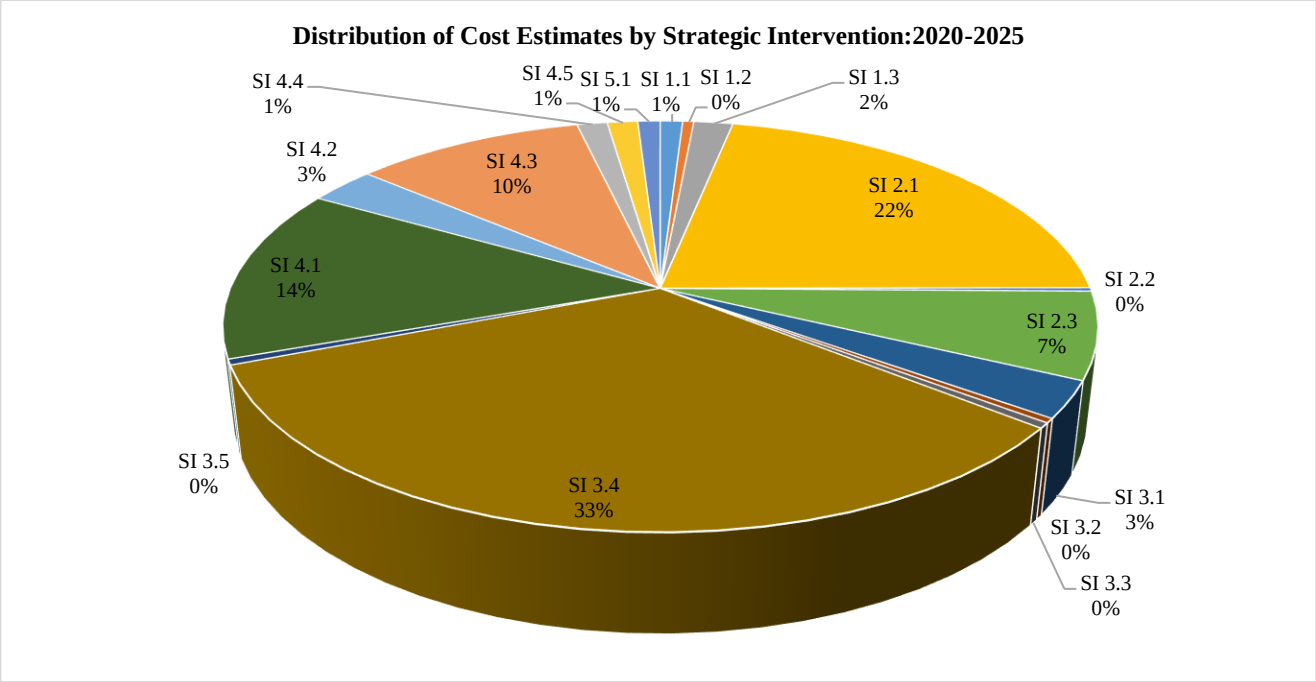
Table 5: Estimated budget requirements by strategic interventions-Research and Investment

Interventions	Total estimated budget: 2020 -2025 LSL (Millions)					
	Year 1	Year 2	Year 3	Year 4	Year 5	Grand Total
SI(5.1):Strengthen the research base to generate reliable data for planning and sustainable financing on alternative medicines and alleviation of the AMR burden	**581,200**	**448,288**	**899,226**	**591,640**	**157,559**	**2,677,913**

Only one (1) strategic intervention has been proposed and hence costed under research and investment as shown in strategic planning matrix in chapter 3 and table 14 above. The total estimated budget for the duration of the plan is approximately M 2.67 million. The costed key activities include; Expenditure tracking analysis exercise in human and animal acquired infections and conducting Out-of-Pocket Expenditure study on antimicrobial medicines.

4.2.1.6 Distribution of Cost Estimates by Strategic Interventions-A summary

Figure 10: Percent distribution of cost estimates by strategic interventions



The figure above shows the percent distribution of the estimated cost by each strategic interventions in percentages. SI 3.4 under hygiene and IPC constitutes a larger proportion of the estimated budget (33%) in comparison with other strategic interventions across all the objectives or thematic areas. SI 2.1 (under Surveillance and Research) aimed at improving appropriate use of

diagnostic investigations to identify pathogens is the second highest accounting for about one fifth of the overall cost of implementing the action plan.

4.2.1.7 Budget requirements by Implementing Agency

As indicated in the methodology in chapter 2, preventing emergence and spread of AMR requires a multi sectorial response. As a result, the cost estimates were further disaggregated by the responsible agencies for implementing the interventions outlined in chapter 3.

Table 6: Estimated budget requirements by implementing agencies

Agency	Total estimated budget Implementing Agency: 2020 -2025 LSL (Millions)						% of Total Cost
	Year 1	Year 2	Year 3	Year 4	Year 5	Grand Total	
MOH	62,921,050	27,037,985	22,144,751	26,287,571	27,237,333	165,628,690	61.2%
MAFS	3,788,950	2,432,546	3,092,034	1,446,726	4,126,595	14,886,852	5.5%
NUL	90,000	92,000	0	0	0	182,000	0.1%
MOWA	90,028,080	0	0	0	0	90,028,080	33.2%
LMDPC	0	0	128,000	0	0	128,000	0.0%
Grand Total	**156,828,080**	**29,562,531**	**25,364,786**	**27,734,298**	**31,363,927**	**270,853,622**	

As shown in the table above, a larger share of the budget (nearly 61%) is proposed to support activities under Ministry of Health (MoH) and 33% is proposed to support activities in the Ministry of Water Affairs (MOWA). Ministry of Agriculture and Food Security will need 5.5% of the estimated budget for implementation of the proposed interventions and their underlying activities.

4.2.1.8 Budget requirements by Cost Categories

Table 7: Estimated budget requirements by cost categories

Cost category	Year 1	Year 2	Year 3	Year 4	Year 5	Grand Total	% of total Cost
Infrastructure and Other Equipment	127,115,680	10,600,000	11,236,000	11,910,160	12,624,769	173,486,609	64.1%
Training and Capacity Building	7,647,450	7,786,185	6,215,496	7,147,680	1,665,387	30,462,197	11.2%
Technical assistance	5,474,750	4,150,642	5,891,899	4,159,374	5,860,105	25,536,770	9.4%
Planning and Administration (meetings)	10,458,800	1,738,900	246,325	1,230,184	7,809,173	21,483,383	7.9%
Monitoring & Evaluation	3,696,000	2,822,280	1,398,750	3,066,085	3,170,430	14,153,546	5.2%
Other Cost	2,100,000	2,268,000	168,000	0	0	4,536,000	1.7%
Communication Material and Campaigns	335,400	196,524	208,315	220,815	234,063	1,195,117	0.4%
Grand Total	**156,828,080**	**29,562,531**	**25,364,786**	**27,734,298**	**31,363,927**	**270,853,622**	

CHAPTER V – MONITORING AND EVALUATION FRAMEWORK

5.1 Introduction

This chapter introduces mechanisms for Monitoring and Evaluation of the National Action Plan and provides an indicator framework to monitor the Plan. The indicator framework provides a list of indicators at output, outcome and Impact level selected by the stakeholders to track progress towards implementation of Strategic Objectives, Strategic interventions, key activities and underlying sub activities.

