



**National Strategic Plan for
Combating Antimicrobial Resistance in
Sri Lanka
2023 -2028**

Ministry of Health

Suwasiripaya, No 385, Rev. Baddegama Wimalawansa Thero Mawatha, Colombo 10, Sri Lanka.



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Message from His Excellency the President of Sri Lanka



Antimicrobial Resistance (AMR) is one of the top 10 global public health threats. It is estimated that each year, 700,000 people succumb to AMR. It is predicted that by 2050, drug-resistant microbes will lead to 10 million deaths each year if the problem is not resolved. AMR causes 3.8 percent reduction in annual gross domestic product (GDP), thereby leading to being an economic threat globally. The world's poorest and those living in low and middle-income countries are extremely vulnerable. Combating AMR would be an enormous challenge to developing countries like Sri Lanka.

It was a timely call on the nations by the 68th World Health Assembly in 2015 to develop national strategies to minimize the development of AMR. Subsequently in 2016, at a high-level meeting convened by the President of the UN General Assembly (UNGA) on the sidelines of the 71st General Debate, UN Member States adopted a political declaration on AMR. It was recognized that urgent cross-sectoral rationalization of antimicrobial use and prevention and control of infections in humans, animals, food, agriculture, and aquaculture sectors is the key to combat AMR.

As recommended by the WHO, the Ministry of Health developed the first National Strategic plan to combat AMR (NSP-AMR 2017-2022) with multisectoral collaboration, with the current publication being its revision. It is commendable that experts from the sectors of human and animal health, fisheries, and agriculture have coordinated as a team to revise and formulate the NSP-AMR for the years 2023 -2028. The developed strategies call on all stakeholders, including the public, to support collaborative efforts to combat AMR. The developed strategies will also support global and regional efforts to address the threat of AMR.

It is indeed a pleasure to acknowledge the commitment extended by all professionals as a one-health team to revise and formulate the NSP-AMR 2023 - 2028. I urge all to dig deep and provide the needed support by all relevant ministries under the leadership of the Ministry of Health, to combat this 'silent pandemic'.

Ranil Wickremesinghe
President
Democratic Socialist Republic of Sri Lanka

Message from the Hon. Minister of Health



Antimicrobial resistance (AMR) is a serious public health problem globally. Unrestricted use of antimicrobial medicines in humans and animals has been responsible for increasing AMR globally. The health impact of AMR would pose a major challenge to a developing country like Sri Lanka. Sri Lanka, as a member state of the WHO South East Asia region became a signatory to the Jaipur Declaration (2011) which agreed to regulate the usage of antimicrobial medicines to prolong and preserve efficacy of antimicrobials.

AMR is known to occur in hospital and community settings and would result in loss of treatment options for patients with infections thereby increasing morbidity and mortality, as well as increased health expenditure. There has been an escalation in the emergence of multidrug-resistant organisms causing infectious diseases in the country. Thus, this “silent pandemic” must be addressed with urgent action now, otherwise the death toll will continue to rise.

As AMR is a global problem, the World Health Organization (WHO) has taken the initiative of promoting and assessing its member countries to develop strategies to overcome this serious threat of AMR. I am delighted that the Ministry of Health has recognized the strategies recommended by WHO, to provide leadership in revising the National Strategic Plan for combating antimicrobial resistance (NSP-AMR) with multisectoral collaboration. I am grateful to the experts from the human health sector, animal health sector, fisheries, environment and agriculture sectors who were instrumental to revise and formulate NSP-AMR 2023-2028.

The Ministry of Health will take necessary actions to perform ongoing activities to promote recommended strategies, such as infection prevention and control, and rational use of medicines, especially by enhancing national awareness of AMR among all stakeholders including healthcare professionals and the public. The availability of safe and effective antimicrobials of good quality will be ensured.

As the Minister of Health, I will ensure financial, legislative, and other necessary support for the implementation of the planned strategies. I appreciate and thank all the stakeholders involved in revising and formulating the NSP-AMR 2023 - 2028. I am certain that all of us will exert our commitment to combat this major health problem which is a threat to the public.

Dr. Ramesh Pathirana
Hon. Minister of Health

Message from the Hon. Minister of Agriculture and Plantation Industries



As we stand at the threshold of combating Antimicrobial Resistance (AMR), it is with gratitude that I reflect upon the transformative journey taken collectively by the experts involved.

Antimicrobial Resistance is a growing global threat and it is important for us to gather and plan together to prevent AMR. It is essential to acknowledge the critical importance of this issue in our present-day world.

AMR is not just a healthcare challenge. But it is a multidimensional issue that exceeds boundaries, affecting not only human health but also our food systems, agriculture, and more importantly the environment. The misuse and overuse of antimicrobial agents have accelerated the development of resistant strains, jeopardizing the effectiveness of these crucial drugs and threatening our ability to combat infections and diseases.

As the Minister of Agriculture and Plantation Industries, I understand that the food crop sector which falls under my responsibility might not have a big impact on Antimicrobial Resistance (AMR). However, in the larger picture of agriculture including livestock, poultry, and fisheries, the use of antibiotics has caused a problem. These drugs, essential for keeping animals healthy, have unintentionally led to germs becoming resistant. Unfortunately, using antibiotics, pesticides, and similar drugs in the wrong way has made these germs stronger, risking the health of both animals and people.

Preventing AMR demands a collaborative and multi-faceted approach that involves all stakeholders including government agencies, healthcare professionals, agricultural experts, industries, and crucially the public. Moreover, collaboration between the agriculture and healthcare sectors is essential. Encouraging interdisciplinary dialogue and knowledge sharing between veterinarians, agronomists, and medical professionals will enable a holistic approach to tackling AMR.

In conclusion, preventing antimicrobial resistance demands our immediate attention and collective action. I appreciate and thank the multi-sectoral stakeholders involved in carrying out the activities of NSP-AMR 2023-2028. I hope together, we can safeguard the efficacy of these life-saving drugs and ensure a healthier, sustainable future for generations to come.

Mahinda Amaraweera
Hon. Minister of Agriculture and Plantation Industries

Message from the Hon. Minister of Fisheries



It is with immense pleasure that I welcome the launch of the National Strategic Plan for Combating Antimicrobial Resistance (NSP-AMR) 2023-2028. This initiative marks a pivotal moment in safeguarding both public health and the future of the fisheries sector.

Antimicrobials, particularly antibiotics, have been invaluable tools in aquaculture. By curbing diseases, they have ensured healthy fish stocks and bountiful harvests. However, their overuse and misuse have led to the phenomenon of antimicrobial resistance (AMR). The AMR poses a critical threat to food security and human health.

Ignoring this growing challenge is not an option. Recognizing the gravity of AMR is the first step towards overcoming it. We must take decisive action to ensure the safety of our food and the sustainability of our fisheries. This demands a multi-pronged approach, wielding all available tools in our arsenal. We must encourage the creation of a framework that encourages prudent antibiotic use, prioritizing disease prevention strategies like improved biosecurity, vaccination, and alternatives to antibiotics such as immunostimulants and the development of disease-resistant animals through selective breeding. Investing in research is key to exploring novel remedies and diagnostics, equipping us with new weapons against resistant bacteria without relying solely on existing antibiotics.

The launch of NSP-AMR demonstrates the Ministry of Health's unwavering commitment to tackling this crucial issue. By taking decisive action today, we can turn the tide on antimicrobial resistance and secure a healthier tomorrow for generations to come.

I assure my fullest support for the implementation of NSP-AMR in the fisheries sector.

Douglas Devananda
Hon. Minister of Fisheries

Message from the Hon. State Minister of Environment



It is with a deep sense of responsibility that I pen this message on the occasion of the launching of National Strategic Plan for combating Antimicrobial Resistance (NSP-AMR) 2023 – 2028 in Sri Lanka. Antimicrobial Resistance (AMR) has been recognized As a major global public health threat and now it is understood as a threat across many sectors including human health, terrestrial and aquatic animal health, agriculture, food production, food safety and environment.

The environment serves as a natural reservoir for a diverse range of microorganisms. Exposure to low concentrations of antibiotics in the environment can exert selective pressure on these microorganisms, favoring the survival and proliferation of resistant strains. Some bacteria in the environment possess natural resistance mechanisms, and exposure to low levels of antibiotics can enhance the prevalence of these resistance traits.

The One Health approach recognizes the interconnectedness of human, animal, and environmental health. Efforts to address antimicrobial resistance should consider the environmental dimension, aiming to reduce the release of antibiotics into the environment and mitigate the environmental drivers of resistance.

Efforts to control the environmental spread of antimicrobial resistance include monitoring antibiotic residues in water bodies, improving wastewater treatment processes, and implementing regulations to limit the environmental release of antibiotics. Addressing antimicrobial resistance from an environmental perspective requires a holistic and collaborative approach that involves stakeholders from public health, agriculture, environmental science, and policy-making domains

As the State Minister of Environment, I wish to express my immense gratitude towards all the professionals worked tirelessly towards formulation a National Strategic Plans and pledge my unwavering support as they embark on this committed journey to save our nation from this silent yet dire crisis.

Janaka Wakkumbura
State Minister of Environment

Message from the Secretary, Ministry of Health



I am very proud to send this message on the occasion of the launching of the National Strategic Plan for Combating Antimicrobial Resistance (NSP-AMR) 2023-2028 in Sri Lanka. I would like to extend my heartfelt gratitude to all those who have tirelessly worked together from the human, animal, fisheries, agriculture, and environment sectors to make this initiative a reality.

Antimicrobial resistance is a growing global concern that affects not only human health but also poses a significant threat to animal health. It has the potential to escalate morbidity and mortality rates, further exacerbating the prevalence of AMR organisms in our environment. The consequences of inaction are dire, and it is our responsibility to tackle this issue head-on.

With invaluable support from the World Health Organization's country office, Sri Lanka initiated its National Strategic Plan to combat AMR in 2017. Now we all are here under one health to renew our commitment for the next five years. This updated plan underscores the importance of continuous vigilance and proactive measures.

We must emphasize the importance of monitoring our activities and addressing past shortcomings through careful evaluation. By doing so, we can ensure that we are taking the right steps towards a future where AMR is no longer an overwhelming threat.

I urge all of us to unite in this critical fight against AMR. Together, we can safeguard the health and well-being of our nation, and leave a lasting legacy for future generations.

Dr. P. G. Mahipala
Secretary of Health

Message from the Director General of Health Services, Director General of Department of Agriculture and Director General of Department of Animal Production and Health

Let us congratulate the National Focal Point-AMR, and his team at the office of Deputy Director General Laboratory Services, Ministry of Health and the entire One Health Team on your well-deserved success. Antimicrobial resistance (AMR) poses a serious threat, and your dedication to combat it is truly commendable.

In a world where inappropriate use of antimicrobial agents span across human, animal, fisheries, agriculture and environmental sectors, we are pleased to acknowledge the significance of your achievements.

The Global Action Plan to combat AMR, established in 2015, was a significant milestone. All member states, including Sri Lanka, committed to developing a National Action Plan aligned with this global initiative. In 2017, Sri Lanka stepped up and crafted the National Strategic Plan for combating Antimicrobial resistance (NSP-AMR), setting a clear path forward. This initiative marked the beginning of a multi-sectoral collaboration under the “One Health” concept, a holistic approach to combating AMR.

Today, we proudly celebrate the publication of the NSP-AMR 2023-2028. This accomplishment is evidence to the sustained dedication and hard work of the entire team. Launching of NSP-AMR a critical step in our ongoing battle against AMR, and your persistent commitment to implementing, monitoring, and evaluating the plan will be a crucial to achieve success.

We look forward to seeing the positive impact that the NSP-AMR 2023-2028 and it will safeguard our health and the well-being of the community. Let us appreciate the combined efforts of One Health stakeholders. Your efforts are truly making a difference, and we are grateful for your remarkable contributions for this worthy cause.

Multi sector collaboration of One Health stakeholders is an inspiration all of us, and we are excited to see the positive changes of our collaborative efforts in the fight against antimicrobial resistance. Let us get together to prevent AMR.



Dr.(Mrs) K. A. C. H. A. Kothalawala
Director General of Department of
Animal Production and Health



Dr. Asela Gunawardena
Director General of
Health Services



Ms. Malathy Parasuraman
Director General of
Department of Agriculture

Message from the National Focal Point for Antimicrobial Resistance



Antimicrobial resistance (AMR) continues as a global threat to public health, with devastating consequences on efficacy and effectiveness of medicines against infectious diseases. Globally, AMR is responsible for approximately 1.27 million deaths per annum with 389,000 estimated fatalities in South Asia. In order to combat AMR threat, the World Health Organization (WHO) has been providing guidance to member states to develop National Strategic Plans in line with the Global Action Plan-AMR (2015).

Sri Lanka developed the first National Strategic Plan for combating AMR (NSP-AMR) in 2017 and it was revised after conducting 19 review meetings during 2023. The revised NSP-AMR 2023-2028 includes seven priority areas. This plan includes the activities of human health sector, animal health sector, fisheries, environment and agriculture sectors. This One Health approach is crucial in managing AMR threat efficiently and effectively.

National AMR Focal Point is responsible for collaboration of all above sectors. Multi-sector collaboration enables us to strengthen integrated AMR surveillance systems, antimicrobial stewardship programmes, infection prevention activities and optimise use of antimicrobials.

The National Advisory Committee on AMR (NAC-AMR) is the governance body which make decisions at the policy level. National Action Plan Implementation and Strengthening Team (NAP-IST) is responsible for implementation of activities of the NSP. Furthermore, collaboration among One Health partners including World Health Organization (WHO), Food and Agriculture Organization (FAO), Organization for World organization for Animal Health (WOAH) and United Nations Environment Programme (UNEP) allows us to work together in accordance with alignment of policies, regulations, and guidelines, ensuring consistency in our efforts.

Moreover, Sri Lanka has been enrolled in the Global AMR Surveillance System (GLASS) since 2017 and AMR data is submitted through WHONET software annually.

I would like to express my gratitude to the Sri Lanka College of Microbiologists and the World Health Organization for their expertise, commitment and unwavering support in this endeavour. Let us continue to work together to fight against this silent pandemic.

Dr. Sudath K Dharmaratne
Deputy Director General - Laboratory Services
National AMR Focal Point
Ministry of Health

Message from WHO Country Office, Sri Lanka



Since its discovery in the last century, antibiotics have been a valuable tool that has helped humankind to tackle and overcome health consequences due to communicable diseases. With frequent and expanding multi-modal usage antimicrobial resistance (AMR) has emerged as a top concern for the world.

Consequently, AMR requires a holistic and multi-sectoral approach referred to as a One Health approach to combat future challenges. The One Health approach brings together multiple sectors and stakeholders engaged in human, terrestrial, aquatic animal and plant health, food and feed production and the environment to communicate and work together in the design and implementation of programmes, policies, legislation, and research to attain better public health outcomes.

The Global Action Plan on Antimicrobial Resistance launched in 2015 was a comprehensive and collaborative effort between human, animal and environment sectors aimed at addressing the growing threat of antimicrobial resistance worldwide. Until recently, there were 178 countries have multi-sectoral National Action Plans (NAPs) on AMR including all 11 countries in the WHO South-east Asian Region. Nonetheless, only 27% of countries reported successfully implementing their NAPs, and only 11% had set aside national funds for this purpose.

In 2023, WHO launched the WHO people-centred approach to addressing AMR in the human health sector. People-centred approach puts people and their needs at the centre of the AMR response and guides policymakers in taking programmatic and comprehensive actions to mitigate AMR in line with a proposed package of core interventions.

Sri Lanka with WHO support developed the initial National Strategic Plan for Combating Antimicrobial Resistance in 2017 covering the period 2017 – 2022. WHO also supported the Ministry of Health to conduct the end term evaluation of the AMR National Strategic Plan 2017 - 2022. Following the end of the plan in 2022, it is indeed a pleasure for WHO Country Office to be a partner to the Government of Sri Lanka in the development of the National Strategic Plan (NSP) for Combating Antimicrobial Resistance in Sri Lanka for the period of 2023 – 2028. These activities were supported through three levels of WHO while utilizing the using the WHO latest tools and guidance and in joint collaboration with AMR National Steering Committee, Sri Lanka College of Microbiologists under the overall aegis of the Deputy Director General Lab Services.

Further to the NSP development, WHO will extend support in the country led effort of developing the two-year costed operational plan to accompany the NSP. WHO Sri Lanka remains committed to supporting the implementation of the AMR National Strategic Plan 2023 – 2028 collaboratively with stakeholders and partners, aiming to enhance the effectiveness and sustainability of efforts in addressing antimicrobial resistance (AMR) challenges.

Dr Alaka Singh
WHO Representative- Sri Lanka

Message from the President, Sri Lanka College of Microbiologists



Antimicrobial resistance (AMR) poses a grave threat to public health, rendering our arsenal of antimicrobial agents increasingly ineffective against bacterial, viral, fungal, and parasitic infections. The emergence and spread of resistant microbes have the potential to reverse decades of medical advancements, jeopardizing the effectiveness of treatments and placing millions of lives at risk.

AMR surveillance of the hospitals of Sri Lanka is conducted under the national AMR surveillance programme and the resistance rates of *E. coli*, *Klebsiella pneumoniae*, and *Acinetobacter* spp from blood and urine, for Carbapenems and third generation Cephalosporins are alarming. MRSA in the blood has no exception. In the face of AMR thriving in the country, the development of the National Strategic Plan (NSP) for Combating AMR in Sri Lanka and the National Action Plan with Monitoring and Evaluation parameters for 2023- 2028 is essential. This was developed by a Consultancy Team consisting of members of the Sri Lanka College of Microbiologists (SLCM) and One Health sector coordinators. This plan serves as a roadmap for safeguarding the effectiveness of antimicrobials for generations to come.

On behalf of the SLCM, I extend our heartfelt gratitude to all those involved, in the development of the NSP including One Health partners. Your dedication, expertise, and tireless commitment are truly commendable. This collaboration signifies an important milestone in our ongoing battle against AMR, a threat that knows no boundaries and requires a unified approach.

Also, I wish to express our thankfulness to the Secretary of Health, the DGHS, the DDGLS, the National Focal Point for AMR, and the WHO country office for their invaluable support and facilitation in the development of the NSP.

As we embark on the implementation phase of this strategic plan, let us continue to work together, to confront AMR head-on. As SLCM, we guarantee our fullest support. Together, we can mitigate the impact of AMR and ensure a healthier future for all.

Dr. Malika Karunaratne
President
Sri Lanka College of Microbiologists

National Strategic Plan for Combating Antimicrobial Resistance in Sri Lanka 2023 - 2028

Executive summary

Antimicrobial Resistance (AMR) is well recognized as a silent pandemic posing a threat to human health, terrestrial and aquatic animal health, plant health, food production, food safety, environmental safety and global developmental goals.

After adoption of the Global Action Plan on Antimicrobial Resistance (GAP-AMR) with five key strategic objectives and in 2015, many countries of the world developed and implemented National Action Plans for combating AMR with a One Health approach.

Sri Lanka has developed and implemented the country's first National Strategic Plan for combating AMR in 2017 (NSP 2017-2022) aligned with the strategic objectives of the GAP-AMR. Country AMR response has been organized and implemented by the national AMR focal point with focal points from human health, terrestrial and aquatic animal health and production, plant health and production, food safety and environment sectors. A National Advisory Committee (NAC-AMR) and a National Action Plan Implementation Strengthening Team (NAP-IST) have been appointed with representatives from the above sectors.

The end-term evaluation of the progress in implementation of NSP 2017-2022 was conducted by a team of Sri Lankan consultant microbiologists with the support of coordinators representing One Health sectors (human health, terrestrial and aquatic animal health and production, plant health and production, food safety and environment). This activity was conducted from April-June 2023 with the support of WHO. The same team of consultants and sector coordinators continued to work to develop the revised and updated National Strategic Plan 2023- 2028 and the National Action Plan for combating antimicrobial resistance in Sri Lanka for the next five-year period from 2023 to 2028 (NAP-AMR 2023-2028). This plan includes the indicators for Monitoring and Evaluation (M&E) framework for the implementation of NAP with selected outcome indicators to monitor the impact.

Methodology

The revised NSP-AMR 2023-2028 and the NAP-AMR 2023-2028 were developed immediately after the end-term review (ETR) of the progress in implementation of the NSP-AMR 2017- 2022, and the results of ETR served as the situational analysis. A desk review of available documents and a series of consultative meetings were conducted to assess the current situation of implementing the strategies recommended by the GAP-AMR and the NSP 2017-2022. Another set of stakeholder meetings were conducted after identifying the policy and implementation gaps observed to discuss the challenges and the lessons learnt during 2017-2022. Stakeholders from human health - curative and preventive, central and peripheral institutions, animal health and production in terrestrial and aquatic sectors, plant health and food production, food safety and environment sectors were actively engaged in discussion to identify the priority actions and activities for the revised NSP-AMR 2023- 2028 and NAP. All sectors included participants from different levels of the organization structure in state and private sectors including administrators, regulatory authorities, consultants, technical experts, academia, professional associations, pharmacists, nurses and industry.

Key recommendations for revision were developed after the assessment of implementation status of the five GAP strategies, weaknesses, gaps and challenges. Key recommendations were used for the identification of new strategies, interventions, priority actions and activities for combating AMR in the next five years.

A literature review was conducted to learn from the experience of other countries and to adopt the new recommendations of quadripartite organizations (WHO, WOA, UNEP, FAO) for prevention and containment of AMR.

Revised National Strategic Plan (2023 -2028)

The new NSP includes seven priority areas to organize the country, AMR response during 2023-2028. The vision and mission statements developed in 2017 remain unchanged. The super goal and goals of the NSP are aligned with those of the GAP-AMR.

Each priority area has a strategic objective and several strategic interventions to achieve the objective. Priority Area 1 identifies the need for advancing the country's response to AMR by strengthening of One Health coordination and ensuring sustainability with resource mobilization, regular monitoring and evaluation.

Priority areas 2 to 6 include the GAP-AMR strategic objectives which have been addressed in the previous NSP and need continued streamlining of activities to improve the outputs and outcomes in each area. Priority area 7 is newly introduced to assess the risk of environmental contamination with antimicrobials and resistant organisms to organize the preventive mechanisms.

National Action Plan for Combating AMR in Sri Lanka - 2023-2028

The NAP-AMR 2023-2028 includes the priority actions, activities, and M&E indicators under each strategic intervention listed in the NSP document. Many process and output indicators are incorporated into the M&E framework to facilitate the early phases of NAP implementation. Several core outcome indicators are also included.

A strong governance and M&E mechanism with One Health representation is proposed in priority area 1 to ensure the progress of implementation including baseline risk assessments.

Chapter 5 on M&E describes the expected plan for evaluation with annual progress reviews and mid-term and end-term reviews. Activities and M&E indicators can be refined with the findings of the midterm evaluation in 2025/2026.

Long-term goals for the country's AMR response should be defined through discussion with multisectoral committees.

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Abbreviations

AG	Agriculture
AH	Animal Health
AMC	Antimicrobial Consumption
AMR	Antimicrobial Resistance
AMU	Antimicrobial Utilization
AR	Antimicrobial Residue
ARSP	Antibiotic Resistance Surveillance Program
AST	Antibiotic Susceptibility Testing
BMP	Best Manufacturing Practices
CEA	Central Environment Authority
CPD	Continuous Professional Development
CSSD	Central Sterile Supply Department
DAPH	Department of Animal Health and Production
DDGLS	Deputy Director General for Laboratory Services
DGHS	Director General Health Services
DHQS	Directorate of Health are Quality & Safety
DOA	Department of Agriculture
DOFAR	Department of Fisheries and Aquatic Resources
DOH	Department of Health
DRA	Drug Regulation Authority
EN	Environment
ET and R	Education, Training and Research
ETR	End-Term Review
FA	Fisheries and Aquatic
FAO	Food and Agriculture Organization of the United Nations
FVMAS	Faculty of Veterinary Medicine and Animal Science
GAP	Good Agricultural Practices
GAP-AMR	Global Action Plan for combating AMR
GLASS	Global Antimicrobial Resistance and Use Surveillance System
GOSL	Government of Sri Lanka
HH	Human Health
IEC	Information, Education and Communication
IHR	International Health Regulations
IPC	Infection Prevention and Control
JEE	Joint External Evaluation
M & E	Monitoring and Evaluation
MOA	Ministry of Agriculture
MDRO	Multidrug Resistant Organisms
MOE	Ministry of Environment
MOF	Ministry of Fisheries
MOH	Ministry of Health
MRI	Medical Research Institute
MSD	Medical Supplies Division
NAC-AMR	National Advisory Committee for AMR NAFP National AMR Focal Point
NAP	National Action Plan
NAP-IST	National Action Plan - Implementation Strengthening Team
NAQDA	National Aquaculture Development Authority
NARA	National Aquatic Resources Research and Development Agency
NEQAS	National External Quality Assessment Scheme
NMCC	National Multisectoral Coordinating Committee
NMQAL	National Medicines Quality Assurance Laboratory

NMRA	National Medicines Regulatory Authority
NRA	National Regulation Authority
NRLN	National Reference Laboratory Net
NSP	National Strategic Plan
NWSDB	National Water Supply and Drainage Board
OIE	World Organisation for Animal Health (WOAH)
PGIM	Post-Graduate Institute of Medicine
PHSRC	Public Health Sector Regulatory Council
QSPs	Quality Standard Procedures
ROP	Registrar of Pesticides
SDG	Sustainable Development Goals
SEARO	South-East Asia Regional Office
SLARS	Sri Lanka Antimicrobial Resistance Surveillance
SLCM	Sri Lanka College of Microbiologists
SOP	Standard Operating Procedure
SPMC	State Pharmaceuticals Manufacturing Corporation
STI/HIV	Sexually Transmitted Infections/Human Immunodeficiency Virus
TOR	Terms of Reference
TrACCS	Tracking AMR Country Self-Assessment Survey
TSG	Technical Supporting Group
TWG	Technical Working Group
UN	United Nations
UNEP	United Nations Environment Programme
VDCA	Veterinary Drug Control Authority
VPD	Vaccine Preventable Disease
WAAW	World AMR Awareness Week
WASH	Water, Sanitation and Hygiene
WB	World Bank
WHO	World Health Organization
WOAH	World Organization for Animal Health

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Chapter 1 – Introduction

The global crisis of antimicrobial resistance

Antimicrobial agents are essential lifesaving medicines used to treat infectious diseases. Antimicrobial resistance (AMR) makes pathogenic bacteria, fungi, viruses and parasites unresponsive to the antimicrobial agents used to treat infections caused by them. Infections due to organisms with AMR are difficult to treat, and result in greater suffering and deaths among humans and animals, escalating healthcare costs and economic losses. Due to their survival advantage, resistant microorganisms have better chances of transmission among patients, within healthcare settings. AMR genes can cross species barriers and geographic boundaries and enter the environment causing widespread contamination. Difficulties in inventing newer molecules that can effectively treat resistant pathogens create a drying antimicrobial pipeline. Therefore, AMR is identified as a silent pandemic and a serious global public health threat.

According to the report issued by an Interagency Core Group established to provide guidance on the global response to AMR in 2019, drug resistant diseases cause 700,000 deaths per year globally. If urgent action is not taken to combat AMR, it is predicted to cause an annual death toll of 10 million in 2050.¹

The globally organized response to AMR

At the 68th World Health Assembly held in May 2015; member nations agreed to implement a Global Action Plan on Antimicrobial Resistance (GAP-AMR). The overall goal of the plan was to ensure the continuity of the ability to treat infectious diseases with effective, safe, quality assured medicines used in a responsible way and accessible to all who need them.

The GAP-AMR developed by the World Health Organization (WHO) in collaboration with Food and Agriculture Organization of the United Nations (FAO) and World Organisation for Animal Health (OIE/WOAH) endorsed by 193 countries at the United Nations High Level meeting held in 2016. All countries were advised to develop their own National Action Plans (NAP) aligned with the five strategic objectives highlighted in the GAP-AMR.²

Key strategic objectives recommended by GAP-AMR

1. Improve awareness and understanding of antimicrobial resistance through effective communication, education, and training
2. Strengthen the knowledge and evidence base through surveillance and research
3. Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures
4. Optimize the use of antimicrobial medicines in human and animal health
5. Develop the economic case for sustainable investment that takes account of the needs of all countries, and increase investment in new medicines, diagnostic tools, vaccines, and other interventions

One Health approach to combat AMR

The importance of interconnections between humans, animals, plants, and their shared environment in propagating AMR has become increasingly evident. Active, multisectoral collaboration of human health, animal health and production (terrestrial and aquatic), plant health and food production, food safety and environment sectors in AMR prevention is emphasized with the One Health approach. Accordingly, the United Nations agencies and other organizations including the World Organization for Animal Health (OIE/WOAH), Food and Agriculture Organization (FAO), United Nations Environmental Programme (UNEP) and the World Bank (WB) have developed strategies to combat AMR in relevant fields.³

One Health is defined as an integrated, unifying approach that aims to achieve optimal and sustainable health outcomes for people, animals, and ecosystems.⁴

AMR as a threat to global development

Initially described as an immediate threat to human health, AMR is now considered as a threat to global development. Adverse impact of AMR in achieving the Sustainable Development Goals (SDG) is well recognized in the areas of health and well-being, poverty reduction, food security, environment, and economic growth.⁵

The Global Antimicrobial Resistance and Use Surveillance System (GLASS) attempts to measure the global burden of AMR. Global data reported in 2021 reveals a serious concern of very high levels of resistance to third generation cephalosporins and carbapenems among Gram negative bacteria causing bloodstream infections.⁶

Understanding the gravity of the crisis and the need for working together to manage the threats at the human-animal-plant and ecosystem interphases, the Tripartite organizations with UNEP has developed a strategic framework for collaboration on antimicrobial resistance.⁴ This strategy emphasizes that countries should own a sustainable One Health response supported by policies, laws, governance structures, multisectoral coordination mechanisms, National Action Plans (NAP) and adequate resources to implement the GAP strategies for combating AMR. Mainstreaming the NAP-AMR into national plans and budgets and engaging key stakeholders of state and private sectors at all levels including civil society groups are recommended.^{4,7}

AMR response in the South-East Asia region

According to WHO risk assessments South-East Asia is a region highly affected by AMR. WHO regional office (SEARO) has been proactive in responding to the AMR threat. A declaration on action to prevent the emergence and contain AMR was signed in 2011 by the health ministers of member countries, at their regional meeting held in Jaipur, India.⁸ SEARO has developed a roadmap for combating AMR to provide guidance to the region and has conducted assessments on country response to AMR on common indicators.^{9,10,11}

Sri Lanka - country context and response to AMR

Sri Lanka is a South Asian island with lower middle-income level and a population of 22,156,000 in 2022.¹² The country has recently experienced an economic crisis affecting the performance of many sectors.

A well-developed, free healthcare delivery system with preventive and curative services has been established and governed by the Ministry of Health (MOH) of the Government of Sri Lanka (GOSL). This system claims many achievements and success stories in healthcare indices such as a high immunization coverage among children and low maternal and perinatal mortality rates. Several infectious diseases of public health importance have been eliminated. However, the state investment in health has been low (1.7% of the GDP or less) compared to the global percentage.¹³

Microbiological services had been limited to the Medical Research Institute (MRI), laboratories of public health programmes and main teaching hospitals, and medical faculties for several decades. The importance of action to combat AMR was identified with the establishment of microbiological diagnostic facilities in hospitals of the country. An AMR surveillance system has been initiated by the Sri Lanka College of Microbiologists (SLCM) in 2009-2010 which has generated several reports on AMR status of the country.¹⁴

Alongside many other countries in the world, Sri Lanka developed the first National Strategic Plan (NSP 2017-2022) for combating AMR in 2017. This strategic plan had been officially approved by the GOSL and implemented from 2017 to 2022. The Deputy Director General of Laboratory Services (DDGLS), who has been identified as the national AMR focal point has organized the implementation of activities recommended by the NSP 2017-2022.

The end term review (ETR) of the implementation of NSP 2017-2022 was conducted during May-June 2023 by a team of local consultants through a multisectoral consultative process supported by the AMR focal point and the WHO. Progress in implementation of NSP 2017-2022 with gaps and challenges identified are described in the ETR report. Recommendations for improving the planning and implementation of country AMR response have been formulated based on the observations made during the ETR process. The current situation of AMR and implementation status of NSP is summarized in chapter two of this document.

This revised National Strategic Plan and the National Action Plan (NSP-AMR and NAP-AMR 2023-2028) are expected to provide a roadmap for the country to improve and sustain the activities for combating AMR in Sri Lanka during the term 2023-2028. The strategic plan and action plan have been developed through a consultative process with active participation of key stakeholders in human health, animal health and production in terrestrial and aquatic sectors, agriculture (plant health and food production), food safety and environment. Efforts have been made to formulate strategies and activities to augment the country response to AMR, considering the gaps in implementation of the previous NSP (2017-2022), challenges faced, and the lessons learnt as well as the strategies recommended by quadripartite organizations.

The Vision and Mission developed during the previous NSP-AMR 2017- 2022 and the alignment with strategic objectives recommended by GAP-AMR remain unchanged in the revised NSP- AMR 2023- 2028.

Chapter 2 – Situational analysis

Strategies adopted for prevention and containment of AMR in Sri Lanka

Policy support, regulations and planning of country AMR response

Sri Lanka has endorsed the National Medicinal Drug Policy in 2007 and the National Medicines Regulatory Authority (NMRA) Act in 2015.¹⁴ NMRA has implemented regulations to control the registration, importation, manufacturing, quality assurance, storage, transport and sale of medicines including antimicrobials. Antimicrobials are categorized as prescription only medicines. Sri Lanka National Health Policy and the National Health Strategic Master Plan (2016 – 2025) developed by MOH in 2015 have identified the need to improve policies and practices for controlling antibiotic resistance and prevention and control of infections (IPC).¹⁵ There are successful efforts in developing national policies for biosecurity, food safety, and IPC lead by the MOH. A policy for combating AMR has been drafted.

Departments of Animal Production and Health (DAPH) Department of Agriculture governed by the Ministry of Agriculture (MOA), Ministry of Fisheries and Aquatic Resources Development (MOF) and Ministry of Environment (MOE) have implemented national policies, acts, regulations, and standards which support the strategic interventions for combating AMR in One Health sectors. There is opportunity for strengthening support for AMR specific interventions during revision of these policies and regulations and national level planning. These sectors have adopted the relevant international codes of practice, standards and conventions to support the implementation of NSP (recommendations of WOA, FAO and UNEP, Codex Alimentarius and Multilateral Agreements for Environmental Protection). MOE has implemented regulations to prevent antimicrobial contamination of environment though Sri Lanka standards and surveillance for antimicrobial contamination of food and environment are yet to be established.

The first NSP for combating AMR (NSP 2017-2022) had been developed with multisectoral collaboration and endorsed by the GOSL in 2017. NSP 2023-2028 was well aligned with the five key strategies of the GAP-AMR (WHO 2016) and included interventions in human health, terrestrial and aquatic animal health and agriculture sectors with 2-year and 5-year milestones. The term for implementation of this first NSP was completed in December 2022 and the End Term Review has been conducted in May-June 2023.

Sri Lanka has recently faced the Joint External Evaluation (JEE) for the assessment of core capacities of International Health Regulations (IHR) which include an assessment on prevention and containment of AMR¹⁶. Recommendations of the JEE are useful for the One Health sectors to focus on improving the AMR response during the next phase of national planning. Capacity of country systems to update and enforce regulations and to implement plans to combat AMR needs further improvement.

The revised NSP for combating AMR and the National Action Plan 2023- 2028 described in this document includes the strategic plan (NSP) in seven priority areas and the National Action Plan (NAP) for combating AMR during the five-year period from the end of 2023 up to 2028. (NSP 2023-2028 and NAP 2023-2028). Stakeholders from all sectors including academia and private sector have been actively engaged in the consultative process for developing the NSP and the NAP.

Governance structure and mechanisms for implementation of One Health AMR response

During the implementation of NSP 2017-2022 it has been decided to establish the National Focal Point for AMR related activities at the MOH due to the direct impact of AMR on human health. Organization of state sector healthcare delivery system is reviewed in HSR 2021.¹³ Performance of the MOH Sri Lanka in 2021 is available on the MOH performance and progress review report 2022.¹⁷ Both documents indicate the availability of governance structures in curative and preventive health sectors to support the implementation of activities related to NSP and NAP-AMR in the country. Ministry of Health has organized its workflow through the head of the department, the Director General of Health Services (DGHS), Deputy Director Generals and many directorates. Curative care services are offered by a network of tertiary, secondary and primary care hospitals and clinics extending from

urban to rural areas of the island. Preventive services are delivered through the Epidemiology Unit and 9 provincial and 26 regional directorates with 354 Medical Officers of Health areas covering the whole country. Several public health programmes are dedicated for the prevention and control of specific communicable diseases such as TB, HIV, leprosy, malaria and filaria. Achieving the targets of Universal Health Care and SDG is a priority for the MOH. These existing structures, mechanisms and expertise are strengths in implementing the AMR response in the human health sector.

Responsibility of organization and implementation of One Health AMR combating activities is co-shared with several other cabinet ministries of the GOSL. Department of Animal Health and Production (DAPH) governs the animal health and production (terrestrial animals). Department of Agriculture (DOA) is responsible for plant health and food production. Both DAPH and DOA are governed by the Ministry of Agriculture (MOA). Activities in aquatic animal health and aquaculture sectors are governed by the Ministry of Fisheries and Aquatic Resources Development (MOF). Activities related to food safety are organized by the MOH with multisectoral groups including representatives from animal production (terrestrial and aquatic), aquaculture, and agriculture. The Ministry of Environment (MOE) governs the organizations responsible for developing and implementing policies and regulations for environmental protection. Several other cabinet ministries, authorities and organizations are involved in service delivery related to public health and sanitation, infrastructure development and regulation in the community level, higher education, school education, vocational training as well as research activities related to AMR.