The Impact level indicators will measure progress towards fulfilment of Strategic Objectives (SOs); Outcome level indicators will track progress towards achieving the Strategic Interventions (SIs) while the key activities and their underlying sub-activities will be tracked using output indicators.

5.1.1 AMR indicators and Sustainable Development Goals (Global context)

The UN Political Declaration of the High-Level Meeting of the General Assembly on antimicrobial resistance further concluded that antimicrobial resistance challenges the sustainability and effectiveness of the public health response towards health and development and the attainment of the 2030 Agenda; Yet the Sustainable Development Goals (SDGs) do not have a single indicator specific to antimicrobial resistance. In the 2018 McKinsey & Company analysis of AMR Indicators and their relevance to the SDGs and targets, it is further revealed that;

- ✓ The SDG indicator framework is not specific, but sensitive and highly relevant to AMR.
- ✓ The SDG framework is very relevant to AMR GAP and nearly 70% of SDGs include indicators relevant to the GAP (covering on average 75% of GAP objectives).
- ✓ SDGs Indicators relating to human health in the GAP are nearly 2-3 times more common than those relating to animal health, plant health or the environment.

5.2 Methodology

The M&E framework was developed with a One Health perspective due to the multi-sectorial nature of the National Action Plan. The Monitoring and Evaluation of Lesotho National Action Plan follows the logical framework adopted from 2017 WHO framework on Monitoring and Evaluation of National Action Plans on AMR. The framework reflects on the causal pathways connecting the plan's inputs, activities and outputs with the desired outcomes and impact goals.

5.2.1 Selection of indicators

Five (5) multi-disciplinary teams were formed according to the thematic areas outlined in the implementation framework (Education and Awareness; Surveillance and Research; Hygiene Sanitation and Biosecurity; Antimicrobial use and Regulation; Investment, Research and

Development). Each team was provided with a set of tools to facilitate development of newly proposed indicators and adoption of already existing indicators from the regional and global Monitoring and Evaluations Frameworks on AMR. The tools include; 2017 WHO framework on Monitoring and Evaluation of National Action Plans on AMR; 2019 WHO, FAO and OIE Monitoring and Evaluation of the global action plan on antimicrobial resistance; 2018-23 Africa CDC Framework for AMR; 2018 Report on AMR indicators and Sustainable Development Goals. The implementation framework for the current National Action Plan was further used as the primary guide for development and selection of output, outcome and impact indicators in line with Strategic planning matrix in chapter 3. The selection process was also based on the criterion outlined in the 2019 M&E Framework for the GAP, where following are the factors that were considered; (1) Indicator relevance to the Strategic Objectives, Strategic Interventions and key activities (2) Availability of data for reporting at midterm and end term, (3) Feasibility of data collection and (4) Sensitivity of indicators to change at midterm and end term.

In order to check on indicator relevance and availability of data for future reporting, Indicator-Objective Mapping tool was developed and used to guide the process in each thematic area. The developed Indicator-Objective mapping tool was used to facilitate categorization of indicators by indicator levels (output, outcome, impact).

5.2.2 The Logical Framework-What causes what?

Table 8: The programme logical framework

Inputs (Resources)	Activities (Actions)	Outputs (immediate results)	Outcome (Intermediate results)	Impact (Ultimate effect)
Legislative and policy framework on AMR	Dissemination of IEC materials on AMR	Availability of Curricula that include AMR and related topics		
Guidelines and standards on AMR	Dissemination of Legislative framework and guidelines on AMR	Increased GOL spending on AMR	Improved AMR knowledge in target population	
Country situational Analysis	Training of staff in AMR focal points on AMR	Increased number of facilities with staff trained on AMR	Reduced incidence of surgical site infections – inpatient surgical procedure	
Technical support from Tripartite (OIE-WHO-FAO)	In country Workshops on development of NAP	Increased number of food production establishments trained on bio security measures	Increased immunization coverage in human and animal	Reduced patterns and trends in resistance in human and animal health
WHO Country Office technical and financial support	Conducting Operational research studies on AMR	Increased number of schools incorporating AMR in to the curriculum	Reduced incidence of infection in health facilities, farms and communities as	Reduced mortality and morbidity due AMR
TORs for AMR TWGs and other Committees	Incorporation of AMR in to the curriculum	Increased number of facilities with functional therapeutic committees	Increased percentage of population using safely managed sanitation services	Reduced Out of pocket expenditure on AM
Localized IEC materials on AMR	Awareness campaigns on AMR in animal health, plant health, food production, food safety and the environment held Establishment of	Increased number of operational research studies conducted on AMR	Optimized use of antimicrobials in human and animal health; phased out animal use for growth promotion	
Funding proposals on AMR activities	Surveillance system for AMR in animals, plants, food and the environment established	Increased number of AMR focal points displaying key messages on AMR		

Source: WHO 2017 Monitoring and Evaluation of National Action Plans on AMR

The 2016 WHO guidelines on Monitoring and Evaluating digital health interventions defines the logical framework as a management tool that summarizes what a project intends to do and how, what the key assumptions are, and how outputs and outcomes will be monitored and evaluated. Using the strategic implementation matrix in Chapter 3, the Logical Framework in table 17 above shows a causal relationship between selected inputs, outputs, outcomes and the ultimate impact. It further provides guidance in relation to the type of indicators to be used for tracking performance.

5.3 The Indicator Framework

A total of 39 indicators have been selected to monitor progress towards implementation of the planned strategic interventions and corresponding key activities. The indicator levels follow a pyramid shape, where majority of the indicators are at output level (at the base) with only few impact level indicators at the apex. The figure below depicts the scenario;

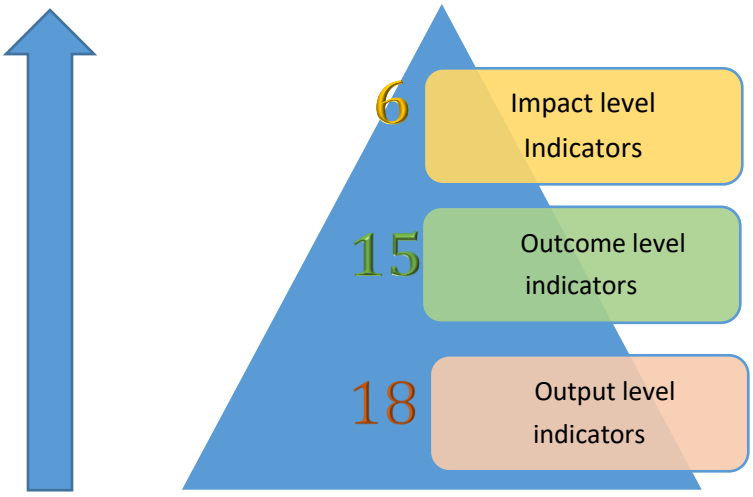


Figure 11: Indicator levels

5.3.1 Indicator listing by thematic areas

Table 9: Indicator listing – (Education and Awareness) & (Surveillance and Research)

1. Education and Awareness	2. Surveillance and Research
• Percentage of targeted population with knowledge on risk and proper use of antimicrobial • Percentage of AMR focal sites (community council Offices, schools, public and private health facilities) displaying key messages on AMR • Percentage of schools implementing curricula that includes AMR and related topics • Percentage of schools implementing curricula that includes AMR and related topics • Percentage of health professionals who meet minimum CEP points on AMR required upon application for retention	• Prevalence levels of ESBL in commensal E. coli from food producing animal species • Out of pocket expenditure on AM • Percentage of laboratory investigations conducted prior to prescription of AMs (Culture Sensitivity Tests) • Percentage of new TB cases with multi-drug resistant TB • Total number of antimicrobial susceptibility tests in plant and animal health • Availability of active multi sectoral AMR Surveillance system