Participation of private sector healthcare providers and industries is vital in AMR prevention activities. In the health sector, only the few internationally accredited private hospitals in Colombo have established programmes for IPC and antimicrobial stewardship. Cooperation of the pharmaceutical industry is important for monitoring the sales of antimicrobials. Industries producing food and medicine for the export market have developed the capacity for complying with international consumer safety standards. Safety of products released to the local market should be improved through encouraging the adoption of best manufacturing practices (BMP), good agricultural practices (GAP) and monitoring standards to ensure the safety of drinking water and food products.

The revised NSP and NAP-AMR has recommended an advanced One Health AMR response through active engagement of stakeholders and harnessing the available structures in all above sectors. Changing the behavior of the public is an important strategy in preventing infections and AMR. Improving communications with patients and families, delivery of key health messages in all languages with effective social marketing tools and working together with civil society organizations to empower the public to follow hygienic practices are essential measures to achieve sustainable practices and long-term impact goals of NSP.

Implementation of key strategies of NSP during 2017-2022

A NSP implementation mechanism with an AMR focal point, the National Advisory Committee (NAC-AMR) and an implementation strengthening team (NAP-IST) has been identified in 2017 with multisectoral representation and terms of reference. However, a costed operational plan endorsed by all sectors and a regular monitoring system have not been available during the term. Some of the activities related to the NSP had been rolled out in 2017 and considerable progress has been reported in the WHO SEARO review on NAP implementation conducted in 2018.¹⁰ Covid-19 pandemic, economic instability and the lack of AMR specific budget lines or funding mechanisms have affected the implementation of NSP-AMR from 2020.

A detailed evaluation of the progress in implementation of NSP was conducted and the progress of implementation of strategic interventions was assessed in mid-2023, using the AMR roadmap developed by WHO-SEARO in 2016.⁹ The report of this end term review provides a detailed analysis of the status of NSP implementation.¹⁸ Table 1 below summarizes the current situation of AMR preventive strategies in the country with important strengths and weaknesses related to implementing NAP/GAP objectives.

Table 1. Important strengths and weaknesses in implementing strategic objectives of NSP 2017-2022

Focus area	Situation at the end of 2022 and strengths	Main weaknesses/gaps identified
Awareness and knowledge on AMR	<p>Several public awareness activities have been conducted during annual WAAW with involvement of human and animal health sectors.</p> <p>Some AMR training programmes have been conducted during the WAAW in 2017-2019 and later in 2022 with WHO funding support. Some KAP studies have been conducted among small target groups.</p>	<p>A coordinated and integrated public awareness programme and a plan for regular training of relevant target groups in One Health sectors on AMR are not evident.</p> <p>A plan for assessing the impact of awareness /training programmes has not been developed.</p>
AMR and AMC surveillance and laboratory capacity	<p>An AMR surveillance system with 25 state sector hospitals has been identified to report AMR in selected organisms to the AMR focal point who forwards data to GLASS.</p> <p>One national survey on AMC is published. AMC data in animal health sector are reported to WOAHA.</p> <p>Some national level reference laboratories in human health and animal health have been accredited with relevant ISO standards. A National EQA system is available for clinical laboratories in human health sector.</p>	<p>An integrated system for AMR or AMC surveillance covering all sectors and key antibacterials and antifungals has not been developed.</p> <p>Limited number of human health state sector hospitals report AMR to GLASS. AMR surveillance reports have not been disseminated regularly in an effective manner.</p> <p>No integrated laboratory network or a programme for surveillance of AMR in animal health, agriculture, food chain and high-risk areas of environment.</p> <p>Some sentinel laboratories have reported stock-outs of consumables. Needs for laboratory capacity development have not been reviewed regularly.</p>
Infection Prevention and Control	<p>Institutional IPC programmes are established in main healthcare settings with trained staff. Regular annual training of IPC nurses has taken place.</p> <p>A hospital IPC manual is available.</p> <p>A few IPC related quality indicators are reported to national level from state sector hospitals.</p> <p>The national immunization programme is well established with >90% childhood vaccination coverage.</p> <p>Biosecurity practices for imported species are well established in animal health and agriculture sectors.</p>	<p>A national plan to improve IPC services in healthcare facilities, food chain and animal care is yet to be developed.</p> <p>A regular programme for IPC training of all target groups on induction and to improve IPC awareness among the public is not evident.</p> <p>Facilities and resources for implementation of IPC precautions are limited in state sector curative care services.</p> <p>WASH infrastructure development in community needs improvement.</p>
Optimizing antimicrobial use	<p>NMRA has a national medicinal drug policy, acts and regulations.¹⁹</p> <p>VDCA and ROP has acts and regulations to control the use of antimicrobials in animal health and agriculture sectors.^{20,21}</p> <p>Antimicrobials are categorized as prescription-only medicines.</p>	<p>A nationally endorsed policy for AMR containment is not available.</p> <p>Capacity for enforcement of endorsed NMRA regulations is limited. Regular post marketing surveillance of antimicrobial quality is not in place.</p>

Focus area	Situation at the end of 2022 and strengths	Main weaknesses/gaps identified
	State sector has a mechanism for antimicrobial procurement, storage, transport and dispensing and a guideline for disposal of unused antimicrobials is being developed. Guidelines on use of antimicrobials are available for common infections in curative care and for the management of HIV, TB, leprosy, malaria and filaria.	AWaRe classification of antimicrobials and Antimicrobial Stewardship Programmes are not established in many hospitals. Surveillance on uninterrupted access to an essential list of quality assured antimicrobials and the periodical surveys on use of antimicrobials (AMU) and sales in humans and animals are not established.
Research and innovation	Individual or institutional level AMR research has taken place with some collaborative efforts and external funding. Veterinary sector has ongoing research on animal vaccines. Aquatics sector has developed some probiotics to minimise the use of antimicrobials.	There are no policies fostering research environment for AMR although capacity exists for research.
Activities in food safety and environment sectors	Regulations for water quality, sanitation, hygiene, and hazardous waste management are being implemented by the environmental sector. The Food Act is being updated by the Ministry of Health. Quality assured antimicrobial residue (AR) monitoring capacity has been established in the animal health sector for testing exported food items.	No national policy/standards or guidelines have been developed for the surveillance of AR/ AMR in wastewater and soil in high-risk environments. No national policy/standards or guidelines have been developed for the surveillance of AR/ AMR in food chain for local markets.

Monitoring and evaluation of NSP 2017-2022

Though the NSP has identified 2-year and 5-year milestones for achieving specific objectives, targets to measure achievements have not been established. Tracking AMR Country Self-Assessment Survey (TrACSS) has been a useful mechanism for evaluating the progress of AMR response on an annual basis. Country reports of annual TrACSS are available and have been summarized in the ETR report.^{11,18}

AMR burden in Sri Lanka during 2017-2022

AMR burden of the country is highlighted with the current information available on GLASS website (GLASS) and two recent research publications.^{22,23,24} Hospital-based studies revealing high rates of multidrug resistant organisms (MDRO) causing healthcare associated infections during the past 12 years are published in annual bulletins of SLCM accessible on the SLCM website (Bulletins of SLCM 2011- 2022– <https://slmicrobiology.lk/slcm-bulletins/>)²⁵ and other peer reviewed Sri Lankan and international journals.

Table 2 summarizes the AMR rates for key SDG indicators reported to GLASS by the country.²⁶ This shows over 50% resistance to beta lactam antibiotics (MRSA) among *Staphylococcus aureus* bacteraemia and over 60% resistance to cephalosporins in *E. coli* bacteraemia during 2018-2020. MDROs cause a grave concern in the management of severe infections. (Data point in 2020 overlaps with the COVID-19 pandemic and may not represent the real magnitude of AMR in the country).

Table 2. AMR in indicator organisms causing bloodstream infections (bacteraemia), 2018- 2020

Indicator organism	Antibiotic	% resistance 2018	% resistance 2019	% resistance 2020
<i>E. coli</i>	Third generation cephalosporin	67.6% (n= 741)	63.0% (n=432)	61.9% (n=279)
<i>Staph. aureus</i>	Methicillin	-	55.9% (n=535)	53.2% (n=301)

According to a multicenter AMR surveillance report on bloodstream infections in 2009-2010, 26% of septic patients in ICU had bloodstream infections with ESBL producing *E.coli* and *Klebsiella pneumoniae*.²⁷ When compared with this report, there is a remarkable rise in the proportion of third generation cephalosporin resistance reported in 2018.

Carbapenem resistance in Gram negative bloodstream infections is a serious concern according to the GLASS country profile for Sri Lanka showing over 60% resistance in *Acinetobacter* spp. and nearly 40% resistance in *K. pneumoniae*.²⁶

AMR in One Health studies

A study conducted as a multisectoral collaborative effort by Fleming fellows in 2021 has shown considerable rates of AMR in *E. coli* strains isolated from human urine, poultry samples and shrimp muscle. The presence of any degree of resistance to critically important antibiotics used in humans in terrestrial animals and aquaculture should be considered as a serious threat. This study also describes the issues of antibacterial use in poultry farming in study areas.²³

AMR in the environment

A study published in 2020 warns about the presence of *E. coli* strains resistant to several antibiotics and genes conferring resistance to tetracycline, sulfonamides, beta lactams and fluoroquinolones in the water of Kelani River, a main river flowing through the Western province of Sri Lanka.²⁴

Key drivers of AMR in Sri Lanka

- Weaknesses in quality assurance of manufactured and/or imported pharmaceuticals.
- Perceptions and behaviour - limited knowledge of the risk for AMR leading to inappropriate use of antibiotics in humans, animals and plants and incomplete treatment courses, over prescribing and dispensing and improper disposal of antimicrobials
- Unregulated access to antimicrobials due to inadequate capacity to regulate and enforce regulations on antimicrobial use
- Inadequacy of resources to practice general hygiene, IPC precautions and waste management
- Poor access to diagnostic facilities

Key recommendations

Focus Area	Key recommendations
One Health AMR response	<ul style="list-style-type: none"> • Strengthen governance, One Health coordination and implementation mechanisms of NAP-AMR • Identification and mobilizing resources • Establish and implement M&E mechanism
Awareness, knowledge and understanding	<ul style="list-style-type: none"> • Establishing a multi-sectoral technical support group for developing a comprehensive and sustained one health national awareness programme

Focus Area	Key recommendations
	<ul style="list-style-type: none"> • Conduct KAP studies cover wider groups of stakeholders and public • Streamlining the incorporation of the AMR related content to the core curricula of relevant disciplines after performing a situational analysis • Regularize pre-service and in-service training programmes on AMR and CPD programmes on AMR
AMR and AMC surveillance and laboratory capacity	<ul style="list-style-type: none"> • Taking early action for expansion of human AMR surveillance <ul style="list-style-type: none"> ○ in a phased manner to a national scale ○ involving private sector as well ○ with review and update of the surveillance protocols ○ ensuring data security • Establish an expert hub for surveillance of AMR with regular analysis of data and dissemination of information to end users and policymakers • Establish a process to identify the gaps and limitations to produce high-quality microbiological data for patient management and support surveillance activities • Establish and strengthen the coordination mechanism between all relevant sectors for AMR surveillance • Identify the national reference laboratories and network laboratories. Addition of new labs from each sector (E.g. mycology laboratory-MRI, NARA bacteriology lab, etc.) should be considered • Establish a laboratory information management system • Establish a database and national laboratory network to share information on food safety
Infection Prevention and Control	<ul style="list-style-type: none"> • Implement a national policy for IPC with a committee of technical experts to conduct national IPC programmes • Compulsory IPC training for all the healthcare staff including private hospitals (through PHRC) <ul style="list-style-type: none"> ○ with regular recruitment and in-service training ○ with adequate funding to conduct programmes for all the hospitals • PHSRC to develop a system to enforce IPC regulations during registration of private institutions on annual registration • Uninterrupted supplies of consumables for IPC activities (antiseptics, disinfectants etc.) • Post marketing surveillance of antibiotics, antiseptics & disinfectants for quality assurance • Monitoring of wastewater released to the environment and water sources to be treated prior to release • Improving laboratory facilities for detection of fish pathogens in aquaculture • Develop a central monitoring system for disease surveillance in farm animals and aquaculture • Plant disease surveillance system should be introduced to the already available pest surveillance
Optimizing antimicrobial use	<ul style="list-style-type: none"> • Expert committees for integrated AMS – One Health • Establish AMS committees at central and institutional/regional levels including the private sector • Review relevant policies, guidelines, legislation and regulations • Adopt policies and guidelines for optimizing use including AMR policy, adopting AWaRe classification and implementing Antimicrobial Stewardship

Focus Area	Key recommendations
	<ul style="list-style-type: none"> • Ensure an integrated stewardship policy at institutional level which should include stewardship for the use of diagnostics, antimicrobials & IPC management of infectious diseases. • Conduct educational programmes to ensure and measure the adherence to guidelines and AWaRE classification. • Establish surveillance of AMU or AMC to enable an informed decision-making process on optimizing antimicrobial use • Allocate trained human resource for monitoring of antimicrobials through the life cycle • Carry out a situational analysis to assess the impact of identified challenging areas in the development of AMR in One Health sectors. • Prioritise/ modify interventions in One Health sectors according to the level of impact, budgetary constraints, and practicality. • Develop/modify policies, guidelines and regulations to implement activities that ensure prudent use of antimicrobials in One Health sectors • Develop a monitoring and evaluation process to assess the progress of the activities in One Health sectors
<p>Research and Innovation to build an economic case</p>	<ul style="list-style-type: none"> • Measure the AMR related disease burden of the country • Measure the economic impact of AMR burden to influence adoption of stronger policies supporting investments in new medicines, diagnostic tools and vaccines • Identify AMR as research priority • Establish cost-benefit analysis for the vaccination programme in the human and veterinary sector • Develop IT facilities to promote AMR related health education and information dissemination
<p>Food production, safety and environment</p>	<ul style="list-style-type: none"> • Increase laboratory capacity for detection of AMR in food for human consumption. • Establish mechanism for sharing data to arrive at effective strategies to combat AMR. • Increase knowledge on AMR in the food safety sector. • Identify environment as a new priority area for interventions • Conduct a risk assessment of AMR in environment • Establish a system for regular monitoring (passive surveillance) of antimicrobial compounds and their metabolites (or residues) and resistant bacteria or antimicrobial resistance genes (ARGs) in water quality • Review existing regulations and formulate new regulations and implement legislation and/or regulations to prevent contamination of the environment with antimicrobials- antimicrobial compounds and their metabolites discharged to the environment

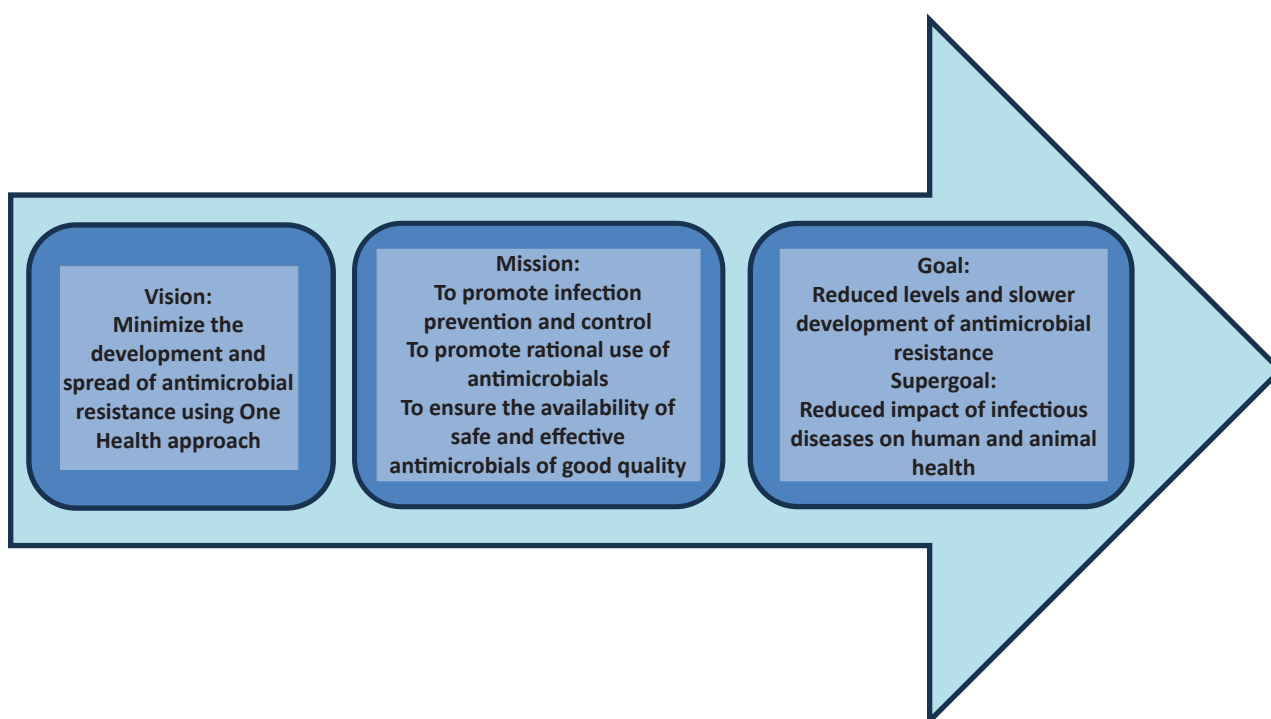
Chapter 3 - National Strategic Plan for Combating Antimicrobial Resistance in Sri Lanka 2023-2028

Sri Lanka has recognised the significance of AMR threat in the country and has implemented many activities to combat AMR. The Minister of Health, Sri Lanka has been a signatory of the Jaipur declaration on prevention and containment of AMR in 2011.

A One Health AMR response has been rolled out with multisectoral engagement since 2017, after development of the first National Strategic Plan for combating AMR (NSP 2017-2022).

The revised National Strategic Plan (NSP 2023-2028) is developed to streamline the processes the country should implement, in order to achieve the goal of minimising the impact of AMR in the country to safeguard humans and animals from the risk of untreatable infections and to support the economic growth and achievement of Sustainable Developmental Goals.

National AMR response – Sri Lanka



National Strategic Plan to Combat AMR in SRI Lanka 2023-2028

NSP AMR 2023-2028 has identified seven priority areas with strategic objectives and a set of strategic interventions to reach the above goal in Sri Lanka. Strategic interventions, priority actions and a list activity are identified through gaps and challenges discussed during the end term review process.

Since Sri Lanka is in a unique situation with well-established systems for healthcare delivery, animal health, agriculture, food production and safety, and environmental sectors, the country has the opportunity of building on the successes already achieved and harnessing the existing frameworks to improve the AMR response. Threats posed by economic constraints need to be identified and remedial measures should be drawn to ensure the progress of planned action.

AMR prevention and containment activities to be implemented in Sri Lanka during the 5-year period from 2023 to 2028 are included in the National Strategic Plan (NSP) under the seven (7) Priority Areas outlined below.

Priority areas of the National Strategic Plan for combating AMR in Sri Lanka

Priority areas	Strategies
1- Advancing the National Response to AMR	Improve multisectoral governance and coordination mechanism for the implementation and monitoring of One Health AMR response
2 - Awareness and understanding of AMR	Improve awareness and understanding of AMR through effective communication, education and training
3 - Burden Assessment of AMR and AMC	Strengthen the knowledge and evidence base through surveillance
4 - Prevention and Control of Infections	Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures
5 - Optimizing Antimicrobial Use	Optimize the use of antimicrobials in human, animal and plant health
6 - Research and Innovation	Develop the economic case for sustainable investment and increased investment in new medicines, diagnostic tools, vaccines, and other interventions
7 - Environmental Safety	Prevent contamination to ensure the safety of environment

Priority area one is introduced to improve the gaps in One Health coordination, operational planning, resource identification and mobilization, and monitoring and evaluation.

Priority areas 2-6 cover the implementation gaps identified in activities under the five strategic objectives of the Global Action plan. Food production and safety also are addressed in priority areas 2-6.

Priority area seven is introduced to cover the relatively new aspects of environmental monitoring to ensure the safety of the environment.

Areas 1-6 of the NSP include integrated One Health interventions as well as activities to be conducted by human health, terrestrial and aquatic animal health and production, agriculture, and environment sectors.

Priority actions and activities to be carried out under strategic interventions identified in the NSP are described in the National Action Plan (chapter 6).

PRIORITY AREA 1 – Advancing the National Response to AMR

Strategic objective 1: Improve multisectoral governance and coordination mechanism for the implementation and monitoring of One Health AMR response

National response to AMR should begin with recognition of AMR as an important threat to human and animal health and as a factor hindering the achievement of sustainable developmental goals. Many different sectors and stakeholders should be actively involved in the response under One Health concept. Organizing a national level multisectoral response needs an overarching national multisectoral coordination mechanism to ensure commitment from many state and non-state sector institutions at different levels. This mechanism should be supported by a dedicated secretariat and should be accountable to an inter-ministerial One Health committee. Effective coordination and communication with relevant ministries including the finance ministry, funding bodies, between and within sectors and with other relevant national programmes should be established. AMR response includes some activities that have already reached a sustainable performance with identified budget lines independently whereas other activities need identification and mobilization of resources for implementation. Activities should be prioritized based on impact goals through discussions with key stakeholders and technical expert groups should be identified to guide and support activities. Multisectoral and sectoral monitoring mechanisms with predefined M&E parameters should be established. Regular progress review meetings should be organized to evaluate performance with appropriate indicators in terms of goals, outcomes or outputs to guide decisions for improvement. AMR should be positioned as a priority within broader development issues and achieving long-term goals identified by other programmes should also be incorporated into AMR response. Therefore, improving and empowering a national level AMR response with a stronger multisectoral governance and coordination mechanism is considered as a priority area in the new National Strategic Plan.

	Strategic interventions	Sectors responsible for action
1.1	Review and improve governance structure and establish a functional mechanism for the AMR response through a high-level committee representing all sectors	AMR focal point and One Health coordinating team HH, AH, FA, AG, EN
1.2	Plan the activities to implement prioritized actions of the NAP to develop the detailed operational plan	
1.3	Cost the detailed operational plan and identification and mobilization of resources	
1.4	Ensure implementation of the operational plan – identify the current phase of implementation of priority actions and implement activities to achieve progress in successive steps until a sustainable operation is established	
1.5	Establish system for collection of data for the identified M&E indicators, identify baselines and organize analysis of data to generate expected knowledge to be used by the AMR multisector coordination mechanism for decision making across all relevant sectors and to advocate for policy changes and allocation of adequate resources	

PRIORITY AREA 2 – Awareness and Understanding of AMR

Strategic objective 2 – Improve awareness and understanding of AMR through effective communication, education and training (GAP objective 1)

This strategic objective aims to increase awareness and understanding of AMR among public and other stakeholders in the human health, animal health, agriculture and environment sectors.

Awareness and education are essential elements of any programme designed to influence behavioral changes and it is expected that nationally coordinated, well designed, sector-targeted education and communication campaigns will enable achieving this objective.

Several smaller-scale behavioral studies have been conducted during the period of 2017 to 2023. In a study conducted with 50 outpatients with acute respiratory tract infections and five physicians in the Outpatient Department (OPD) at a large, public tertiary care hospital in southern province, it was found that 80% of outpatients with influenza-like illness received antibiotics. Patient demand was cited as an important cause of antibiotic overuse²⁹. A cross-sectional study conducted among 262 doctors revealed that while the knowledge and practice scores were high, when knowledge and practice scores were correlated, the practice score was lower than that of knowledge³⁰. A study on 466 pharmacy undergraduates revealed that 24% of senior students had used antibiotics in the previous month though their knowledge was satisfactory³¹. In a cross-sectional descriptive study conducted among 450 patients attending the OPD of a Teaching Hospital, awareness on AMR was found to be poor³².

However, as a nationally representative assessment has not taken place to detect behavioral patterns of public and key stakeholders in all sectors, it is important to carry out this activity in a more organized manner in the new strategic plan.

	Strategic interventions	Sectors responsible for action
2.1	Raising awareness, knowledge and understanding among the public and target groups on AMR to change behaviour leading to irrational use of antimicrobials	HH, AH, FA, AG
2.2	Understand the AMR risk and response in all sectors	HH, AH, FA, AG, EN
2.3	Training and professional education on AMR in human health and food safety sectors	HH
2.4	Training and professional education on AMR in terrestrial and aquatic animal health sectors	AH
2.5	Training and professional education on AMR provided to the farming (animal and plant), food production, and environment sectors.	AH, FA, AG, EN

PRIORITY AREA 3 – Burden assessment of AMR and AMC

Strategic objective 3 – Strengthen the knowledge and evidence base through surveillance (GAP objective 2)

Building robust surveillance systems capable of producing data that can be used to inform and evaluate the actions taken is an essential component of AMR response. Surveillance systems require coverage of the population, access to quality assured laboratory services, adequate diagnostic stewardship, and strong reporting systems and it is challenging to develop and sustain robust national surveillance systems in lower middle-income countries due to deficiencies observed in the critically important response areas.

Sri Lanka has an AMR surveillance system in health sector with participation of some government hospitals. GLASS is fed with the data generated through WHONET in these centers. Better attention on development of infrastructure and other resources is essential to optimize this system to generate good quality representative data to evaluate trends and enable national policy development. This is of great concern as preliminary data on AMR of the country indicate a significant AMR threat, requiring urgent evidence-based actions. The need for establishing a network of quality assured national reference laboratories has long been recognized. Identification and strengthening of this network including laboratories of all sectors will enable systematic generation, analysis, sharing and usage of surveillance data effectively. Therefore NSP 2023-2028 has identified strategic interventions to strengthen and sustain the AMR surveillance system and development of the laboratory network.

AMC is not under surveillance in Sri Lanka. This is a gap area which needs immediate attention. The “GLASS methodology for surveillance of national antimicrobial consumption” published in 2020 addresses and guides developing a national AMC surveillance framework and streamlines the reporting process to GLASS-AMC. The interventions in NSP 2023-2028 emphasizes on establishment of surveillance of AMC.

Building laboratory capacity is a priority need for the patient management in human health sector. Facilities to identify pathogens (both bacteria and fungi) up to the species level and antimicrobial sensitivity testing including detection of resistance mechanisms are limited and the situation is made worse by the interruptions in the supply chain of necessary consumables and shortage of trained professionals. Proper assessment and stepwise capacity building is essential for clinical microbiology laboratories to overcome these shortcomings.

	Strategic interventions	Sectors responsible for action
3.1	Ensure the surveillance system for AMR in human sector covers the whole island systematically and AMR data are collated nationally	HH
3.2	Link the national AMR surveillance system with antimicrobial consumption /utilization data for human health	HH
3.3	Establish the national surveillance system for AMR in animal sector for terrestrial and aquatic animals.	AH, FA
3.4	Implement an integrated surveillance system for AMR under one health concept	HH, AH, FA, AG, EN
3.5	Introduce a system in place to assess utilization of antimicrobials in agriculture	AG
3.6	Establish a national reference laboratory network for AMR surveillance	HH AH, FA, AG, EN
3.7	Build laboratory capacity to produce high-quality microbiological data to support surveillance activities and patient management in human health	HH
3.8	Build laboratory capacity to monitor the development of AMR in animals and to detect the antimicrobial residues in animals and food safety	AH, FA, HH

PRIORITY AREA 4 – Prevention and Control of Infections

Strategic objective 4: Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures (GAP objective 3)

This objective aims to reduce the need for antibiotics and antibiotic misuse by preventing infections both in the community and health-care setting, in all sectors involved. Effective sanitation, hygiene and IPC measures will reduce viral, bacterial and fungal infections. In Sri Lanka, antibiotic misuse is observed at outpatient and general practice setting for respiratory tract infections, most of which are of viral origin. Similar misuse happens for gastroenteritis and other predominantly viral infections. Therefore, reducing such infections via strengthening the governance mechanism, awareness, proper sanitation and hygiene will lead to minimize misuse of antibiotics, leading to reduction in the AMR burden. At the same time, the reduced rates of bacterial infections in the community will minimize the need for antibiotics.

At health-care settings, the IPC measures will reduce infections of health-care origin. These infections are most-likely to be caused by antibiotic resistant bacteria and their treatment is difficult and expensive. Studies performed in intensive care units (ICUs) on healthcare associated infections have shown high rates of multidrug resistance among common bacterial pathogens. Thus, the reduction of infections through enhanced IPC measures in health care settings would lead to fewer infections with antibiotic resistant bacteria helping the preservation of antibiotics, especially the broad-spectrum antibiotics that are usually required for the treatment of such infections.

Prevention and control of infections among animal and plants by increased awareness, monitoring, cohorting and destroying on time will reduce the use of antimicrobials and in turn will minimize the contamination of the environment with antimicrobials and antimicrobial resistant organisms.

	Strategic intervention	Sectors responsible for action
4.1	Formulate a national policy on IPC and establish an expert committee to advise and monitor IPC programmes at national level	HH AH AG FA
4.2	Build capacity for IPC activities in healthcare settings with adequate and uninterrupted resources	HH
4.3	Develop surveillance and audit assessments of compliance with IPC practices for improvement	HH
4.4	Develop public awareness programmes linked with AMR awareness programmes	HH
4.5	Develop awareness and monitoring mechanisms of IPC in community health, animal health, plant health, food production and food safety	HH, AH, AG, FA, EN

PRIORITY AREA 5 – Optimizing Antimicrobial Use

Strategic objective 5: Optimize the use of antimicrobials in human, animal and plant health (GAP objective 4)

The goal of this strategic objective is to preserve antimicrobial efficacy and ensure sustainable and equitable access to antimicrobials for responsible and prudent use in human, animal and plant health. To achieve this goal, it is necessary to optimize the production and use of antimicrobials along the whole life cycle from research and development to disposal.

New and existing antimicrobials are global goods. Overuse and misuse of antimicrobials are well known drivers of AMR and responsible and prudent use of antimicrobials is vital in preventing the emergence of AMR in common pathogens. Poor quality antimicrobials lead to poor outcomes in infectious disease and encourage the development of AMR. Policies, regulatory frameworks, systems, guidelines, and financing are all needed to ensure equitable access to effective, quality assured antimicrobials to minimize the emergence and transmission of resistant pathogens. Ensuring safe management of wastes from antimicrobial production, health facilities, farms and communities will reduce food safety risks and emergence of AMR in environmental sources.

Sri Lanka has developed regulations for controlling the use of antimicrobials in all sectors. Enforcement of regulations needs to be strengthened with regular monitoring to overcome gaps. Supply of high-quality antimicrobials and optimal use should be monitored. Adopting the AWaRe classification and establishing antimicrobial stewardship committees will have to be addressed as priority actions in human health sector during the next few years.

Animal health (terrestrial and aquatic), agriculture and food production sectors have identified some areas for further improvement during the term of next NSP.

	Strategic interventions	Sectors responsible for action
5.1	Regulate the antimicrobials in human health to promote appropriate use	HH
5.2	Ensure uninterrupted access to quality assured antimicrobials in human health sector	HH
5.3	Optimize the use of antimicrobials in human health through AwaRe classification, guidelines, prescriber awareness and stewardship	HH
5.4	Monitor the use of antimicrobials in human health	HH
5.5	Ensure uninterrupted access to quality assured antimicrobials in the animal (terrestrial /aquatic) and plant health sector	AH, FA, AG
5.6	Optimize the use of antimicrobials in the animal (terrestrial /aquatic) and plant health sector	AH, FA, AG
5.7	Regulate the use of antimicrobials in the animal (terrestrial /aquatic) and plant health sector	AH, FA, AG
5.8	Monitor the use of antimicrobials in the animal (terrestrial /aquatic) and plant health sector	AH, FA, AG

PRIORITY AREA 6 – Research and Innovation

Strategic objective 6: Develop the economic case for sustainable investment and increased investment in new medicines, diagnostic tools, vaccines, and other interventions (GAP objective 5)

It is well known that AMR has major financial consequences mainly high healthcare costs due to an increase in hospital admissions and medication usage. It has other negative impacts on the economy such as the loss of human productivity caused by sickness and premature death, reduced livestock output and increased demands for new diagnostics and treatment services.

Further, these effects have a disproportionate toll on developing countries.

AMR is a One Health problem, so its economic impact has relative contributions from human, animal and environmental sectors.

Ensuring sustainable investment through research has been identified as one of the strategic objectives and priority areas in the previous NSP. However, these activities have not been conducted in a unifying and organized manner. Some of the activities have been carried out by the disease control programs and individual institutions without central coordination, so sustainable investment could not be ensured.

Therefore, in this new NSP three strategic objectives and nine priority actions have been identified to ensure sustainable investment and increase investment in new medicines, diagnostic tools, vaccines, and other interventions.

	Strategic interventions	Sectors responsible for action
6.1	Develop the economic case for sustainable investment in AMR related activities	HH, AH, FA, AG, EN
6.2	Prepare an economic case for sustainable investment in new medicines, diagnostic tools and vaccines	HH, AH, FA
6.3	Provide strategic leadership in basic research on infectious diseases and AMR	HH, AH, FA, AG, EN

PRIORITY AREA 7 – Environmental safety

Strategic objective 7: Prevent contamination to ensure the safety of environment

The role of environment in AMR has been increasingly recognized during the last decade and the possibility of spreading antimicrobial residues and resistant microorganisms through water, soil, and air need to be considered.

Activities to prevent the contamination of environment are included in strategic objectives on improving awareness and understanding, effective sanitation, hygiene, and waste management practices and safe disposal of antimicrobials. Research on environmental aspects with a One Health collaborative approach is addressed in priority area 6.

A risk assessment to identify high impact areas for monitoring and implementing preventive strategies with improvements of standards and regulations are included in this priority area since those interventions involve action in a wider scope.

Sri Lanka has already developed regulations to ensure safety of drinking water, sanitation and waste disposal and agreed to comply with international environmental agreements. Current status of regulations, preventive strategies and monitoring will be reviewed and updated by experts in relevant areas to address the AMR threat to ensure a safe and healthy environment for humans, animals and plants.

	Strategic interventions	Sectors responsible for action
7.1	Conduct a rapid national assessment of risks for AMR / antimicrobial compound residues and AMR pathogens in the environment	EN
7.2	Establish a system for regular monitoring (passive surveillance) of antimicrobial compounds and their metabolites (or residues) or resistant bacteria or antimicrobial resistance genes (ARGs) in water quality	EN
7.3	Review existing regulations and formulate new regulations and implement legislation and/or regulations to prevent contamination of the environment with antimicrobials. antimicrobial compounds and their metabolites discharged to the environment	EN

Chapter 4 – Implementation of the country AMR response

This chapter outlines the organization of country AMR response with inputs, process, mechanisms and principles for the implementation, and integration of One Health activities of NAP-AMR.

National AMR response 2023-2028

The National Strategic Plan for combating AMR in Sri Lanka includes 7 priority areas. Each priority area has one strategic objective and several strategic interventions.

The National Action Plan (NAP) includes priority actions identified to complete the strategic interventions of the NSP. Activities related to priority actions are enlisted with expected outputs/outcomes for monitoring and evaluation, responsible authorities, and a timeframe for implementation.



The governance bodies are responsible for appointing the committees, subcommittees/expert groups and working groups to implement, monitor and evaluate the activities of the NAP 2023-2028. Detailed annual action plans for the forthcoming year should be prepared well in advance.

Inputs

Organization and implementation of a sustainable One Health AMR response generating the expected outcomes and impact need inputs from many state and private sector organizations as well as technical capacity. Some of the inputs and preparatory work for initiating the NAP implementation are listed below. These areas are addressed in Priority Area one of the NSP.

- strengthened coordination, collaboration and governance.
- support of policies and legal instruments
- political commitment
- international collaborations
- baseline risk assessments to define targets - AMR and AMC, disease burden.
- assessment of capacity, stakeholders, resource requirements and gaps
- detailed planning of priority actions in a stepwise manner with incremental targets for implementation, monitoring, and reporting arrangements
- costing of the operational plan
- identification and mobilization of resources
- establishing monitoring and evaluation mechanisms

Implementation process

WHO has described the following 6 steps for the sustainable implementation of NAP.



An outline of the priority actions within each step shown above is included as checklists to facilitate the country teams to establish the process³³.

Mechanism for the implementation of country response to AMR

The AMR secretariat/coordinating center, national AMR focal point, and sectoral AMR focal points need to be endorsed with defined terms of reference at relevant ministerial levels of GOSL. The structures, functions, roles and responsibilities of different levels of committees should be reviewed.

It is recommended to have a National Multisectoral Coordinating Committee (NMCC) to link the National Advisory Committee for AMR (NAC-AMR) and the National Action Plan Implementation Strengthening Team (NAP-IST) and to facilitate the M&E process.

NAP-AMR has recommended establishing subcommittees of experts and key stakeholders (Technical Support Groups) for each priority area of the NSP to organize the activities and guide the working groups in each sector. Membership of each committee should be nominated by relevant heads of ministries/department or other institutes to represent all areas and sectors relevant to the implementation of priority actions. The roles and responsibilities of each committee should be clearly identified.

Prioritization of activities, costing and identification and mobilization of funding and other resources are included in priority area 1. Heads of ministries/departments in the NAC-AMR can decide to initiate the no cost/low-cost activities first and identify GOSL budget-lines for implementing the NAP with M&E. External funding support should be sought for prioritized activities if GOSL finding is not currently adequate. There should be a plan for transitioning onto GOSL funding to maintain sustainability in future.

The AMR secretariat/coordinating center, focal points and committees should adhere to the guiding principles recommended for the implementation of NAP.

Guiding Principles for the implementation of NAP

The guiding principles for implementation for NAP-AMR listed below have been articulated in the 68th World Health Assembly to emphasize the need for integrated and well-coordinated efforts at the national, institutional, and individual levels³⁴. National level interventions should be linked to regional and global priorities and efforts.