• Percentage of health facilities with at least one personnel trained on AMR • Percentage of health facilities trained on STGs • Availability of Curricula that include AMR and related topics • Availability of National communication strategy for AMR • Total number of planned AMR sensitization meetings with community leaders[5]	• Availability of updated MOH research agenda that include AMR as priority topic • Percentage of facilities with AMR diagnostics tools • Percentage of laboratories with functional diagnostic equipment for detection of drug resistance • Total number of Operational research studies on AMR

Table 10: Indicator listing-(IPC, Hygiene, Sanitation and Bio security) & (AM use and regulation)

3. IPC, Hygiene, Sanitation and Biosecurity	4. Antimicrobial use and Regulation
• Percentage of population using safely managed sanitation services, including a hand-washing facility with soap and water (SDG6) • Percentage of commercial farms that have implemented a biosecurity programme	• Availability of Legislation on Medicine and Medical device control bill • Percentage of new-borns with suspected severe bacterial infection who receive appropriate antibiotic therapy • Percentage of farms, compliant with standards for proper use of antimicrobial in animals • Vaccine coverage in human and animal health • Antimicrobial (AM) use per capita in human health • Percentage of hospitals prescribing antimicrobials for surgical prophylaxis with >80% compliance with guidelines • Percentage of inspected medicines that met required WHO standards • Rate of readmissions due to surgical site infection • Total number of reported adverse drug reactions • Percentage of retail pharmacies inspected that comply with standards • Percentage of facilities with active committees (therapeutic , AMS) • Percentage of AMR focal sites with AMR guidelines (DHMT, rural water supply, department of environment) • Percentage of facilities reporting stock outs (non-availability) of specified antibiotics

Table 11: Indicator listing-Crosscutting indicators among thematic areas

- Proportion of GOL budget allocated for research
- Proportion budget allocated for AMR interventions (GOL, Donors)
- Mortality attributable to AMR infections
- Morbidity due to AM

[5] parliamentarians, local government, chiefs at national, district and chiefdom levels non-governmental organizations, Civil Society Organizations

5.4 Performance Monitoring

5.4.1 Routine data Collection

The data collection methods for generating data on selected indicators will be based on the existing ministerial routine data collection platforms. This includes the use of District Health Information System_2 (DHIS2) used in the MOH, Laboratory Management Information System (LMIS) in the MOH and Integrated Financial Management Information System used across collaborating Ministries. The primary source documents will also be used as the point of reference for data elements generated in different sectors but are not ultimately aggregated and reported at district and national level. Such data will be collected at agreed time intervals in line with the reporting requirements in the indicator matrix. The use of existing platforms to generate and report data on AMR indictors is a sustainability measure in the M&E system for combating AMR in Lesotho.

5.4. 2 Integrated supportive supervisions (routine supervisions)

In line with the One Health Approach, a multi-sectoral integrated supportive supervision will be conducted on quarterly basis from national to the lower level using the developed supervision check list as a guide. The checklist will be developed in line with the proposed output level indicators, where progress towards fulfilment of planned sub-activities will be monitored. The data elements which are not reported through routine data collection platforms but are a requirement for reporting on progress will be collected during supervision visits. This includes adherence to the guidelines, stock levels on antibiotics in AMR focal points and functionality of AMR committees at lower level of implementation.

5.5. Evaluation and Surveys

Using information generated from monitoring, programme evaluations will be conducted at mid-way in the implementation of the National Action Plan and also by the end of the duration of the plan. It is also proposed that the baseline assessment on newly proposed indicators will be conducted and such information will serve as a guide towards routine monitoring, and programme evaluations and mid-term and end term.

Targeted surveys will be conducted to inform indicators which data may not be possible to generate through routine data collection platforms and integrated supervisions. The surveys will be conducted mainly on indicators tracking the behavioural patterns from the demand side (general population) and supply side (AMR focal sites) of interventions on prevention of the spread of AMR. Such indicators include; knowledge on AMR among the population, Out of pocket expenditure on antibiotics/antimicrobials, adherence to prescription guidelines in AMR focal points and adherence to the use of agreed standards by the private practitioners including retail pharmacies. These indicators will be informed by surveys such as, Lesotho Demographic and Health Survey (LDHS)-

every 5 years, Multiple Indicator Cluster Survey (MICS)-every 2 years, Accreditation of Health facilities survey-every 2 years.

5.5.1 Embedded Implementation Research (Operational Research)

Following successful activity monitoring through reporting and conducting of integrated supportive supervisions, it is envisaged that at least one operational study will be conducted in each year for the duration of a plan. The priority topics listed in the MOH research agenda will also be considered while initiating an operational research.

5.6 Feedback mechanisms

The information from supervision report, targeted surveys and operational research will be harmonized in to one monitoring report which will be consolidated into the National Report on AMR produced quarterly, semi-annually and annually. The quarterly and semi-annual reports will focus on activity monitoring while the annual reports will track outcomes and reflect on strides towards achievement of impact indicators.

Existing country level platforms will be used to communicate the achievements and challenges in the implementation of the National Action Plan. Such platforms include; Health Sector District Based Quarterly reviews, Health Sector Annual Joint Reviews (AJR), and reporting to Social Cluster Investment Committee (Quarterly). The table below provides a summary of different reporting platforms targeting both external and internal stakeholders.

Table 12: Feedback platforms for accountability on results

Reporting hierarchy	**Reporting platform**	**Frequency of reporting**			
		Quarterly	Semi-Annually	Annually	Biennial
Global	World Health Assembly			X	
	OIE AMR Technical meeting			X	
	Country Progress Monitoring on AMR in 6 WHO Regions			X	
Regional	SADC Antimicrobial TWG				X
	Africa CDC meetings			X	
	ReAct Africa Annual Conference			X	
Country level	Health Sector-Annual Joint Review (AJR)			X	
	Social Cluster Investment Committee	X	X		
	Ministerial Capital projects progress reporting	X	X		

5.7 Limitations to the M&E Framework

- Unavailability of global targets on AMR, from which the country could draw own targets.
- The Global SDGs monitoring framework adopted by the country does not have indicators specific to AMR, hence difficulty for the country to ensure proper alignment of M&E for AMR with existing M&E frameworks across the sectors.
- Unavailability of baseline information for majority of indicators proposed in the indicator matrix, of which realistic target setting and reporting based on targets may be a challenge in the first year of implementation.