- **Whole-of-society engagement** - Engaging all sectors and disciplines and civil society for the implementation of NAP-AMR to achieve the goals.
- **Prevention first** - Improving sanitation and hygienic measures, immunization and IPC precautions to prevent infections and to minimise the use of antimicrobials.
- **Access** - Improving equitable access to and appropriate use of existing and new antimicrobial medicines, health care services, preventive technologies, diagnostic tools, knowledge, education and information.
- **Sustainability** - Long-term investment in all the strategies in the plan with political commitment and international collaborations to promote the technical and financial investment.
- **Incremental targets for implementation** - Implementing priority actions of NAP-AMR to ensure achievement of the five strategic objectives of GAP in a stepwise manner to meet both local needs and global priorities.

Integration of One Health activities, adopting new recommendations/technology and continual improvement

One Health AMR activities involve a wide scope of sectors and areas of work from macroeconomic planning to research in molecular mechanisms of AMR. Discussion with stakeholders from all sectors is required for the detailed planning, funding, and implementation of activities. and Ongoing multilateral discussion is especially important in cross-cutting areas such as food production, food safety and environmental safety introduced into the new NAP-AMR. Status of operations in these areas should be reviewed and links with existing programmes should be established.

Regular meetings of One Health committees should be held according to an annual action plan. Reviewing of emerging local and global evidence and adopting innovative methods for combatting AMR should be a priority. Guidance published by relevant organizations should be discussed to adopt updated recommendations for the continual improvement and fine tuning of the National response to AMR.

Chapter 5 - Monitoring and Evaluation of the Country AMR Response

Monitoring and evaluation (M&E) are essential steps of a sustainable AMR response. NSP 2023-2028 identifies priority actions and activities in 7 priority areas to implement a One Health AMR response over a period of five years. Many stakeholders from different sectors are involved in the implementation of different activities of NAP at any given time. A strong M&E system with responsibility of reporting, coordinating and analyzing results should be established to monitor the progress of implementation of NAP.

Priority area 1 of the NSP identifies the planning and implementation of a M&E plan as a strategic intervention. It includes a National Multisectoral Coordinating Committee to creating and overseeing an effective mechanism for data generation and sharing among all key One Health stakeholders. Institutionalizing the M&E mechanism and integration with sectoral performance measurement can be considered for sustainability. Regular reviews of M&E results should be conducted by the authorities responsible for governing the implementation of NAP-AMR to ensure the achievement of expected results and should be used to inform decisions for tailoring the AMR response.

Monitoring

Monitoring is a continuous process for tracking progress and includes financial monitoring and results-based monitoring. Results based monitoring includes process and output indicators to verify implementation of activities and delivery of outputs. Since this M&E framework with NAP AMR is being introduced for the first time, many process and output indicators are incorporated to ensure the successful initial implementation of AMR response.³⁵ Monitoring of inputs for the implementation such as domestic and international funding and other resources and utilization of resources are included in priority area 1.

Outcome and impact measurements are required to monitor the effectiveness of implementation of NAP AMR. Baseline assessments of core output/outcome indicators related to GAP strategic objectives described in reference 36 should be made in order to measure the results and impact of the response. Baseline assessments are described in priority areas 2-7.

The key stakeholders can further prioritize the activities depending on baseline risk assessments and availability of resources. NAC-AMR should decide on a measurable results framework with a proportionate approach to set targets on AMC patterns and core indicators other priority areas already included in the NAP and M&E framework such as AMR patterns of key organisms (SDG indicators and Tricycle protocol). Percentage of bloodstream infections due to selected antimicrobial-resistant organisms and the proportion of health facilities that have a core set of relevant essential medicines available and affordable on a sustainable basis are two main SDG indicators which can be used to monitor the outcomes.

Annual progress of 5% reduction in AMR and AMC patterns of selected organisms/antimicrobials with a 25% reduction at the end of the 5-year term can be set as an achievable target.

Existing AMR monitoring process of TB and HIV can be linked to AMR surveillance. Additional monitoring parameters such as % of bloodstream infections caused by carbapenem resistant Enterobacteriaceae (*E.coli*, *Klebsiella*), penicillin resistant *Streptococcus pneumoniae* and azole resistance in Candidaemia. AMR programme should link with other global reporting processes on selected infections (HIV, Malaria, TB, Leprosy and other bacteria/viral infections) to monitor the long-term impact of implemented strategies.³⁶

Evaluation

Evaluation is a systematic and objective assessment of the design, implementation, and results of a programme with a view to assessing whether intended objectives have been achieved.

Annual progress evaluation of the country AMR response should be conducted by the designated M&E coordinators using the WHO TrACSS tool. The results of this self-assessment (TrACSS) should be discussed at management and advisory committee meetings.

Recommendations of the Joint External Evaluation of country capacity for IHR should be implemented and monitored.

Mid-term and End-term evaluations of the AMR response should be planned in 2025 and 2028. Initial M&E data should be made available to assess the progress of implementation and to inform the decision making process at the mid-term evaluation for the fine tuning of the NAP, M&E framework and targets.

Evaluation of long-term impact goals of the AMR Response should be aligned with the following goals of GAP-AMR.

1. Reduced levels and slower development of resistance
2. Continued ability to treat infectious diseases with effective and safe medicines
3. Reduced impact of infectious diseases on human and animal health and economic development

Patterns and trends of core AMR surveillance indicators should be analyzed to assess the impact goal 1.

National Action Plan for Combating Antimicrobial Resistance in Sri Lanka 2023-2028

Activities with Monitoring and Evaluation Framework

Priority Area 1 – Organization of One Health AMR response

Strategic objective - Advancing the National Response to AMR

Strategic intervention 1.1 Review and improve governance structure and establish a functional mechanism for the AMR response through a high-level committee representing all sectors				
Priority action	Activity	Monitoring and Evaluation Indicators	Data sources for Monitoring and Evaluation	Responsibility and timeframe
1.1.1. Re-establish the mechanism for multi-sector and One Health collaboration, coordination, and accountability.	<p>1.1.1.1. Identify key stakeholders in each sector with representatives from the private sector and civil society. (e.g. Human Health Sector (HH) – curative, preventive, laboratory, food safety, regulatory, health economics and planning, education, training, research, higher education, private health sector, industry, patient support group representatives)</p> <p>1.1.1.2. Define organization structure of One Health AMR response to ensure functionality, coordination, and funding required for the well-organized implementation of NAP-AMR</p> <p>1.1.1.3. Identify the NAP-AMR implementation framework with a National Multisectoral Coordinating Committee (NMCC) and</p>	<p>1.1.1.1 Composition of committees to represent One Health sectors and key stakeholders.</p> <p>1.1.1.2. Document with organization structure for one Health AMR response</p> <p>1.1.1.3. NAP implementation framework document</p>	Records of meetings and other documents maintained with the AMR programme coordinating center	<p>Sectors</p> <p>Human Health (HH), Animal Health and Production- Terrestrial (AH), Fisheries & Aquatics (FA),</p> <p>Plant health and production - Agriculture (AG)</p> <p>Environmental safety (ENV), Governance</p> <p>Heads of relevant Ministries/ Departments/ Institute of GOSL</p>

Strategic intervention 1.1 Review and improve governance structure and establish a functional mechanism for the AMR response through a high-level committee representing all sectors					
	subcommittees and technical support groups and working groups for integrated One Health activities to be implemented under another strategic objective			AMR focal points NAC-AMR Proposed NMCC Y 1	
1.1.2. Review / define TOR for advisory and coordinating committees, technical support groups and working groups/task force with roles & responsibilities for implementation of activities & monitoring progress of implementation	<p>1.1.2.1. Appoint a subcommittee to develop TOR for committees at different levels.</p> <p>1.1.2.2. Conduct subcommittee meetings to develop TOR</p> <p>1.1.2.3. Endorse TOR developed for committees at the NAC-AMR</p>	<p>1.1.2.1. TOR for committees at different levels</p> <p>1.1.2.2. Minutes of meetings</p> <p>1.1.2.3. Endorsed TORs</p>	Records of meetings and other documents maintained with the AMR programme coordinating center	Y 1 Heads of Ministries/ Departments of GOSL, AMR focal points and NAC-AMR/ NMCC	
1.1.3. Identify the improvements in the organization to support the implementation & monitoring of AMR programme	<p>1.1.3.1. Discuss the improvements required for implementation of NAP-AMR and monitoring & evaluation with relevant stakeholders.</p> <p>1.1.3.2. Organize implementation of activities starting with annual activity plans for the AMR programme, monitoring & progress review meetings</p>	<p>1.1.3.1. Annual operational plan for implementation of activities and M&E</p> <p>1.1.3.2. Annual operational plan for implementation of activities and M&E</p>	Records of meetings and other documents maintained with the AMR programme coordinating center	Y1-Y5 Heads of Ministries or Departments of GOSL, AMR focal points and NAC-AMR /NMCC	
1.1.4. Organize regular meetings of committees, subcommittees/support groups and technical working groups	<p>1.1.4.1. Develop a meeting calendar annually.</p> <p>1.1.4.2. Conduct regular meetings according to the calendar</p>	<p>1.1.4.1. Meeting Calander</p> <p>1.1.4.2. Minutes of meetings</p>	Records of meetings and other documents maintained with the AMR programme coordinating center	Y1-Y5 Heads of Ministries or Departments of GOSL, AMR focal points and NAC-AMR /NMCC	

Strategic intervention 1.2 Plan the activities to implement prioritized actions of the NAP to develop the detailed operational plan			
1.2.1. Discuss the implementation of national AMR action plan and monitoring & evaluation with all stakeholders.	1.2.1.1. Organize meetings with key stakeholders of all sectors to discuss the implementation of NAP-AMR and monitoring & evaluation.	1.2.1.1. Minutes of meetings with stakeholders	Records of meetings and other documents maintained with the AMR programme coordinating center
1.2.2. Streamlining NSP with other existing national action plans or strategies or programmes*	1.2.2.1. Incorporate AMR activities into other programmes at national level and link with relevant programmes already conducting relevant activities.	1.2.2.1. List of links with other programmes and relevant activities and indicators	
1.2.3. Identification of risks & resources	1.2.3.1. Organize baseline surveys and annual risk assessments and resources assessments for implementation of NAP-AMR	1.2.3.1. Baseline surveys, risk assessment and resource requirement assessment reports.	
1.2.4. Identification of sub-activities related to priority actions and activities for each sector to develop the detailed operational plan.	1.2.4.1. Conduct multisectoral technical support group meetings and technical working group meetings in each sector for detailed planning of implementation of activities.	1.2.4.1. Minutes of meetings and the annual operational plan with Prioritized sub-activities	
Strategic intervention 1.3 Cost the detailed operational plan and identify and mobilize resources			
1.3.1. Costing of the detailed operational plan	1.3.1.1. Approve a proposal and conduct costing with the help of an international WHO consultancy.	1.3.1.1. Costed operational plan	Fund management documents Reports of activities/ meetings and other documents maintained with the AMR programme
1.3.2. Identification of resources	1.3.2.1. Identification of resources required for the operational plan by AMR focal points	1.3.2.1. Budget allocation and identified funding sources	Heads of Ministries or Departments of GOSL, AMR focal points HH, AH, FA, AG, ENV and NAC-AMR /NMCC Y1-Y5
1.3.3. Mobilization of resources	1.3.3.1. Implement the process for allocating and mobilizing resources	1.3.3.1. Availability of funds and other resources for implementation of activities.	

Strategic intervention 1.4 Ensure implementation of the operational plan – identify the current phase of implementation of priority actions and implement activities to achieve progress in successive steps until a sustainable operation is established				
1.4.1. Identify the key stakeholders in each sector for implementation of activities.	1.4.1.1. Establish subcommittees with key stakeholders in each sector for implementation of activities.	1.4.1.1. Lists of key stakeholders for each activity	Reports of activities/ meetings and other documents maintained with the AMR programme	Heads of Ministries or Departments of GOSL, AMR focal points HH, AH, FA, AG, ENV and NAC-AMR /NMCC Y 1-5
1.4.2. Establish technical support groups (TSG) and technical working groups (TWG) and conduct baseline assessments	1.4.2.1. Establish multisectoral technical support groups to support the implementation of the activities 1.4.2.2. Identify technical working groups in each sector to implement activities 1.4.2.3. Conduct baseline assessments for identified actions	1.4.2.1. Multisectoral members of TSGs 1.4.2.2. TWGs in each sector 1.4.2.3. Results of baseline assessments		
1.4.3. Establish the mechanisms for implementation of NAP.	1.4.3.1. Establish mechanisms/processes/ methods for implementation of activities	1.4.3.1. Documented mechanisms/methods		
1.4.4. Identify targets to be achieved over the timeframe	1.4.4.1. Identify targets to be achieved over the timeframe according to the baseline measurements	1.4.4.1. Availability of baseline assessments/ measurement s, and targets for relevant activities		
1.4.5. Implement activities according to the identified timeframe	1.4.5.1. Appoint activity coordinators to coordinate implementation of activities 1.4.5.2. Coordinate and implement activities according to the identified timeframe.	1.4.5.1. List of activity coordinators 1.4.5.2. Records of activity implementation according to the plan		

Strategic intervention 1.5 Establish system for collection of data for the identified M&E indicators, identify baselines and organize analysis of data to generate expected knowledge to be used by the AMR multisector coordination mechanism for decision making across all relevant sectors and to advocate for policy changes and allocation of adequate resources.				
1.5.1. Identify the necessary data sources for M&E indicators.	1.5.1.1. Establish the mechanism for generating data for M&E indicators	1.5.1.1. Availability of M&E mechanism	1.5.1.1. Availability of M&E mechanism	Y1-Y5 Heads of Ministries or Departments of GOSL, AMR focal points HH, AH, FA, AG, ENV and NAC-AMR /NMCC
1.5.2. Establish system for collection of data for M &E	1.5.2.1. Establish the system for dataflow for identified M&E indicators	1.5.2.1. Availability of evidence of regular data flow	1.5.2.1. Availability of evidence of regular data flow	Reports of baseline assessments and activity monitoring Annual TrACSS
1.5.3. Identify baselines.	1.5.3.1. Identify baselines through 1.4.2.3. and establish regular monitoring of identified specific indicators	1.5.3.1. Availability of baseline reports	1.5.3.1. Availability of baseline reports	Annual progress review reports Mid-term review report -2025
1.5.4. Organize analysis of data to generate expected knowledge.	1.5.4.1. Organize analysis of data to generate expected knowledge for modifying interventions with an internal mechanism for progress review through a National Multisectoral Coordinating Committee	1.5.4.1. Availability of regular review reports & annual progress review reports of the AMR programme	1.5.4.1. Availability of regular review reports & annual progress review reports of the AMR programme	End-term review report -2028
1.5.5. Establish the mechanism to review knowledge for annual risk assessment (1.2.3.) and decision-making across all relevant sectors and to advocate for policy changes and allocation of adequate resources	1.5.5.1. Establish the mechanism to review knowledge for annual risk assessment and decision-making across all relevant sectors and to advocate for policy changes and allocation of adequate resources. 1.5.5.2. Plan annual progress reviews, mid-term reviews and end-term review 1.5.5.3. Conduct annual progress reviews, mid-term review and end-term review	1.5.5.1. Documentation of mechanisms 1.5.5.2. annual progress reviews, mid-term review, and end-term review 1.5.5.3. Evaluation of progress of NAP implementation, risk assessment and annual planning	1.5.5.1. Documentation of mechanisms 1.5.5.2. annual progress reviews, mid-term review, and end-term review 1.5.5.3. Evaluation of progress of NAP implementation, risk assessment and annual planning	

- Abbreviations for sectors: Human Health (HH), Animal Health-Terrestrial (AH), Fisheries & Aquatics (FA), Agriculture (AG), Environment (ENV)
- * Other projects /programme with activities related to AMR - One Health Strategy or One Health mechanism, Plans for improvement Water, Sanitation and Hygiene (WASH), National health sector development plans, National action plan on health security and International Health regulations, Climate change and environmental planning, National development plans; United Nations SDG, National Food Safety strategy and policies, National Agriculture development plans and policies; National Environment Policy/ Regulations related to Waste Management under National Environment Act; National Action Plan on Sewerage Management

Priority area 2 - Awareness and Understanding of AMR

Strategic objective - Improve awareness and understanding of AMR through effective communication, education and training

Strategic intervention 2.1 Raising awareness, knowledge, and understanding among the public and target groups on AMR to change behavior leading to irrational use of antimicrobials				
Priority action	Activity	Monitoring and Evaluation Indicators	Responsibility	Timeframe
2.1.1. Identification of priority stakeholders through a stakeholder analysis in each sector for awareness activities	2.1.1.1. Identification of priority stakeholders for awareness activities by TSGs in human health, food safety, animal health & food production, plant health & food production and environment sectors	2.1.1.1.1. The report on stakeholder groups	MOH, DAPH, MOF, DOA, MOE	Y 1-5
2.1.2. Developing and implementing comprehensive and sustained one health national awareness programme	<p>2.1.2.1. Establishing a sub-committee for improving AMR and IPC awareness among the general public and target groups of stakeholders</p> <p>2.1.2.2. Develop annual activity plan for awareness</p> <p>2.1.2.3. Establish and regularly update a One Health AMR website</p> <p>2.1.2.4. Identify key messages for each sector</p> <p>2.1.2.5. Utilizing available service and information/ communication networks for awareness raising on AMR</p>	<p>2.1.2.1. A sub-committee established & evidence of meetings conducted</p> <p>2.1.2.2. Availability of annual action plan for raising awareness</p> <p>2.1.2.3. Availability, updating and number of visitors of the website</p> <p>2.1.2.4. Availability of key messages in each sector</p> <p>2.1.2.5. Documentary evidence on including AMR as a topic in existing awareness activities</p>	MOH, HPB, FHB, DAPH, DOA, MOF, MOE	Y 1-5

Strategic intervention 2.1 Raising awareness, knowledge, and understanding among the public and target groups on AMR to change behavior leading to irrational use of antimicrobials			
	2.1.2.6. Conducting workshops for key stakeholders to enhance awareness according to the annual action plan	2.1.2.6. Number of awareness workshops and % of annual activities completed	
2.1.3. Develop new Information, Education and Communication (IEC) materials and other knowledge sharing portals for public and stakeholder awareness and behavior change	<p>2.1.3.1. Identification of technical experts from in human health, food safety, food production, animal health, plant health and environment sectors to support knowledge sharing portals for public and stakeholder awareness as a One Health activity</p> <p>2.1.3.2. Develop IEC material based on the key messages identified to bring about behavioral change</p> <p>2.1.3.3. Identify the communication strategies with effective modes of delivering messages for public and stakeholder awareness e.g. interactive quizzes or innovative methods for AMR learning such as gamification, dedicated websites, or web portals with comprehensive information on AMR for easy access to the public</p> <p>2.1.3.4. Conduct public and stakeholder awareness using the materials and methods developed with community engagement and media partnership and evaluate effectiveness through follow up studies</p>	<p>2.1.3.1. TSG for improving IEC material for AMR awareness activities (2.1.2.1.)</p> <p>2.1.3.2.1. Number of social media messages developed</p> <p>2.1.3.2.2. Number of television and radio advertisement/awareness videos developed</p> <p>2.1.3.3. Innovative modes of delivery identified for awareness programmes</p> <p>2.1.3.4.1. Number of social marketing programmes conducted in electronic media</p> <p>2.1.3.4.2. Number of articles published in printed media</p>	<p>MOH (HPB, IT Department), DAPH, DOA, MOF, MOE</p> <p>Y 1-5</p>