5.8 Indicator Matrix

Table 13: Indicator Matrix

Ind. #	Indicators	M0easures Strategic Objective	Baseline	Targets in years					Indicator level	Data Source	Frequency of reporting
				2021	2022	2023	2024	2025			
1.	Mortality attributable to AMR infections	SO.1-SO.4	TBD	TBD	TBD	TBD	TBD	TBD	Impact	Survey	5 years
2.	Morbidity due to AM	SO.1-SO.4	TBD	TBD	TBD	TBD	TBD	TBD	Impact	Survey	5 years
3.	Percentage of targeted population with knowledge on risk and proper use of antimicrobials	SO. 1	TBD	TBD	TBD	TBD	TBD	TBD	Impact	Survey	Biennial
4.	Prevalence levels of ESBL in commensal E. coli from food producing animal species	SO.1-SO.4	TBD	TBD	TBD	TBD	TBD	TBD	Impact	Survey	5 years
5.	Out of pocket expenditure on AM	SO.1-SO.5	TBD	TBD	TBD	TBD	TBD	TBD	Impact	Survey	Biennial
6.	Percentage of population using safely managed sanitation services, including a hand-washing facility with soap and water (SDG6)	SO.4	TBD	TBD	TBD	TBD	TBD	TBD	Impact	Survey	5 years
7.	Percentage of AMR focal sites (community council Offices, schools, public and private health facilities) displaying key messages on AMR	SO. 1	TBD	TBD	TBD	TBD	TBD	TBD	Outcome	ISS-Reports	Bi-annual
8.	Percentage of schools implementing curricula that includes AMR and related topics	SO.1	TBD	TBD	TBD	TBD	TBD	TBD	Outcome	ISS-Reports	Annually
9.	Percentage of health professionals who meet minimum CEP points on AMR required upon application for retention	SO.1	TBD	TBD	TBD	TBD	TBD	TBD	Outcome		Annually
10.	Percentage of new-borns with suspected severe bacterial infection who receive appropriate antibiotic therapy	SO.4	TBD	TBD	TBD	TBD	TBD	TBD	Outcome	H/Facility Records	Annually
11.	Percentage of commercial farms that have implemented a biosecurity programme	SO.4	TBD	TBD	TBD	TBD	TBD	TBD	Outcome	ISS-Reports	Biennial
12.	Percentage of farms, compliant with standards for proper use of antimicrobial in animals	SO.4	TBD	TBD	TBD	TBD	TBD	TBD	Outcome		

13.	Vaccine coverage in human and animal health	SO.4	TBD	TBD	TBD	TBD	TBD	TBD	Outcome	DHIS2	Annually
14.	Antimicrobial (AM) use per capita in human health	SO.1, SO.2	TBD	TBD	TBD	TBD	TBD	TBD	Outcome	H/Facility Records	Annually
15.	Percentage of hospitals prescribing antimicrobials for surgical prophylaxis with >80% compliance with guidelines	SO.4	TBD	TBD	TBD	TBD	TBD	TBD	Outcome	H/F survey	Biennial
16.	Percentage of inspected medicines that met required WHO standards	SO.2	TBD	TBD	TBD	TBD	TBD	TBD	Outcome	H/F survey	Biennial
17.	Rate of readmissions due to surgical site infection	SO.2, S04	TBD	TBD	TBD	TBD	TBD	TBD	Outcome	H/Facility Records	Annual
18.	Total number of reported adverse drug reactions	SO.2, S04	TBD	TBD	TBD	TBD	TBD	TBD	Outcome	H/Facility Records	Quarterly
19.	Percentage of retail pharmacies inspected that comply with standards	SO.2	TBD	TBD	TBD	TBD	TBD	TBD	Outcome	ISS-Reports	Quarterly
20.	Percentage of laboratory investigations conducted prior to prescription of AMs (Culture Sensitivity Tests)	SO3, S04	TBD	TBD	TBD	TBD	TBD	TBD	Outcome	H/Facility Records	Quarterly
21.	Percentage of new TB cases with multi-drug resistant TB	SO.3, SO.4	TBD	TBD	TBD	TBD	TBD	TBD	Outcome	Survey	Biennial
22.	Percentage of facilities with active committees (therapeutic , AMS)	SO.4	TBD	TBD	TBD	TBD	TBD	TBD	Output	ISS-Reports	Quarterly
23.	Percentage of AMR focal sites with AMS guidelines (H/Fs, Agric resource centres, sub-centre, water blenkers)	SO.4	TBD	TBD	TBD	TBD	TBD	TBD	Output	ISS-Reports	Quarterly
24.	Percentage of AMR focal sites with AMR guidelines (DHMT, rural water supply, department of environment)	SO.4	TBD	TBD	TBD	TBD	TBD	TBD	Output	ISS-Reports	Quarterly
25.	Percentage of facilities reporting stock outs (non-availability) of specified antibiotics	SO.4	TBD	TBD	TBD	TBD	TBD	TBD	Output	H/Facility Records	Quarterly
26.	Availability of Legislation on Medicine and Medical device control bill	SO.4	N/A	1	N/A	N/A	N/A	N/A	Output	MOH reports	Quarterly
27.	Percentage of health facilities with at least one personnel trained on AMR	SO.4	TBD	TBD	TBD	TBD	TBD	TBD	Output	MOH reports	Quarterly
28.	Percentage of health facilities trained on STGs	SO.4	TBD	TBD	TBD	TBD	TBD	TBD	Output	MOH reports	Quarterly

29.	Total number of antimicrobial susceptibility tests in plant and animal health	SO.3, SO.4	TBD	TBD	TBD	TBD	TBD	TBD	Output	MOH reports	Quarterly
30.	Availability of active multi sectoral AMR Surveillance system	SO.2	TBD	TBD	TBD	TBD	TBD	TBD	Output	MOH reports	Quarterly
31.	Availability of updated MOH research agenda that include AMR as priority topic	SO.2, SO.5	TBD	TBD	TBD	TBD	TBD	TBD	Output	MOH reports	Quarterly
32.	Percentage of facilities with AMR diagnostics tools	SO.2,SO.5	TBD	TBD	TBD	TBD	TBD	TBD	Output	ISS-Reports	Quarterly
33.	Percentage of laboratories with functional diagnostic equipment for detection of drug resistance	SO.2,SO.5	TBD	TBD	TBD	TBD	TBD	TBD	Output	ISS-Reports	Quarterly
34.	Total number of Operational research studies on AMR	SO.2,SO.5	TBD	TBD	TBD	TBD	TBD	TBD	Output	MOH reports	Quarterly
35.	Availability of Curricula that include AMR and related topics	SO.1	N/A	TBD	TBD	TBD	TBD	TBD	Output	MOH reports	Quarterly
36.	Availability of National communication strategy for AMR	SO.1	N/A	TBD	TBD	TBD	TBD	TBD	Output	MOH reports	Quarterly
37.	Proportion of GOL budget allocated for research	SO.2,SO.5	TBD	TBD	TBD	TBD	TBD	TBD	Output	MOH reports	Annually
38.	Proportion budget allocated for AMR interventions (GOL, Donors)	SO.5	0%	TBD	TBD	TBD	TBD	TBD	Output	MOH reports	Annually
39.	Total number of planned AMR sensitization meetings with community leaders[6]	SO.1	TBD	TBD	TBD	TBD	TBD	TBD	Output	MOH reports	Quarterly

[6] Parliamentarians, local government, chiefs at national, district and chiefdom levels non-governmental organizations, Civil Society Organizations