Strategic intervention 2.1 Raising awareness, knowledge, and understanding among the public and target groups on AMR to change behavior leading to irrational use of antimicrobials			
		2.1.3.4.3. IEC material distributed /displayed among different groups of public (teachers, school children, youth, farmers, pet owners, etc.)	
		2.1.3.4.4. follow up studies combined with 2.2.1.3.	
2.1.4. Celebrating WAAW (World Antimicrobial Awareness Week) annually with one health engagement	2.1.4.1. Include WAAW activities in annual activity plan in each sector 2.1.4.2. Organizing and conducting series of webinars and other awareness activities for stakeholders during WAAW	2.1.4.1. Plan for WAAW activities 2.1.4.2. Evidence of activities carried out during WAAW in a given year	MOH, DAPH, DOA MOF, MOE Y 1-5
Strategic intervention 2.2 Understand the AMR risk and response in all sectors			
2.2.1 Conduct KAP (knowledge attitude and practice) studies across general population, professionals in health, veterinary, environment, agriculture, farmers and food processing and food safety sectors via a central mechanism	2.2.1.1. Identify stakeholder groups among whom KAP studies should be conducted in each sector 2.2.1.2. Cover wider groups in the KAP studies 2.2.1.3. Use the findings & recommendations of KAP studies to improve annual awareness programmes and evaluate effectiveness	2.2.1.1. List of stakeholders identifies in each sector 2.2.1.2. Number of studies conducted and areas covered 2.2.1.3. Annual awareness programmes based on recommendations and follow-up studies for evaluation	MOH, DAPH, MOF, DOA, MOE, Ministry of Higher Education Y 1-5

Strategic intervention 2.3 Training and professional education on AMR in human health and food safety sectors			
<p>2.3.1. Incorporate AMR related content to the core curricula of relevant disciplines and high school health educational programmes</p>	<p>2.3.1.1. Perform a situational analysis of the current status</p> <p>2.3.1.2. Communicate with relevant universities and other training institutions to incorporate AMR into undergraduate curricula and high school educational programmes according to the needs identified</p> <p>2.3.1.3. Review and evaluate the already existing training modules to include AMR related topics</p>	<p>2.3.1.1.1. Situation analysis report</p> <p>2.3.1.2.1. Number of relevant undergraduate curricula incorporating AMR related topics</p> <p>2.3.1.2.2. Availability high school health educational programmes incorporating AMR related topics</p> <p>2.3.1.3. Number of training modules reviewed and revised to incorporate AMR related topics</p>	<p>MOH, DAPH, DOA, MOF, MOE, Ministry of Education and Higher Education, Universities, National Institute of Education</p> <p>Y 1-5</p>
<p>2.3.2. Ensure AMR is formally and systematically included in pre-service induction training of all relevant health cadres</p>	<p>2.3.2.1. Discuss with MOH officials to include AMR and IPC in pre-service/ induction training.</p> <p>2.3.2.2. Creating an online prescriber skill assessment module on AMR and IPC to improve prescribing behaviour and IPC practices among doctors</p>	<p>2.3.2.1. Availability of induction training on AMR and IPC</p> <p>2.3.2.2. Availability of online skill assessment module on AMR and IPC and number of doctors assessed</p>	<p>MOH: Medical services, nursing & paramedical; IT unit & ET and R unit, Environment and food safety units: SLCM and other medical professional associations</p> <p>Y 1-5</p>
<p>2.3.3. Include antimicrobial resistance, antimicrobial stewardship and infection prevention and control in training curricula of post graduate training of doctors to improve prescribing behavior</p>	<p>2.3.3.1. Communication with the PGIM director to incorporate a module on rational prescribing in formative assessments for PGIM training programmes</p>	<p>2.3.3.1. List of PGIM courses in which a module on rational prescribing is included</p>	<p>MOH, PGIM, Ministry of Higher Education</p> <p>Y 1-5</p>

Strategic intervention 2.3 Training and professional education on AMR in human health and food safety sectors				
2.3.4. Introduce and scale up in-service training programmes or other CPD activities on AMR for relevant healthcare workers in public and private sectors nationwide	2.3.4.1. Development of in-service training modules including E-learning modules on AMR and IPC for all categories of health staff 2.3.4.2. Conducting training of trainers (TOT) sessions for this module	2.3.4.1. Availability of in-service training modules for all relevant categories 2.3.4.2. Evidence for conducting training of trainer programmes	MOH (ET and R)	Y 1-5
Strategic intervention 2.4 Training and professional education on AMR in the terrestrial and aquatic animal health sectors				
2.4.1. AMR is formally and systematically included in pre-service training curricula of veterinary graduates and veterinary paraprofessionals	2.4.1.1. Reviewing existing curriculum of Veterinary undergraduate training on AMR at FVMAS 2.4.1.2. Improvement of curriculum with necessary changes an updated knowledge on AMR at FVMAS 2.4.1.3. Development of training module in curriculum of veterinary para-professionals on AMR	2.4.1.1. Evidence of communication with the Dean/Veterinary faculty and conducting the curriculum revision 2.4.1.2. Improved Veterinary Undergraduate Curriculum 2.4.1.3. New AMR module incorporated in the curriculum for veterinary para-professionals	DAPH, Ministry of Higher Education	Y 1-5
2.4.2. Make continuous in-service training a formal requirement for veterinary professionals and paraprofessionals in animal health and production	2.4.2.1. Reviewing existing AMR training module and make it compulsory in the CPD programme for veterinary professionals.	2.4.2.1.1. Communication from DG/DAPH on reviewing CPD module & compulsory CPD programme 2.4.2.1.2. Revised CPD module on AMR 2.4.2.1.3. Evidence of CPD programmes on AMR for veterinary professionals	DAPH	Y 1

Strategic intervention 2.4			
Training and professional education on AMR in the terrestrial and aquatic animal health sectors			
	<p>2.4.2.2. Incorporate an AMR module in the annual training programme of veterinary para-professionals as a compulsory training</p>	<p>2.4.2.2.1. Communication from DG/DAPH on AMR module as a compulsory in-service training programme</p> <p>2.4.2.2.2. Training module on AMR</p> <p>2.4.2.2.3. Evidence of in-service training on AMR for veterinary para-professionals</p>	
Strategic intervention 2.5			
Training and professional education on AMR provided to the farming (animal and plant), food production and environment sectors			
<p>2.5.1 Tailored AMR training courses are routinely available in agricultural extension officers, researchers, farmers, food safety officers, food processors, retailers and stakeholders in environment sector</p>	<p>2.5.1.1. Development of training modules for farmers, food safety officers, food processors, retailers on risk of AMR</p> <p>2.5.1.2. Capacity building and in-service training for field officers, extension officers, scientists and assistants</p> <p>2.5.1.3. Training of private sector key stakeholders on AMR management</p> <p>2.5.1.4. Training of key stakeholders in environment sector on AMR management</p>	<p>2.5.1.1. Evidence of training on AMR in the in-service training programmes for stakeholders in food production and safety</p> <p>2.5.1.2. Evidence of training on AMR in the in-service training programmes for stakeholders in agriculture sector</p> <p>2.5.1.3. Evidence of training on AMR for stakeholders in private sector</p> <p>2.5.1.4. Evidence of training on AMR for stakeholders in environment sector</p>	<p>DAPH, MOF DOA MOE</p> <p>Y 1</p>

Priority Area 3 – Burden Assessment of AMR and AMC
Strategic Objective – Strengthen the knowledge and evidence base through surveillance

Priority action	Activity	Monitoring and Evaluation Indicators	Responsibility	Timeframe
Strategic intervention 3.1 Ensure the surveillance system for AMR in human sector covers the whole island systematically and AMR data are collated nationally				
3.1.1. Identify the centers in government health sector which need to be included in national surveillance and develop those in a phased manner with a defined time interval	3.1.1.1. Form the Expert sub-committee to work on surveillance of AMR in human health and food safety sectors. 3.1.1.2. Plan the future programme by the committee preferably with 3 phases (The committee to decide on phases of implementation, number of suitable centers for surveillance with time frames, to identify working groups to work on various aspects of AMR surveillance and design a supervisory mechanism to monitor the sustainability of the activity) to develop guidelines for antibiotic sensitivity testing.	3.1.1.1. Expert sub-committee established. 3.1.1.2.1. The centers in government health sector identified by names of institutions 3.1.1.2.2. A document describing the expansion methodology in a phased manner is available.	MOH	Y 1
	3.1.1.3. Appoint a technical working group (sub-committee) to review the surveillance protocol. 3.1.1.4. Appoint a technical working group (sub-committee) to assess the centers for identifying the needs for implementing a sustainable AMR surveillance and develop a report on requirement for each center to participate in surveillance	3.1.1.3. Reviewed surveillance protocol available for use and the guideline for ABST is available. 3.1.1.4.1. A report of the need assessment of the identified centers to implement surveillance 3.1.1.4.2. Number of centers developed out of the No of centers selected		

Strategic intervention 3.1 Ensure the surveillance system for AMR in human sector covers the whole island systematically and AMR data are collated nationally				
	<p>3.1.1.5. Enable the working committee to liaise with the centers and the central authority to provide requirements for the selected centers phase wise in order to implement the surveillance</p> <p>3.1.1.6. Train the HR to carry out the surveillance of AMR</p>	<p>3.1.1.4. to 3.1.1.5. Percentage of centers participating in surveillance out of the number of centers developed at the end of phase 1, 2 and 3</p> <p>3.1.1.6 number of people trained (category wise) during a specified period (annually)</p>		Y2-5 Y1-4
3.1.2. Identify the centers in private health sector which need to be included in national surveillance and include those in a phased manner with a defined time interval	<p>3.1.2.1. Conduct advocacy meetings with private health sector to discuss the activity (private institutions to develop the system/mechanism of participation and data sharing)</p> <p>3.1.2.2. Establish liaison between the expert committee (sub-committee) and a team identified from the private health institutions.</p> <p>3.1.2.3. Make decisions on the data sharing of surveillance through the public-private co-team</p> <p>3.1.2.4. Implement the system</p>	<p>3.1.2. Number of private hospitals providing information for national surveillance/ Number eligible to provide data</p>	MOH HH – private sector	Y3-5
3.1.3. Formulate an expert technical hub (sub-committee) to collate and analyze data nationally.	<p>3.1.3.1. Conduct meetings of the subcommittee to design/review/decide on collection of data, analysis of data & dissemination of data liaising with the centers.</p>	<p>3.1.3.1.1. Availability of a Document on methodology for data management considering the security of data</p> <p>3.1.3.1.2. Expert sub-committee notes/Minutes</p>	MOH	Y1 Y1-5

Strategic intervention 3.1 Ensure the surveillance system for AMR in human sector covers the whole island systematically and AMR data are collated nationally			
	3.1.3.2. Implement the designed programme with government Institutions.	3.1.3.2. A report on data analysis is available for reference.	Y2-5
	3.1.3.3. The subcommittee collaborates with the private sector for collection, analysis and dissemination of data	3.1.3.3. A link established with private sector and a document is available for reference	Y3
3.1.4. Disseminate National AMR data to the stakeholders and internationally.	3.1.4.1. Decide on the methodology for dissemination of data to the stakeholders and internationally through the technical hub (in 3.1.3) for data management.	3.1.4.1.1. Availability of a document describing the data dissemination system	Y1
		3.1.4.1.2. Availability of an annual national report	Y1-5
	3.1.4.2. Implement data dissemination as per the method developed.	3.1.4.2. Records /Evidence for data dissemination and data submission for GLASS on an annual basis(records)	Y2-5
Strategic intervention 3.2 Link the national AMR surveillance system with antimicrobial consumption /utilization data for human health			
3.2.1. Design and implement a system for surveillance of antimicrobial use, that includes monitoring national level sales and antimicrobial consumption (AMC) in human health sector.	3.2.1.1. Develop a TOR for an expert sub-committee for designing the programme for surveillance for antimicrobial use and the committee is established.	3.2.1.1. Expert committee is available with a TOR	Y1
	3.2.1.2. Develop the mechanism to monitor the sales & consumption of antimicrobials.	3.2.1.2. Availability of a document describing the mechanism for surveillance	Y1
	3.2.1.3. Build capacity of teams responsible for establishing the mechanisms for AMC monitoring and implement monitoring of AMC as per WHO guidelines	3.2.1.3.1. Availability of an annual national report on antimicrobial consumption	

Strategic intervention 3.2			
Link the national AMR surveillance system with antimicrobial consumption /utilization data for human health			
		3.2.1.3.2. Total human consumption of antibiotics for systemic use (Anatomical Therapeutic Chemical classification code J01) in Defined Daily Doses per 1000 population (or inhabitants) per day	Y2-5
3.2.2. Develop a linking system for human AMR surveillance with AMC surveillance	3.2.2.1. The expert committees on two surveillances work on a comparison methodology to link / compare and contrast the data on AMR & AMC surveillances.	3.2.2.1. A document describing the methodology of how the AMR and AMC surveillances are combined to produce information of national importance.	Y2
	3.2.2.2. The committees work on producing useful statistics on AMR & AMC and produce a national report comparing the data	3.2.2.2. Availability of a national report on AMR & AMC eliciting the relationships/trends	Y3-5
Strategic intervention 3.3			
Establish a national surveillance system for antimicrobial resistance & antimicrobial use in the animal sector for terrestrial and aquatic animals.			
3.3.1. Implement the system for surveillance of antimicrobial resistance for terrestrial and aquatic animals.	3.3.1.1. Identification of the technical group (sub-committee) for surveillance-related activities	3.3.1.1. The committee appointed.	Y1
	3.3.1.2. Working on establishing a budget line for AMR, AM residue and AMC/AMU surveillance in livestock sector	3.3.1.2. Letter from treasury indicating the availability of a budget line	Y1-2
	3.3.1.3. Develop regulation to make AMR Surveillance a compulsory contribution for the stakeholders in Animal health sector	3.3.1.3. Gazette notifications of regulations are available	Y3

Strategic intervention 3.3 Establish a national surveillance system for antimicrobial resistance & antimicrobial use in the animal sector for terrestrial and aquatic animals.			
3.3.2. Design and implement a system for antimicrobial use, that includes monitoring national level sales and consumption of antimicrobials in animal sector	3.3.1.4. Reviewing the existing surveillance programme for poultry and dairy industry and other areas such as pharmaceutical factory effluent, animal hospitals, and livestock farm units, etc.	3.3.1.4. Review report on existing level (situational analysis)	Y1
	3.3.1.5. Development of AMR surveillance programme in livestock sector as in poultry, dairy, and other areas	3.3.1.5. Surveillance programme is functional with all necessary components (Documentation available)	Y1
	3.3.1.6. Implementation of AMR surveillance in livestock, poultry, pharmaceutical factories and animal hospitals, etc.	3.3.1.6. Surveillance system establishment - with availability of reports of surveillance	Y2
	3.3.2.1. Identification of technical group (sub- committee) to design the activity and implementation mechanism.	3.3.2.1. A committee nominated with a TOR in place.	Y1
	3.3.2.2. Reviewing the national data on antimicrobial consumption to understand the trend in recent past of antimicrobial consumption in veterinary sector	3.3.2.2.1. A report of antimicrobial consumption on an annual basis (Report from drug registrar)	Y2-5
	3.3.2.3. Develop capacity of VRA/Veterinary Drug Registrar/Animal feed Registrar office	3.3.2.2.2. Submission of national AMC data to WOAH annually (WOAH report) 3.3.2.3. Number of officers trained/number of officers available in relevant field	Y1-5 Y1

Strategic intervention 3.3 Establish a national surveillance system for antimicrobial resistance & antimicrobial use in the animal sector for terrestrial and aquatic animals.				
3.3.3. Develop a system to link to compare the data of the animal & aquatic AMR surveillances with use of antibiotics	3.3.3.1. Identification of a technical group from both sectors to have the link/methodology of comparison developed on AMR surveillance and AMC surveillance	3.3.3.1. Availability of the group formed with a TOR defined.	DAFH, MOF	Y2
	3.3.3.2. The technical group develop a system to link data sharing between the animal & aquatic AMR surveillance with consumption of anti-microbials	3.3.3.2. Documentation of the system developed		Y3
Strategic intervention 3.4 Implement an integrated surveillance system for antimicrobial resistance under one health concept				
3.4.1. Formulate a multi-sectoral technical hub (sub-committee) to design the system for Integrated Surveillance for AMR in human, animal, food safety, aquatic, agriculture and environment	3.4.1.1. Identification and nomination of technical experts from all sectors to design the integrated surveillance for AMR 3.4.1.2. The technical hub to design the integrated surveillance sector-wise in a phased manner	3.4.1.1. A committee is available with a TOR 3.4.1.2. The committee report on the design of integrated surveillance	MOH, DAPH, MOF, DOA, MOE	Y3
3.4.2. The designed system for Integrated Surveillance is piloted, sector-wise and in the phased manner	3.4.2.1. Optimize integrated surveillance for AMR in human health with animal health sector 3.4.2.2. Optimize integrated surveillance for AMR in human health and animal health with food safety	3.4.2.1. Report of integrated surveillance systems of human and animal health sector by the multisectoral technical sub-committee 3.4.2.2. Report of integrated surveillance systems of human, and animal health with food safety by the multisectoral technical sub-committee	MOH, DAPH, MOF, DOA, MOE	Y4
				Y5

Strategic intervention 3.4 Implement an integrated surveillance system for antimicrobial resistance under one health concept				
	3.4.2.3. Optimize integrated surveillance for AMR in human, animal health, and food safety with the environment sector and agriculture sector	3.4.2.3. Report of integrated surveillance for AMR in human, animal health, and food safety with the environment sector and agriculture sector by the multisectoral technical subcommittee		
3.4.3. Implement the integration of surveillance - TRICYCLE PROJECT (TCP)	3.4.3.1. Design the TCP by a trained group on TCP 3.4.3.2. Apply for funding support. 3.4.3.3. Implement the project when funding is available	3.4.3.1. Design of the TCP available 3.4.3.2. Evidence of funding requests made 3.4.3.3. Implementation is complete and a report is available	Y2 Y3 Y4	
Strategic intervention 3.5 Introduce a system in place to assess the use of antimicrobials in agriculture and the environment				
3.5.1. Formulate a working group including high-ranking officers to guide the group, to design a system to identify and assess the use of antimicrobials in agriculture.	3.5.1. 1. the working group formulated to work on AMR is actively functioning	3.5.1.1. The documentation on committee with the TOR in place.	DOA	Y1
3.5.2. Implement and monitor the system with generation of data on AMR systematically.	3.5.2.1. Establish a system for regular monitoring (passive surveillance) of antimicrobial compounds and their metabolites (or residues) and resistant bacteria or antimicrobial resistance genes (ARGs) in water quality 3.5.2.2. Monitor water quality (surface water and wastewater) in high-risk areas for antimicrobial compounds and their metabolites (or residues) or resistant bacteria or antimicrobial resistance genes (ARGs)	3.5.2.1.1. Report on the monitoring system 3.5.2.1.2. Publications or surveillance reports of the water quality 3.5.2.2. Publications or surveillance reports of the water quality	MOH, MOE	Y2-5

Strategic intervention 3.5 Introduce a system in place to assess the use of antimicrobials in agriculture and the environment				
	3.5.2.3. Develop a sampling regimen for environmental samples and carry out testing for AMR agents using available methods	3.5.2.3. Document on sampling regimen of environmental samples		
Strategic intervention 3.6 Establish a national reference laboratory network (NRLN) for AMR surveillance				
Priority action	Activities	Monitoring and Evaluation Indicators	Responsibility	Time frame
3.6.1. Identify national reference laboratories and participating laboratories for AMR surveillance from all sectors	<p>3.6.1.1. Identify the NRL/NRLs for AMR surveillance in human health, food safety, and the participating laboratories</p> <p>3.6.1.2. Identify the NRL for AMR surveillance in veterinary sector and the participating laboratories</p> <p>3.6.1.3. Identify the NRL for AMR surveillance in fisheries and aquatic sector and the participating laboratories</p> <p>3.6.1.4. Identify the NRL for AMR surveillance in plant/agriculture sector and the participating laboratories if any</p> <p>3.6.1.5. Identify the NRL for AMR surveillance in environmental sector and the participating laboratories if any</p>	<p>3.6.1.1. to 3.6.1.5. List the national reference laboratories and network laboratories (from all sectors) and include them in the surveillance protocol (updated booklet) data flow</p> <p>3.6.1.1. to 3.6.1.5. Number and percentage of laboratories included in the national AMR surveillance system from each sector</p>	MOH, MOA, MOF, MOE	Y 1
3.6.2. Formulate TORs for laboratories of the NRLN	3.6.2.1. Write and approve terms of reference for national reference laboratories of each sector with expertise in methods for confirming and characterizing specific pathogens and organizing quality assurance schemes.	3.6.2.1. TORs developed for national reference laboratories of each sector	MOH, MOA, MOF, MOE	Y 1

Strategic intervention 3.6 Establish a national reference laboratory network (NRLN) for AMR surveillance			
	3.6.2.2. Write and approve terms of reference for participating laboratories of each sector specifying their role in national AMR surveillance.	3.6.2.2.1. TORs developed for participating laboratories of each sector 3.6.2.2.2. Number and percentage of laboratories with TORs in the national reference laboratory network	MOH, MOA, MOF, MOE Y 1
3.6.3. Build capacity of the NRLN to produce nationally and internationally comparable surveillance data	3.6.3.1. Establish CLSI/EUCAST guidelines for AST in all laboratories included in the NRLN 3.6.3.2. Identify the indicator organisms (and antimicrobials to test) for AMR surveillance in each sector in par with international recommendations 3.6.3.3. Identify the test methods/ equipment/consumables necessary for identification of organisms and AST for AMR surveillance in each laboratory	3.6.3.1. Number and percentage of laboratories within the NRLN with capacity to perform identification and AST according to international standards for AMR surveillance 3.6.3.2. List of organisms (and antimicrobials to test) for AMR surveillance in each sector 3.6.3.3. List of test methods/ equipment/consumables necessary for identification of organisms and AST for AMR surveillance in each laboratory	MOH, MOA, MOF, MOE Y 1

Strategic intervention 3.6 Establish a national reference laboratory network (NRLN) for AMR surveillance			
	3.6.3.4. Establish the test methods/ equipment/consumables necessary for identification of organisms and AST for AMR surveillance in each laboratory	3.6.3.4. Evidence of establishing test methods/ equipment/consumables necessary for identification of organisms and AST for AMR surveillance in each laboratory	MOH, MOA, MOF, MOE Y 1-5
	3.6.3.5. Obtain/apply for accreditation by all national reference laboratories and participating laboratories	3.6.3.5. Number and percentage of accredited laboratories within the NRLN	Y 1-5
	3.6.3.6. Establish a laboratory information management system within the NRLN	3.6.3.6. Number and percentage of laboratories with a functioning laboratory information management system within the NRLN	Y 1-5
	3.6.3.7. Annual publication of National AMR surveillance report	3.6.3.7. Annual AMR surveillance reports	Annual
Strategic intervention 3.7 Build laboratory capacity to produce high-quality microbiological data to support surveillance activities and patient management in human health			
Priority action	Activities	Monitoring and Evaluation Indicators	Responsibility
3.7.1. Develop policies/protocols/ algorithms and update standards for microbiological investigations for the AMR surveillance and diagnosis of infections in human health sector	3.7.1.1. Develop policies/protocols/ algorithms for microbiological diagnostics	3.7.1.1. Availability of the diagnostic policies/protocols/ algorithms	MOH
	3.7.1.2. Update standard operating procedures (SOP) for microbiological investigations.	3.7.1.2. Availability of updated SOPs for microbiological investigations	Y 1-3

Strategic intervention 3.7 Build laboratory capacity to produce high-quality microbiological data to support surveillance activities and patient management in human health				
	3.7.1.3. Identify the minimum requirement at different levels of laboratories for surveillance and diagnosis	3.7.1.3. Document with minimum requirements at different levels of laboratories for surveillance and diagnosis		
3.7.2. Perform a baseline laboratory capacity assessment (by qualified technical assessors) of clinical microbiology laboratories according to internationally accepted standards.	3.7.2.1. Appoint a group of qualified technical assessors and carry out the laboratory capacity assessment	3.7.2.1.1. Number of laboratories assessed 3.7.2.1.2. Number and percentage of microbiology laboratories with and without the minimum standards at various levels as a baseline (Report of the baseline laboratory capacity assessment)	MOH, National Laboratory Advisory Committee NAC-AMR NAP-IST MOH	Y 1
	3.7.2.2. Make recommendations to improve laboratory capacity according to the above assessment	3.7.2.2. Recommendations based on the above report to improve laboratory capacity		
3.7.3. Ensure the availability of infrastructure, trained human resources, and equipment at different levels of microbiology laboratories according to the findings of the baseline lab assessment	3.7.3.1. Identify the requirements of infrastructure, trained human resources, and equipment at different levels of microbiology laboratories according to the findings of the baseline lab assessment	3.7.3.1. Report on requirements of infrastructure, trained human resources, and equipment at different levels of microbiology laboratories according to the findings of the baseline lab assessment	MOH	Annual
	3.7.3.2. Establish a mechanism to provide the laboratories with identified requirements to fulfill the standards	3.7.3.2.1. Report on procedures carried out for capacity development of microbiology laboratories at various levels	MOH, NAC-AMR, NAP- IST	Annual

Strategic intervention 3.7 Build laboratory capacity to produce high-quality microbiological data to support surveillance activities and patient management in human health			
		3.7.3.2.2. The percentage of calibrated instruments out of the instruments identified for calibration in the laboratory 3.7.3.2.3. The number and percentage of filled cadre 3.7.3.3. Number and percentage of microbiology laboratories with and without the minimum standards at various levels after the specified period of capacity development	MOH Annual
	3.7.3.3. Monitoring and reporting of the progress of the above mechanism annually	3.7.4.1. Reporting of stock- outs of estimated consumables	MOH, MSD Annual
3.7.4. Ensure an uninterrupted supply of consumables for the clinical microbiology laboratories	3.7.4.1. Establish an electronic inventory management system for monitoring stock status, reporting stock-outs and immediate remedial measures	3.7.5.1. Availability of quality manuals 3.7.5.2. Availability of technical manuals 3.7.5.3. EQA reports	MOH Y 1 -2 Y 1 -2 Annual
3.7.5. Develop laboratory quality management system	3.7.5.1. Develop quality manuals 3.7.5.2. Develop technical manuals 3.7.5.3. Identify and fulfill other requirements for laboratory accreditation	3.7.6.1.-3. Number and % of clinical microbiology laboratories with a laboratory information management system	MOH Y 1-5
3.7.6. Establish a laboratory information management system	3.7.6.1. Assess requirements, develop specifications, call for tenders and develop the LIMS 3.7.6.2. Fulfill the requirements for establishment of the LIMS 3.7.6.3. Implementation and training of staff		

Strategic intervention 3.8 Build laboratory capacity to monitor the development of AMR and to detect the level of antimicrobials in animals and food safety				
Priority action	Activities	Monitoring and Evaluation Indicators	Responsibility	Time frame
3.8.1. Identify the laboratory capacity that is needed using a risk-based approach	3.8.1.1. Evaluation of laboratory capacity of animal health laboratories on AST in DAPH and FVMAS. 3.8.1.2. Prioritization of labs based on capacity to have standard AST	3.8.1.1. The report on capacity assessment	DAPH	Y 3-5
3.8.2. Identify, develop, and accredit laboratories to detect and monitor the incidence of AMR by performing antibiotic sensitivity on target groups of organisms and antibiotics based on risk-based approach i) at the animal production level ii) in food of animal origin	3.8.2.1. Identification of Division of Bacteriology, CVIC, and FVMAS for accreditation for AST 3.8.2.2. Accreditation of two labs for AST 3.8.2.3. Appoint an expert committee to monitor the development of AMR and to detect the level of antimicrobials in food of animal origin 3.8.2.4. Identify the veterinary laboratory capacity that is needed at the animal production level using risk-based approach 3.8.2.5. Identify target groups of organisms and antibiotics to monitor the incidence of AMR-based risk-based approach 3.8.2.6. Perform antibiotic susceptibility on target groups of organisms and antibiotics at animal production level	3.8.2.1.1. Priority list 3.8.2.1.2. The application of the accreditation 3.8.2.2. Accredited certificate 3.8.2.3. Committee establishment 3.8.2.4. Identified laboratories 3.8.2.5. Target group of organisms and antibiotics 3.8.2.6. Specific indicators on percentage of resistance in target organism and antibiotics (e.g., Resistance to 3 rd generation cephalosporin in <i>E. coli</i> isolates)	DAPH	Y 1-5

**Strategic intervention 3.8
Build laboratory capacity to monitor the development of AMR and to detect the level of antimicrobials in animals and food safety**

<p>3.8.2.7. Perform antibiotic susceptibility on target groups of organisms and antibiotics at food of animal origin</p> <p>3.8.2.8. Develop a monitoring mechanism for sharing of information between human and animal health sector</p> <p>3.8.2.9. Obtain ISO 17025 accreditation for the identified veterinary laboratories to cover the scope of testing, performing antimicrobial susceptibility testing</p> <p>3.8.2.10. Appoint an expert subcommittee to monitor the development of AMR and to detect the level of antimicrobials in food of animal origin.</p> <p>3.8.2.11. Identify the public health laboratory capacity that is needed for food of animal origin using a risk-based approach</p> <p>3.8.2.12. Identify target groups of organisms to monitor the incidence of AMR based on risk-based approach</p> <p>3.8.2.13. Perform antibiotic sensitivity on target groups of organisms for food of animal origin.</p> <p>3.8.2.14. Obtain ISO 17025 accreditation for the Identified public health laboratories - to</p>	<p>3.8.2.7. Percentage of resistance in targeted organisms</p> <p>3.8.2.8. Established mechanism for monitoring, analysis, and interpretation of surveillance data generating annual reports.</p> <p>3.8.2.9. ISO certification of identified laboratories</p> <p>3.8.2.10 Subcommittee appointed</p> <p>3.8.2.11. Identified laboratories</p> <p>3.8.2.12. Identified a list of Target groups of organisms and Antibiotics for the performance of AST.</p> <p>3.8.2.13. Percentage resistance of antibiotics in target organisms.</p> <p>3.8.2.14. Percentage of laboratories with ISO 17025 accreditation</p>	<p>- Food advisory committee</p> <p>- MOH</p> <p>- Food control unit.</p> <p>- MOH</p> <p>- Food control unit.</p> <p>- MOH</p> <p>- Food control unit</p> <p>- MOH</p> <p>- Food control unit.</p>	<p>1 Y</p> <p>1 Y</p> <p>1 Y</p> <p>2Y</p> <p>3 years</p>	

Strategic intervention 3.8 Build laboratory capacity to monitor the development of AMR and to detect the level of antimicrobials in animals and food safety				
	cover the Scope of testing – performing Antibiotic Sensitivity Testing (AST)	for AST		
<p>3.8.3. Identify, develop, and accredit laboratories to detect and monitor antibiotic utilization in animals by detection of antibiotic residue levels in</p> <p>i) food of animal origin (meat /fish /milk)</p>	<p>3.8.3.1. Appoint an expert committee to detect and monitor antibiotic utilization in animals by detection of antibiotic residue level</p> <p>3.8.3.2. Identify the laboratory capacity that is needed for detection of antimicrobial residues in food produced for both local and export market based on the available laws/regulations/guideline</p> <p>3.8.3.3. Identify the target matrices to monitor antibiotic residues</p> <p>3.8.3.4. Obtain ISO 17025 accreditation for the identified laboratories to cover the scope of testing</p>	<p>3.8.3.1. Expert committee established and functioning to generate annual reports</p> <p>3.8.3.2.1. Report on identified laboratory capacity</p> <p>3.8.3.2.2. Laws, regulations and guidelines for antimicrobial residues in food for both local and export market</p> <p>3.8.3.3. Target matrices identified</p> <p>3.8.3.4. Accreditation certificate for the defined scope</p>	<p>DAFH</p>	<p>1-5 Y</p>

Priority Area 4 - Prevention and Control of Infections Strategic Objective - Reduce the incidence of infection through effective sanitation, hygiene, and infection prevention measures

Priority action	Activity	Monitoring and Evaluation Indicators	Responsibility	Timeframe
Strategic intervention 4.1 Formulate a national policy on IPC and establish an expert committee to advise and monitor implementation of IPC programmes at national level				
4.1.1. Establish an expert committee to advise & monitor the implementation of IPC programmes at national level	4.1.1.1. Appointing a multisectoral expert committee to guide development, implementation & monitoring of national IPC programmes	4.1.1.1. National multisectoral expert committee with TOR	MOH, MOA, MOF, MOE	Y 1
4.1.2. Formulation and endorsement of national policy on IPC and a national programme for implementation of the policy	4.1.2.1. Conduct a situational analysis of the IPC status of the country (healthcare settings and community) including existing policies and regulations. 4.1.2.2. Develop and endorse the national Policy on IPC in line with existing policies and regulations 4.1.2.3. Design the national programme on IPC in line with WHO-recommended standards through expert committee meetings 4.1.2.4. Identify the resource gaps for the implementation of the IPC programme. (Infrastructure, expertise, trained human resource, equipment & consumable)	4.1.2.1. Availability of the report of situation analysis 4.1.2.2. Availability of an endorsed national policy on IPC 4.1.2.3. Availability of a national programme on IPC 4.1.2.4. Report on available resources and gaps identified	MOH, MOA, MOF, MOE	Y 1-3

Strategic intervention 4.1 Formulate a national policy on IPC and establish an expert committee to advise and monitor implementation of IPC programmes at national level			
	<p>4.1.2.5. Address the gaps and implement the designed IPC programme to meet standards recommended by WHO</p> <p>4.1.2.6 Monitor the implementation of IPC programme with national IPC quality indicators and sector-specific IPC assessment tools (WHO/WOAH/FAO/UNEP)</p>	<p>4.1.2.5. Evidence of programme implementation</p> <p>4.1.2.6. National IPC quality indicators and level of compliance with identified IPC standards</p>	
<p>4.1.3. Development of research studies & using surveillance to assess communicable disease burden in the community to introduce new IPC interventions e.g. new vaccines and other interventions to improve sanitation and hygiene in the community</p>	<p>4.1.3.1. Assess the communicable disease burden through disease burden studies and existing surveillance mechanisms and oversight committees to identify the need for new IPC strategies in the community</p> <p>4.1.3.2. Use the findings of disease burden studies/surveillance to introduce new vaccines to the EPI programme</p> <p>4.1.3.3. Identify specific target groups for special vaccination programmes according to disease burden estimates.</p> <p>4.1.3.4. Improve and monitor the WASH infrastructure in healthcare settings according to policies/regulations and guidelines and WHO recommendations</p>	<p>4.1.3.1. Regular reports on communicable diseases in the community through links with relevant programmes and committees</p> <p>4.1.3.2. to 4.1.3.4. AMR programme linked with relevant programmes for surveillance and prevention of infectious disease.</p> <p>4.1.3.2. to 4.1.3.4. Evidence of monitoring & evaluation linked with relevant programmes</p>	<p>MOH (Epidemiology unit, Occupational and Environment health unit)</p> <p>Y 1-5</p>

**Strategic intervention 4.2
Build capacity for IPC activities in healthcare settings with adequate and uninterrupted resources**

<p>4.2.1. Improve or establish properly equipped IPC units in hospitals according to WHO guidelines</p>	<p>4.2.1.1. Prepare TOR for IPC units</p> <p>4.2.1.2. Improve IPC units in all hospitals according to WHO guidelines</p> <p>4.2.1.3. Ensure the IPC units do the annual estimates of requirements for IPC programmes of the hospitals</p> <p>4.2.1.4. Ensure IPC unit is equipped with uninterrupted supply of equipment & consumables</p>	<p>4.2.1.1. Availability of TOR for IPC units</p> <p>4.2.1.2.1. Ratio of number of IPC nurses to number of patients</p> <p>4.2.1.2.2. Identified liaison nurses</p> <p>4.2.1.2.3. Percentage of hospitals with functioning IPC units with availability of IPC committee meeting minutes</p> <p>4.2.1.2.4. The identified list of tasks for the annum</p> <p>4.2.1.3. Annual estimate of requirements for IPC programmes of the hospitals</p> <p>4.2.1.4. List of requirements of consumables per year per institution and availability</p>	<p>MOH</p>	<p>Y 1</p>
<p>4.2.2. Training of IPC staff</p>	<p>4.2.2.1. Develop/improve training modules for IPC Mos, ICNOs and link nurses</p> <p>4.2.2.2. Organise a national programme for training of IPC staff at recruitment</p>	<p>4.2.2.1. Availability of training modules for IPC Mos, ICNOs and link nurses</p> <p>4.2.2.2.1. Availability of national training programmes for IPC staff at recruitment</p> <p>4.2.2.2.2. Percentage of trained staff in IPC units</p>	<p>MOH (Education, Training and research unit)</p>	<p>Y 1-5</p>