Annexure

Annex 1: The Operational Planning Matrix-EDUCATION AND AWARENESS

KEY ACTIVITY 1.1.1.: Undertake baseline study (KAP) on AMR awareness, in the general populace and professionals in relevant sectors (animal, human health, crops, and environment.)											
SUB ACTIVITIES	**EXPECTED OUTPUT**	**RESPONSIBLE**	**COST (LSL)**	YR1				**TIMELINES IN YEARS**			
				Q1	Q2	Q3	Q4	**YR2**	**YR3**	**YR4**	**YR5**
1.1.1.1 Stakeholders Sensitization Meeting (Ministry Directors, CHE, NGOs, Das, DSCs)	Sensitization Meeting Held	TWG-E&A	22,000	X							
1.1.1.2 Develop Research Protocol for submission to the ethics committee	Research Protocol developed	TWG-E&A	59,600	X							
1.1.1.3 Develop Questionnaires for different Target audiences (Consumers, Prescribers & Dispensers, Media, Local Authorities, etc.)	Questionnaires Developed	TWG-E&A	44,700	X							
1.1.1.4 Procurement of Tablets for data collection (Android)	Tablets procured	TWG-E&A	150,000	X							
1.1.1.5 Conduct Training for data collectors (Enumerators)for KAP and Rapid Assessment	Trained Enumerators for both KAP and Rapid Assessment	TWG-E&A	352,500	X							
1.1.1.6 Pretesting of Questionnaires	Questionnaires Tested	TWG-E&A	185,500	X							
1.1.1.7 Data Collection	Data collected	TWG-E&A	935,000	X							
1.1.1.8 Data presentation and analysis	Data analyzed	TWG-E&A	740,100	X							
1.1.1.9 Results validation	Validation done	TWG-E&A	123,300	X							
1.1.2.0 Printing	Printed report	TWG-E&A	10,000	X							
1.1.2.1 Report launch and Dissemination	Report launched and disseminated	TWG-E&A	55,000	X				X			

KEY ACTIVITY 1.1.2.: Develop and disseminate national communication strategy for AMR											
1.1.2.1 Introductory Meeting for TWG and other stakeholders	Introductory Meeting Held	TWG-E&A	10,000	X							
1.1.2.2 Develop Communication Strategy	AMR Communication Strategy Developed (Zero Draft)	TWG-E&A	139,200	X							
1.1.2.3 Validation of AMR Communication Strategy	Validated AMR Communication Strategy	TWG-E&A	105,250	X							
1.1.2.4 Printing of AMR Communication Strategy	Printed AMR communication strategy	TWG-E&A	100,000	X							
1.1.2.5 Launch and dissemination of AMR Communications Strategy	Communication Strategy launched and developed	TWG-E&A	37,000	X				X			
KEY ACTIVITY 1.2.1: Develop and disseminate IEC materials for diverse stakeholders in human, animal and environmental health sectors											
1.2.1.1 Review, localize and Adopt Existing IEC Materials and develop new material (WHO, FAO, OIE)	IEC materials adopted and developed	TWG-E&A	21,000	X							
1.2.1.2 Pre-testing of IEC materials by type	IEC material tested	TWG-E&A	104,250	X							
1.2.1.3 Validation and adoption of IEC Materials	IEC materials validated	TWG-E&A	104,250	X							
1.2.1.4 Print IEC materials	IEC Materials Printed	TWG-E&A	704,637	X							
1.2.1.5 Distribution of IEC Materials	IEC Material Distributed	TWG-E&A	704,637	X				X			
KEY ACTIVITY 1.2.2.: Conduct advocacy and sensitization meetings for parliamentarians, local government, chiefs at national, district and chiefdom levels non-governmental organizations, Civil Society Organizations											
1.2.2.1.1Hold Sensitization Meetings for various key informants	Sensitization Meeting held	TWG-E&A	**215,123**								
KEY ACTIVITY 1.2.3.: Conduct awareness campaigns amongst stakeholders, including during WAAW.											

1.2.3.1 Conduct Awareness Campaigns for Stakeholders in the human, animal, plant health and environment	Awareness Campaigns conducted	TWG-E&A		X				X			
KEY ACTIVITY 1.2.4.: Capacitate media on reporting on AMR and dissemination of key messages											
1.2.4.1 Hold Sensitization Meetings with Media owners and editors	Sensitization Meeting held	TWG-E&A	**8,200**	X							
1.2.4.2 Conduct Training for Journalist and Reporters on AMR	Journalists Trained	TWG-E&A	**236,300**	X							
1.2.4.3 Run Annual competition on AMR Reportage and award best stories	AMR Reportage Awards Held	TWG-E&A		X							
1.2.4.4 Formulate Terms of Reference for the Awards Panel	ToR developed	TWG-E&A	**3,100**	X							
1.2.4.5 Appoint a panel of judges for Media Awards	Panel of Judges appointed	TWG-E&A	**338,226**	X							
1.2.4.6 Hold Awards for Journalists Reporting on AMR	Media Awards Held	TWG-E&A	**177,005**	X							
KEY ACTIVITY 1.2.5: Commemorate Antimicrobial Awareness Week											
1.2.5.1 Commemorate Antimicrobial Awareness Week	AMR week commemorated	TWG-E&A	**340,481**				X	X	X	X	X
1.2.5.2 Hold national symposium on AMR	National symposium on AMR held	TWG-E&A	**2,572,241**				X	X	X	X	X
KEY ACTIVITY 1.3.1: Advocate for the integration of AMR and related topics in formal and informal education at all levels											
1.3.1.1 Conduct advocacy meetings with stakeholders for mainstreaming AMR and related issues in curricula	Meeting held	TWG-E&A	142,274				X	X	X	X	X
1.3.1.2 Conduct a desk review of existing curricular	Baseline survey data on curricula	TWG-E&A	15,000					X			
1.3.1.3 Develop AMR manuals and SOPs for inclusion in Curriculum	Manuals/ SOPs developed	TWG-E&A	42,000					X			
1.3.1.4 Develop, Validate and Print teaching materials	Printed training packages	TWG-E&A	21,000					X			
1.3.1.5 Distribute training materials	Training Packages distributed	TWG-E&A	0								
1.3.1.6 Mainstream the curricula, manuals, and SOPs	AMR Curricular taught in schools	TWG-E&A	0								

KEY ACTIVITY 1.3.2.: Engage professional registration bodies for inclusion of AMR CPE as pre-requisite for retention											
1.3.2.1 Conduct advocacy meetings with stakeholders for inclusion of AMR CPE as pre-requisite for retention	Advocacy Meetings held	TWG-E&A	27,000					X			
1.3.2.2 Develop AMR CPE manuals	AMR CPE Manuals Developed (Draft	TWG-E&A	138,000					X			
1.3.2.3 Validate AMR CPE Manual	AMR CPE Manuals validated	TWG-E&A	85,600					X			
1.3.2.4 Administer AMR CPE	AMR CPE Administered	TWG-E&A	0								
KEY ACTIVITY 1.3.3.: Conduct in-service training programs on AMR for professionals in the human health, veterinary, environmental and agricultural											
1.3.3.1 Develop AMR In-service training manuals	AMR In-service training manuals developed	TWG-E&A	171,250						X		
1.3.3.2 Administer AMR In-service training	Training conducted	TWG-E&A	85,600						X		
1.3.3.3 Develop AMR Pre-Registration Examination tool	AMR Pre-Registration Examination tool conducted	TWG-E&A	4,600						X		
1.3.3.4 Validate AMR Pre-Registration Examination tool	AMR Pre-Registration Examination tool developed	TWG-E&A	6,400						X		

Annex 2: The Operational Planning Matrix-SURVEILLANCE AND RESEARCH

SUB ACTIVITIES	EXPECTED OUTPUT	RESPONSIBLE	COST (LSL)	YR1				TIMELINES IN YEARS			
				Q1	Q2	Q3	Q4	YR2	YR3	YR4	YR5
KEY ACTIVITY 2.1.1.: Strengthen laboratories capacity to detect, and analyze AMR at all sectors											
2.1.1.1 Procure diagnostic equipment and supplies for antimicrobial determination	Diagnostic equipment and supplies procured	TWG-S&R	56,370,929				X	X	X	X	X
2.1.1.2 Capacitate laboratory professionals on detection and analysis of AMR	Laboratory Professionals trained	TWG-S&R	1,614,271				X	X	X		
KEY ACTIVITY 2.1.2.: Strengthen quality management systems to provide consistent diagnostic standards by all laboratories											
2.1.2.1Develop collaboration mechanisms between the national and external laboratories on AMR diagnostics	Collaboration mechanisms developed	TWG-S&R	627,169				X	X	X		
2.2.1.2Develop quality management system guidelines in all laboratories	Quality management guidelines developed	TWG-S&R	276,000				X				
2.2.1.3 Advocate for use of approved (WHO, OIE-FAO) SOPs for optimal detection of AMR	Advocacy done	TWG-S&R	12,800				X				
KEY ACTIVITY 2.3.1.: Strengthen quality management systems to provide consistent diagnostic standards by all laboratories											
2.3.1.1 Develop collaboration mechanisms between the national and external laboratories on AMR diagnostics	Linkages developed	TWG-S&R	627,169				X	X	X		
2.3.1.2 Develop quality management system guidelines in all laboratories	Guidelines developed/ guidelines adopted	TWG-S&R	276,000				X				
2.3.1.3 Advocate for use of approved (WHO, OIE-FAO) SOPs for optimal detection of AMR	SOPs administered	TWG-S&R	12,800				X				
KEY ACTIVITY 2.4.1 Build One Health antimicrobial resistance surveillance system that integrates data sharing from human, water, environment and agricultural sectors											
2.4.1.1 Establish multi-sectoral AMR surveillance reporting and information sharing	Multi-sectoral AMR surveillance reporting and information sharing system established	TWG-S&R	50,000				X				

2.4.1.2 Advocate for incorporation of AMR issues into DHIS2 or Incorporate AMR into DHIS2	AMR issues incorporated in DHIS2	TWG-S&R	64,000				X				
2.4.1.3 Develop reporting frameworks for AMR	Reporting frameworks developed Mechanisms developed	TWG-S&R	128,000				X				
2.4.1.4 Develop national guidelines for surveillance systems	National guidelines developed	TWG-S&R	240,000				X				
2.4.1.5 Advocate for participation in Global Antimicrobial Resistance GLASS)	Mechanisms developed	TWG-S&R	140,000				X				
2.4.1.6 Develop and adopt standards for antibiotic residues in waste generated from farms, factories, human health care	Standards adopted and developed	TWG-S&R	132,000				X				
KEY ACTIVITY 2.5.1 Promote Multi-sectoral collaboration for research implementation in various aspects of Antimicrobial use and resistance in humans, animals and plants											
2.5.1.1 Develop AMR research agenda for incorporation into research agendas of all relevant sectors (humans, water, environment and agriculture)	AMR agenda incorporated into sectoral Research agendas	TWG-S&R	40,000				X				
2.5.1.2 Advocate for academic institutional research on AMR		TWG-S&R	182,000				X	X			
2.5.1.3 Capacitate practitioners (professionals) on basic and operational research in antimicrobial use and resistance	Capacity building conducted	TWG-S&R	17,300,464				X	X	X	X	
2.5.1.4 Establish platform (conference or symposium) for regular information sharing on antimicrobial resistance research.	Information sharing platform established	TWG-S&R	968,000				X	X			

Annex 3: The Operational Planning Matrix- INFECTION, PREVENTION AND CONTROL

KEY ACTIVITY 3.1.1.: Conduct situation analysis of sanitary and phytosanitary measure, IPC and biosecurity.											
SUB ACTIVITIES	**EXPECTED OUTPUT**	**RESPONSIBLE**	**COST (LSL)**	YR1				**TIMELINES IN YEARS**			
				Q1	Q2	Q3	Q4	**YR2**	**YR3**	**YR4**	**YR5**
3.1.1.1 Conduct workshop with stakeholders on sanitary and phytosanitary measure, IPC and biosecurity.	Workshop conducted	TWG- S&R	1,665,300				X		X		X
3.1.1.2 Conduct validation meeting	Validation meeting held	TWG- S&R	685,681				X		X		X
3.1.1.3 conduct meeting for situational report writing	Meeting held	TWG- S&R	910,855				X		X		X
3.1.1.4 Disseminate situational analysis report	Report disseminated	TWG- S&R	460,506				X		X		X
KEY ACTIVITY 3.1.2.: Develop guidelines and protocols for biosecurity measures for pathogen risk reduction											
3.1.2.1 Conduct stakeholders workshop on development of guidelines and protocols	Guidelines and protocols developed	TWG- S&R	685,681				**x**		**x**		**x**
3.1.2.2 Conduct validation meeting on biosecurity measures for pathogen risk reduction	Validation meeting conducted	TWG- S&R	415,472				**x**		**x**		**x**
3.1.2.3 Dissemination of guidelines and protocols	Guidelines and protocols disseminated	TWG- S&R	136,000				**x**				
KEY ACTIVITY 3.1.3 Capacitate Famers on biosecurity measures for pathogen risk reduction											
3.1.3.1 Train farmers on biosecurity measures	Training conducted	TWG- S&R	**2,851,812**					**x**	**x**	**x**	**x**
KEY ACTIVITY 3.2.1 Develop integrated Protocols, guidelines and reporting framework on animal trans-boundary animal/plant disease occurrence transmission											
3.2.1.1 Conduct workshop with stakeholder to develop protocols, guideline and reporting tools	Number of workshops conducted	TWG- S&R	**249,895**					**x**			
3.2.1.2 Conduct validation meeting on protocols, guideline and reporting framework	Validation meeting held	TWG- S&R	**151,209**					**x**			
3.2.1.3 Disseminate Protocols, guideline and reporting on animal trans-boundary animal/plant disease occurrence transmission	Protocols and guidelines disseminated	TWG- S&R	**144,160**					**x**			
KEY ACTIVITY 3.2.2: Advocate for recruitment of border control officers at all designated ports of entries											

3.2.2.1Develop TORs for Border control officers	TORs developed	TWG- S&R	102,750				x				
3.2.2.2 Advocate for deployment Border control officers	Border control officers deployed	TWG- S&R	21,000				x				
KEY ACTIVITY 3.2.3: Strengthen border patrols MOH, MAFS											
3.2.3.1 Conduct meetings with stakeholders inclusive of security agencies	Number of meetings held	TWG- S&R	**278,758**				x	x	x	x	x
KEY ACTIVITY 3.3.1: Review vaccination programmes in animal and human health											
3.3.1.1 Conduct a review workshop	Review workshop conducted	TWG- S&R	**1,141,511**				x	x	x	x	x
KEY ACTIVITY 3.4.1: Develop legal framework (in line with One-Health Approach)											
3.4.1.1 Review existing laws		TWG- S&R	**458,152**				x				x
KEY ACTIVITY 3.4.2.: Promote Open Defecation Free (ODF) communities and free water accessing communities											
3.4.2.1 Engage contractor to build toilets and install water lines in rural communities identified	Contractor engaged	TWG- S&R	**90,028,080**				x				
KEY ACTIVITY 3.4.3: Conduct follow-ups for IPC initiatives and report-write-ups											
3.4.3.1 Undertake field and sites visits	Field and site visits conducted	TWG- S&R	933,503				x	x	x	x	x
3.4.3.2 Write reports on field and sites visit	Report produced	TWG- S&R	277,345				x	x	x	x	x

Annex 4: The Operational Planning Matrix-ANTIMICROBIAL USE AND REGUALTION

KEY ACTIVITY 4.1.1.: Review the EML &STGs based on antimicrobial resistance data											
SUB ACTIVITIES	**EXPECTED OUTPUT**	**RESPONSIBLE**	**COST (LSL)**	YR1				**TIMELINES IN YEARS**			
				Q1	Q2	Q3	Q4	**YR2**	**YR3**	**YR4**	**YR5**
4.1.1.1 Hold Review meetings on EMLs and STGs	Number of meetings held	MOH	2,590,082		X						
4.1.1.2 Hold a 2 day stakeholders validation meetings	Number of meetings held	MOH	415,391		X						X
4.1.1.3 Hold dissemination meeting	Number of meetings held	MOH	535,303			X					X
4.1.1.4 Monitor use of STGs and EML	Number of studies conducted	MOH					X			X	
KEY ACTIVITY 4.1.2: Formulate regulations and guidelines for use of veterinary medicine											
4.1.2.1 Hold meeting on development of Guidelines and Regulation	Guidelines and regulation developed	MAFS	129,900		X						
4.1.2.2 Hold a 2 day stakeholders validation meetings	Validation meeting held	MAFS	110,000			X					
4.1.2.3 Hold Dissemination Meeting	Dissemination meeting held	MAFS	81,900			X					
KEY ACTIVITY 4.1.3.: Review existing policy drafts (animal health) to include AMR issues											
4.1.3.1 Hold review meeting on existing policy drafts	Review meeting held	MAFS, MOH	99,500			X					
4.1.3.2 Hold a 2 day stakeholders validation meetings	Validation meeting held	MAF, MOH	110,000			X					
4.1.3.3 Hold Dissemination Meeting	Dissemination meeting held	MAFS, MOH	1,852,969			X		X	X	X	X
KEY ACTIVITY 4.14: Resuscitate Therapeutics Committees at National and health facility levels with clear TORs MOH											
4.1.4.1 Hold meeting with therapeutics committee to draft terms of reference for National, Health facility level committees	Terms of Reference developed	MOH	97,500				X				
4.1.4.2 Hold orientation meeting with DHMT and Hospital Management on the terms of references	Orientation meeting held	MOH	93,600				X				

KEY ACTIVITY 4.1.5: Develop and disseminate AMR stewardship guidelines											
4.1.5.1 Hold meeting on Development of AMR guidelines	AMR guidelines developed		262,000		X						X
4.1.5.2 Hold a 2 day Validation meeting	Validation meeting held		39,000		X						X
4.1.5.3 Train and dissemination AMR guidelines	AMR guidelines disseminated		304,800			X		X	X	X	X
KEY ACTIVITY 4.1.6: Establish the one health regulatory Authorities											
4.1.6.1 Twining with SADC countries with stringent Regulatory Authority	Availability of report	MOH, MAFS, ,MTEC	0				X				
4.1.6.2 Hold Stakeholders meeting on establishment of one health regulatory Authority	Stakeholders meeting held	MOH, MAFS,METC, M ODP	0						X		
KEY ACTIVITY 4.1.7: Establish pharmaceutical quality control laboratory											
4.1.7.1 Procure Pharmaceutical Laboratory quality control Minilabs	Minilabs procured	MOH	5,000,000					X			
4.1.7.2 Construction and equip the Pharmaceutical Quality Control Laboratory	Quality control laboratory constructed	MOH	21,937,600		X						
KEY ACTIVITY 4.1.8.: Establish the one health regulatory Authorities											
4.1.8.1 Twining with SADC countries with stringent Regulatory Authority	Availability of report	MOH, MAFS, ,MTEC	0				X				
4.1.8.2 Hold Stakeholders meeting on establishment of one health regulatory Authority	Stakeholders meeting held	MOH, MAFS,METC, M ODP	0						X		
KEY ACTIVITY 4.1.9.: Develop and Disseminate Pharmacovigilance Guidelines											
4.1.9.1 Hold a meeting to review the Pharmacovigilance guidelines	Review meeting held	MOH	131,000							X	
4.1.9.2 Hold validation meeting with stakeholders on Pharmacovigilance guidelines and reporting tools	Validation meeting held	MOH	115,600							X	
4.1.9.3 Train health facility personnel on Pharmacovigilance guidelines and reporting tools (dissemination)	Training conducted	MOH	225,740							X	
KEY ACTIVITY 4.1.10.: Strengthen AMR Coordination at district level											
4.1.10.1 Hire AMR district focal persons	AMR focal persons hired	MOH	12,176,122	X	X	X	X	X	X	X	X
4.1.10.2 Procure a vehicle	Vehicle procured	MOH	4,200,000	X							

4.1.10.3 Conduct Antimicrobials Use Survey	AMU survey conducted	MOH	1,538,093					X			X
KEY ACTIVITY 4.2.1.: Capacitate healthcare personnel on use of EML and STGs (antimicrobials).											
4.2.1.1 Hold workshop on use of EML and STGs (Training of updated EML and STGs)	Training conducted	MOH	1,827,220					X	X	X	X
4.2.1.2 Develop tool to monitor AMR Use in Lesotho	Tools developed	MOH	99,500			X					
4.2.1.3 Conduct AMR Review meetings for the Multi -sectorial Coordinating Committee and 5 TWGs	Review meeting conduct	MOH	620,080			X		X	X	X	X
KEY ACTIVITY 4.3.1.: Revive Veterinary Drug committee											
4.3.1.1 Hold meeting with Veterinary Drug committee members	Number of meetings held		5,800	X			X	X	X	X	X
KEY ACTIVITY 4.3.2.: Resuscitate Therapeutics Committees at National and health facility levels with clear TORs MOH											
4.3.2.1 Hold meeting with therapeutics committee to draft terms of reference for National, Health facility level committees	Terms of Reference developed	MOH	97,500				X				
4.3.2.2 Hold orientation meeting with DHMT and Hospital Management on the terms of references	Orientation meeting held	MOH	93,600				X				
KEY ACTIVITY 4.4.1.: Capacitate Health Personnel on Rational prescribing and dispensing of antimicrobials											
4..4.1.1 Hold workshop on rational prescribing and dispensing	Workshop held		451,000					X			
4.4.1.2 Conduct Supportive supervision and mentorship biannually	Number of workshops held		1,342,492				X	X	X	X	X
KEY ACTIVITY 4.5.1.: Establish Pharmacovigilance committees (PVCs) at District level.											
4.5.1.1 Hold meeting with National Pharmacovigilance Committee to draft terms of reference for PVCs at district level	Terms of Reference developed		39,800		X						
4.5.1.2 Hold orientation meeting with DHMT and Hospital Management on the terms of references	Orientation meeting held		93,600		X						
4.5.1.3 Supervise and mentor human and animal health professionals on pharmacovigilance reporting	Number Supportive supervisory visits conducted	MOH and MAFS	702,000				X	X	X	X	X

Annex 5: The Operational Planning Matrix-INVESTMENT, RESEARCH and DEVELOPMENT

KEY ACTIVITY 5.1.1.: Advocate for Multi-sectoral collaboration for research on alternative medicines in various aspects of Antimicrobial use and resistance in humans, animals and plants											
SUB ACTIVITIES	**EXPECTED OUTPUT**	**RESPONSIBLE**	**COST (LSL)**	YR1				**TIMELINES IN YEARS**			
				Q1	Q2	Q3	Q4	**YR2**	**YR3**	**YR4**	**YR5**
5.1.1.1. Liaise with other external academic institutions to undertake some of the research activities	Research activities undertaken	TWG-RI&D	13,400	X	X	X	X				
KEY ACTIVITY 5.1.2: Mobilize resources required for research on alternative medicines and for the implementation of AMR NAP											
5.1.2.1Solicit assistance from funding organizations and development partners	Availability of funding	TWG-RI&D	703,513	X	X	X	X	X	X	X	X
KEY ACTIVITY 5.1.3.: Undertake expenditure tracking analysis in human and animal acquired infections.											
5.1.3.1Develop protocol and assessment tools	Availability of tools	TWG-RI&D	686,000					X			
5.1.3.2Train stakeholders (data collectors) on the use of data collection tools	Trained data collectors	TWG-RI&D	200,000					X			
5.1.3.3Data collection	Availability of data	TWG-RI&D	168,000					X			
5.1.3.4Data analysis and report writing	Availability of the report	TWG-RI&D	70,000					X			
KEY ACTIVITY 5.1.4.: Conduct Out-of-Pocket Expenditure on AMU in relation to animal, plant, environment and human health											
5.1.4.1Develop protocol and assessment tools	Availability of tools	TWG-RI&D	343,000						X		
5.1.4.2Train stakeholders (data collectors) on the use of data collection tools	Trained data collectors	TWG-RI&D	100,000						X		
5.1.4.3Data collection	Availability of data	TWG-RI&D	168,000						X		
5.1.4.4Data analysis and report writing	Availability of the report	TWG-RI&D	70,000						X		

Annex 6: LIST OF COUNTRY PARTICIPANTS

Ministry/Organization	Participant's Name
AMR Education and Awareness Technical Working Group	
1. Ministry of Health-Public Relations Office	Mateboho Mosebekoa
2. Ministry of Health - Health Education Department	Nkareng Mosala
3. Ministry of Health -Health Education Department	Ntsebo Moremoholo
4. Ministry of Health -Pharmaceutical Department	Lerato Kholokholo
5. Ministry of Agriculture and Food Security -Agriculture Information Services	Neo Mokoara
6. National University of Lesotho-Agriculture Department	Professor Philip Makama
7. Ministry of Water-Water Commission	Matebele Setefane
8. Ministry of Agriculture and Food Security- Department of Crops	Lesetla Makoae
9. Media Institute of Lesotho	Boitelo Rabele
10. World Health Organization (WHO)	Thato Mxakasa
AMR Surveillance and Research Technical Working Group	
11. Ministry of Health -Disease Control Directorate –HIV Surveillance	Keletso Sealiete
12. Ministry of Health–Research Unit	Dr. Kyaw Thin
13. Ministry of Health – Health Planning and Statistics Unit	Masebeo Koto
14. Ministry of Health – National Reference Laboratory (AMR Focal Point)	Mahloli Ratsiu
15. Ministry of Health – Manager National Reference Laboratory	Mathabo Mareka
16. Ministry of Agriculture and Food Security – Laboratory	Makalo Mabusetsa
17. Ministry of Water-Department of Water Affairs-Laboratory	Ntiea Letsapo
18. Ministry of Agriculture and Food Security –Epidemiology	Dr. Marose Molomo
19. Ministry of Health-Pharmacovigilance	Marelebohile Mabuzela
20. World Health Organization (WHO)	Mohlakola Hlabana
21. National University of Lesotho-Pharmacy Department	Molungoa Sello
22. National Health Training College	Rapelang Leluma
23. Lesotho Agricultural College	Thabo Matsepe
Hygiene, Infection Prevention and Control & Biosecurity Technical Working Group	
24. Ministry of Health–Pharmacy Hospital Services	Motaba Sebotsa
25. Ministry of Tourism, Environment and Culture- Pollution Control	Kobeli Ts'asanyane
26. Ministry of Health – Director - Nursing Services Directorate	Mpoeetsi Makau
27. Ministry of Health -Nursing directorate	'Mathaabe Raseleso
28. Ministry of Health - Environmental Health Department –WASH	Mosepeli Ratikane
29. Ministry of Health -Environmental Health Department- Food Safety	Motsamai Mahahabisa

30. Ministry of Tourism, Environment and Culture- Pollution Control	Samuel Zwakala
31. Ministry of Health -International Health Regulations	Ntsoaki Mokete
32. Ministry of Health -International Health Regulations	Lisemelo Zachia
33. Ministry of Agriculture and Food Security – Veterinary Public Health	Dr. Tabitha Seeiso
34. Ministry of Health-Quality Assurance	Nthekeleng Mots'oane
Antimicrobials Use, Regulation and Harmonisation Technical Working Group	
35. Ministry of Health -Medicine Regulation and Policy	Germina Mphoso
36. Ministry of Health -Medicine outlets Inspections and Licensing	Neo Khoarai
37. Ministry of Health -Medicines Importation and Exportation	Bokang Lefaso
38. Ministry of Agriculture and Food Security -Department of Livestock (AMR Focal point)	Dr. Mpaliseng Matlali
39. Lesotho Medical and Veterinary Council	Dr. Gerard Mahloane
40. Ministry of Health- Clinical Service/ Epidemiology	Dr. Tsepang Lekhela
41. Ministry of Health-Family Planning Program	Mangose Sithole
42. Ministry of Health-PMTCT Program	Seipati Motsei
43. Ministry of Health- Mohale's Hoek District Health Manager	Dr. Mahlape Tiiti
44. Ministry of Health-Dental department	Dr. Joelle Mianda Kalambay
45. Ministry of Health – Director Clinical Services	Dr. Lucy Mapota- Masoabi
46. Lesotho Medical Dental and Pharmacy Council	Dr. Moji
47. Christian Health Association of Lesotho	Matseliso Noe
Investment, Research and Development Technical Working Group	
48. Ministry of Health – National AMR Coordinator (AMR Focal Point)	Nteboheng Tjobe
49. Ministry of Development Planning	Mantheka Lekatsa
50. Ministry of Health – Health Planning and Statistics Unit – Monitoring & Evaluation	Matlotlo Mohasi
51. Ministry of Finance	Mabusisiwe Mosito
52. Ministry of Health – Health Planning and Statistics Unit - Research	Makoae Mathaha
53. Ministry of Health-Human Resource Manager	Rethabile Topo
54. Ministry of Health – Health Planning and Statistics Unit – Policy and Strategic planning	Kelumetse Moletsane
55. Ministry of Agriculture and Food Security -Planning Unit	Mothibeli Mojaje
56. Ministry of Health -International Health Regulations	Khotso Mahomo
57. Ministry of Development Planning	Nkeletseng Molahlehi
58. Food and Agriculture Organization (FAO)	Mohlophehi Maope
59. Clinton Health Access Initiative (CHAI)	Tholoana Masupha
60. Clinton Health Access Initiative (CHAI)	Thatohatsi Sefuthi

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