Strategic intervention 4.2 Build capacity for IPC activities in healthcare settings with adequate and uninterrupted resources				
	<p>4.2.2.3. Organise a national programme for refresher training of IPC staff</p> <p>4.2.2.4. Commemorate Global Hand Hygiene Day at the national level annually</p> <p>4.2.2.5. Organizing a national programme for Training of Trainers on IPC (TOT)</p>	<p>4.2.2.3.1. Availability of national programme for refresher training of IPC staff</p> <p>4.2.2.3.2. Percentage (%) of IPC staff who underwent refresher training within the past 3 years</p> <p>4.2.2.4. Annual Hand hygiene day activities</p> <p>4.2.2.5. Number of national programmes for TOT</p>		Y 1-5
4.2.3. Implementation of national policy on waste management	<p>4.2.3.1. Schedule training programmes on waste management in healthcare institutes</p> <p>4.2.3.2. Ensure budget allocation for waste management (including discarded antimicrobials and waste containing antimicrobial residues) according to the national policy</p>	<p>4.2.3.1. Number of training programmes conducted.</p> <p>4.2.3.2. Percentage (%) of healthcare institutes with a dedicated budget for waste management</p>	MOH, MOE	Y 1-5
4.2.4. Development of guidelines for building constructions/renovations in hospital settings in compliance with IPC standards	<p>4.2.4.1. Establish an expert committee for developing the guidelines</p> <p>4.2.4.2. Identify critical areas of built environment which need input in relation to IPC before and during building construction/renovation</p> <p>4.2.4.3. Develop guidelines for IPC requirements for critical areas of the built environment</p>	<p>4.2.4.1. Expert committee on built environment</p> <p>4.2.4.2. Identified critical areas needing IPC input in building construction/renovation</p> <p>4.2.4.3. Availability of guidelines for building constructions in hospital settings in relation to IPC (e.g., Operating theaters, isolation areas)</p>	MOH (DHQS) (Directorate for Healthcare Quality & Safety) CECB	Y 1-5

Strategic intervention 4.3			
Develop HAI surveillance and audit/assessments of compliance with IPC practices for improvement			
4.3.1. Monitor hand hygiene compliance and rates of Healthcare-Associated Infections (HAI) in healthcare settings	4.3.1.1. Monitor & improve hand hygiene compliance 4.3.1.2. Establish surveillance for monitoring selected HAI rates (MRSA bacteraemia, SSI, CAUTI in ICUs)	4.3.1.1. Hand hygiene compliance rates 4.3.1.2. Percentage (%) of healthcare institutes with a surveillance programme for IPC	MOH, DHQS Y 1-5
4.3.2. Monitor selected quality indicator rates at national level	4.3.2.1. Monitor identified quality indicators in order to improve the IPC practices in healthcare settings 4.3.2.2. Identify and correct the gaps in resources, knowledge, or compliance with practices	4.3.2.1. Rates of quality indicators (E.g. SSI, hospital-onset MRSA & CAUTI in ICUs) 4.3.2.2. Interventions to improve gaps identified	MOH (DHQS) Y 1-5
4.3.3. Develop assessments/audits to monitor compliance with IPC practices	4.3.3.1. Encourage developing an annual audit plan for IPC at institution level	4.3.3.1. Percentage (%) of healthcare institutes with an annual audit plan	MOH Y 1-5
Strategic intervention 4.4			
Develop public awareness programmes on infection prevention linked with AMR awareness programmes			
4.4.1. Develop IEC (information, education & communication) materials for different categories of the general public	4.4.1.1. Identify key topics for improving awareness on infection prevention in community. E.g. - Reducing the incidence of food borne disease through effective sanitation, hygiene and infection prevention measures 4.4.1.2. Develop IEC material on key topics identified 4.4.1.3. Use mass media to disseminate the message on key topics (TV, radio & social media)	4.4.1.1. List of key topics 4.4.1.2. Types and Number of IEC material developed on the key topics 4.4.1.3. Number of programmes on different modes of communication	MOH (HPB, Epid unit) Y 1-5

Strategic intervention 4.5 Develop awareness and monitoring mechanisms of IPC in community health, animal health, plant health, and food production				
4.5.1 Develop best management practices in animal health & aquaculture by formulation of national policy on IPC	4.5.1.1. Establish a committee to make recommendations for development of IPC policy for companion animals and livestock production system 4.5.1.2. Formulate and endorse the policy for IPC in veterinary sector	4.5.1.1. Committee appointed. 4.5.1.2 Endorsed policy	DAPH, MOF	Y 1-5
4.5.2. Establish an expert committee to advise, implement and monitor IPC programmes at the national level with strict biosecurity protocols to prevent the introduction of pathogens to farms (fish farming and aquaculture)	4.5.2.1. Appoint a multisectoral expert committee 4.5.2.2. Establish two sub-committees for implementing IPC programmes for companion animals and livestock 4.5.2.3. Review existing biosecurity standards in poultry grandparents, parents, hatcheries, commercial farms, fish farms and aquaculture	4.5.2.1. Committee appointed 4.5.2.2. Two subcommittees appointed 4.5.2.3. Biosecurity standards updated for relevant sectors.	DAPH, MOF	Y 1 Y 1-2
4.5.3. Identify research priorities & funding for infectious diseases, surveillance & vaccine development in animal health sector (terrestrial and aquatic)	4.5.3.1. Identify research priorities for infectious diseases in animal health sector. 4.5.3.2. Identify priority for surveillance in the animal health sector	4.5.2.4.1. Availability of guidelines for implementing biosecurity standards 4.5.2.4.2. Evidence of implementation of standards 4.5.3.1 to 4.5.3.3. Committee reports including priorities.	DAPH, MOF	Y 1

Strategic intervention 4.5

Develop awareness and monitoring mechanisms of IPC in community health, animal health, plant health, and food production

	<p>4.5.3.3. Identify research priority for Vaccine development in animal health sector</p> <p>4.5.3.4. Develop proposals to identify funding for research, surveillance and vaccine development</p> <p>4.5.3.5. Receive funding for research, surveillance and vaccine development.</p> <p>4.5.3.6. Establish a surveillance programme for the identified disease in animal health sector</p>	<p>4.5.3.4. Fund allocation letters</p> <p>4.5.3.5. Availability of funds for proposed activities</p> <p>4.5.3.6. Research publications, vaccine trials and surveillance reports generated through identified activities</p>		Y 2-5
<p>4.5.4. Develop a monitoring mechanism for IPC practices in animal health sector & aquaculture</p>	<p>4.5.4.1. Establish a committee/unit to make recommendations for IPC practices in companion animals and livestock according to WOAHA guideline</p> <p>4.5.4.2. Establish a committee for training staff on implementing and monitoring IPC in animal health and aquaculture and implement strict biosecurity protocols to prevent the introduction of pathogens to farms</p> <p>4.5.4.3. Identify training requirements for staff on IPC</p> <p>4.5.4.4. Develop training module/document for IPC</p>	<p>4.5.4.1-2. Committee appointed and developed IPC recommendations for animal health sector (terrestrial and aquatic)</p> <p>4.5.4.3. Report on training needs and monitoring</p> <p>4.5.4.4. Training material developed</p>	DAPH, MOF	Y 1-2

Strategic intervention 4.5 Develop awareness and monitoring mechanisms of IPC in community health, animal health, plant health, and food production				
	4.5.4.5. Conduct IPC training for staff batch-wise	4.5.4.5.1. Evidence of conducting IPC training for staff		Y 2-5
		4.5.4.5.2. Committee reports, project end report, attendance sheets and monitoring		
4.5.5. Implementation of National Waste Management policy and existing regulations related to waste management in animal health, production and aquaculture sectors.	4.5.5.1. Appoint a committee for adopting regulations and implementation of waste management in animal health sector according to the National Waste Management policy to, minimize the release of antimicrobial residues and contaminants into the environment	4.5.5.1. Committee appointed	DAPH MOF MOE	Y 1
	4.5.5.2. Formulate guidelines and mechanisms for implementation of National Waste Management policy in the animal health sector e.g. effective effluent management systems to treat wastewater from aquaculture operations	4.5.5.2. Availability of guidelines and mechanisms for implementation of National Waste Management policy in the animal health sector		Y 1-2
	4.5.5.3. Establish mechanism for implementation of National Waste management policy in the animal health sector	4.5.5.3. and 4.5.5.4. Evidence of implementation and monitoring of waste management in the animal health sector according to the National Waste Management policy - progress report of the project & the annual report from DAPH, MOF, MOE		
4.5.6. Develop surveillance & audits to monitor IPC	4.5.6.1. Establish a monitoring body to conduct IPC audits and surveillance at the division of animal health	4.5.6.1. Appointed monitoring body and methods for audits and surveillance	DAPH, MOF	Y 1

Strategic intervention 4.5 Develop awareness and monitoring mechanisms of IPC in community health, animal health, plant health, and food production				
	4.5.6.2. Review infection surveillance and IPC audits annually at animal health division	4.5.6.2. Reports of surveillance and audits		Y 2-5
4.5.7. Guidelines development for building constructions in hospital settings in relation to IPC	4.5.7.1. Establish a committee for development of guideline for establishment and operation of animal clinics, animal hospitals.	4.5.7.1. Appointed committee	DAHP	Y 1
	4.5.7.2. Develop a guideline for establishment and operation animal clinics and animal hospitals	4.5.7.2. Guideline for establishment and operation of animal clinics and hospitals		Y 2
4.5.8. Develop awareness & monitoring mechanisms of IPC in animal health, aquaculture	4.5.8.1. Appoint a committee for development of awareness programme on IPC in veterinary sector including livestock and ornamental fish	4.5.8.1. Appointed committee	DAHP, MOF	Y 1
	4.5.8.2. Develop an IPC awareness programme for owners of livestock species and ornamental fish	4.5.8.2. IPC awareness programme for owners of livestock species and ornamental fish	DAHP MOF	Y 2-5
	4.5.8.3. Review the developed IPC and publish in the web site of DAHP and FVMAS	4.5.8.3. Web site information on IPC and number of users		Y 2
4.5.9. Develop a surveillance mechanism of disease monitoring in farms & livestock animals, according to international regulations	4.5.9.1. Appoint a committee to identify priority diseases or pathogens to have monitoring mechanism in livestock and ornamental fish and to update the disease/pathogen control programmes and to identify the need to introduce new vaccines	4.5.9.1. Appointed committee	DAHP	Y 1 Y 1-5

Strategic intervention 4.5 Develop awareness and monitoring mechanisms of IPC in community health, animal health, plant health, and food production				
	4.5.9.2. Review disease burden to update the disease/pathogen control programme and to identify the need to introduce new vaccines	4.5.9.2. Report of pathogen control programme		
4.5.10. Establish vaccination programme for animals and aquaculture	4.5.10.1. Update the vaccination programme for terrestrial animals & aquaculture 4.5.10.2. Implement an updated vaccination programme for companion animals, livestock and aquaculture	4.5.10.1. Vaccination programme for terrestrial animals and aquaculture 4.5.10.2. Vaccination programme for companion animals, livestock and aquaculture	DAPH MOF	Y 1-5
4.5.11. Improve infectious disease surveillance and control in agriculture sector	4.5.11.1. Improve the infectious disease surveillance and control programme in agriculture sector	4.5.11.1. Reports on infectious disease surveillance and control in agriculture sector	DOA	
4.5.12. Maintain border control and quarantine for animals and plants facilities for international trade	4.5.12.1. Prepare an annual report of quarantine of all sectors. 4.5.12.2. Update of SOPs for border control for animals, animal products and plants	4.5.12.1. Annual report of quarantine issued by DAPH, DOA & MOF 4.5.12.2. Availability of updated SOPs	DAPH, DOA, MOF	Y 1-5
4.5.13. Introduction and promotion of Good Agricultural Practices (GAP) programme for farms	4.5.13.1. Introduce GAP in farms to control the use of antifungals and pesticides. 4.5.13.2. Monitor compliance with GAP	4.5.13.1. Number of farms agreeing to follow GAP 4.5.13.2. Number of farms monitored and percentage compliance with GAP	DOA	Y 1-5

Strategic intervention 4.5

Develop awareness and monitoring mechanisms of IPC in community health, animal health, plant health, and food production

<p>4.5.14. Develop best management practices in environment and ensure access to safe water and sanitation</p>	<p>4.5.14.1. Communicate and collaborate with responsible governance bodies or organizations about recommendations to improve sewage system and to promote responsible use of chemicals to prevent contamination of environment and water resources</p>	<p>4.5.14.1.1. Proportion of population using safely managed drinking-water services (SDG 6 indicator)</p> <p>4.5.14.1.2. Proportion of population using safely managed sanitation services (SDG 6 indicator)</p> <p>4.5.14.1.3. Environmental standards (SDG 12.4 indicators).</p> <p>a. Compliance with international multilateral environmental agreements</p> <p>b: Reports on hazardous waste generated per capita, and proportion of hazardous waste treated, by type of treatment</p>	<p>MOE</p>	<p>Y 1-5</p>
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Priority Area 5 - Optimizing Antimicrobial Use

Strategic objective: Optimize the use of antimicrobials in human, animal and plant health.

Priority action	Activities	Monitoring and Evaluation Indicators	Responsibility	Timeframe
Strategic interventions 5.1. Regulate the use of antimicrobials in human health to promote appropriate use				
5.1.1. NMRA to strengthen implementation of regulations and monitoring of the same for registration, waiver of registration, manufacturing, importation, labelling, availability of information, advertising, distribution, transport, storage, sale, pharmacovigilance, post-marketing surveillance and disposal of antimicrobials	5.1.1.1. Appoint a subcommittee of experts to review and endorse the draft AMR policy and to make recommendations to update existing regulations related to registration, waiver of registration, manufacturing, importation, labelling, availability of information, advertising, distribution, transport, storage, sale, pharmacovigilance, post-marketing surveillance and disposal of antimicrobials in human health in view of optimizing use and combating AMR	5.1.1.1. Establishing a subcommittee of experts	MOH, NMRA, NMQAL	Y 1
	5.1.1.1.1. Committee meetings to review and make recommendations to update the AMR policy & relevant regulations.	5.1.1.1.2. Committee meetings and availability of a report with recommendations to update policy & regulations.		Y 2
	5.1.1.1.3. Endorsing the updated AMR policy and regulations	5.1.1.1.3. Availability of endorsed AMR policy and updated regulations for optimal use of antimicrobials and combating AMR.		Y 2-5

Strategic interventions 5.1.

Regulate the use of antimicrobials in human health to promote appropriate use

	<p>5.1.1.4. Reviewing and updating procedures to ensure implementation of AMR policy and regulations.</p> <p>5.1.1.5. Identifying/updating the monitoring mechanisms to ensure implementation of policy and regulations.</p> <p>5.1.1.6. Establish the monitoring mechanisms to ensure implementation of policy and regulations.</p>	<p>5.1.1.4. Updated procedures established to ensure implementation of policy and regulations.</p> <p>5.1.1.5. Updated monitoring mechanisms to ensure implementation of policy and regulations.</p> <p>5.1.1.6. Evidence of functional monitoring mechanisms to ensure implementation of AMR policy and regulations</p>		<p>Y 2-5</p> <p>Y 2-5</p> <p>Y 3-5</p>
<p>5.1.2. Establish mechanism and laboratory capacity to ensure quality of antimicrobials during registration, procurement, storage & distribution, and pharmacovigilance</p>	<p>5.1.2.1. Review the capacity of NMQAL to ensure the quality of antimicrobials during registration, procurement, storage & distribution, and pharmacovigilance/post marketing surveillance to identify the necessary improvements.</p> <p>5.1.2.2. Develop a plan of action for Y1-5 for improving capacity of NMQAL to ensure the quality of antimicrobials.</p> <p>5.1.2.3. Implementation of the planned improvements identified in 5.1.2.2.</p>	<p>5.1.2.1. Report on NMQAL capacity to ensure the quality of antimicrobials.</p> <p>5.1.2.2. Availability of an action plan for improving capacity of NMQAL to ensure the quality of antimicrobials.</p> <p>5.1.2.3. Availability of NMQAL outputs as evidence of improvements identified in 5.1.2.2</p>	<p>MOH, NIMRA, NMQAL</p>	<p>Y 1</p> <p>Y 1</p> <p>Y 2-5</p>

Strategic intervention 5.2. Ensure uninterrupted access to quality assured antimicrobials in human health sector			
5.2.1. Identify essential antimicrobials and a regulatory framework for preservation of new antimicrobials	5.2.1.1. Appoint an expert committee to review and make recommendations to update the list of essential antimicrobials and to review the need for introducing new antimicrobials with a regulatory mechanism for preservation of new antimicrobials.	5.2.1.1. An expert committee is established to review the need for introducing new antimicrobials with a regulatory mechanism for preservation of new antimicrobials.	Y 1
	5.2.1.2. Establish a regulatory mechanism for preservation of new antimicrobials.	5.2.1.2. Availability of a regulatory mechanism for preservation of new antimicrobials and to review reports on consumption of essential and new antimicrobials.	Y 1
	5.2.1.3. Update lists of essential and new antimicrobials annually	5.2.1.3. Availability of essential and new lists of antimicrobials annually	Y 2-5
	5.2.1.4. Review the reports of consumption of essential and new antimicrobials annually to make informed decisions on use of antimicrobials.	5.2.1.4. Evidence of reviewing reports on consumption of essential and new antimicrobials by the expert committee	Y 2-5
5.2.2. Review and update regulations and/or guidelines for estimations, procurement, quality assurance, storage & distribution, access levels, sales, and dispensing of antimicrobials	5.2.2.1. Appoint an expert committee to review and make recommendations to update the regulations and/or guidelines for estimations, procurement, storage & distribution, access levels, sales, dispensing and disposal of antimicrobials.	5.2.2.1. Appointment and meetings of an expert committee to review and update the regulations/guidelines for estimations, procurement, storage & distribution, access levels, sales, dispensing and disposal of antimicrobials.	Y 1-2
	5.2.2.2. Expert committee meetings make recommendations to update the guidelines for estimations, procurement, procurement, storage, sales, and dispensing of antimicrobials	5.2.2.2. Updated guideline with a quality management system for the management of antimicrobials including estimations,	Y 1-2

Strategic intervention 5.2.

Ensure uninterrupted access to quality assured antimicrobials in human health sector

	<p>quality assurance, storage & distribution, access levels, sales, dispensing and disposal of antimicrobials with a quality management system.</p> <p>5.2.2.3. Conduct training sessions for relevant staff on updated guidelines for estimations, procurement, quality assurance, storage & distribution, access levels, sales, dispensing and disposal of antimicrobials.</p> <p>5.2.2.4. Expand antimicrobial waste treatment and disposal facilities according to expert committee recommendations and updated regulations</p>	<p>procurement, quality assurance, storage & distribution, access levels, sales, dispensing and disposal.</p> <p>5.2.2.3. Monitoring/audits of estimations, procurement, quality assurance, storage & distribution, access levels, sales, dispensing and disposal of antimicrobials</p> <p>5.2.2.4. Availability of a regulatory framework for the discharge of antimicrobials and waste potentially contaminated with antimicrobials into the environment and audit reports on disposal of antimicrobials</p>		<p>Y 2-5</p>
<p>5.2.3. Monitor the availability of essential antimicrobial agents in healthcare settings</p>	<p>5.2.3.1. Update the mechanism to monitor the availability of essential antimicrobial agents in healthcare settings of different levels.</p> <p>5.2.3.2. Establish a mechanism to respond to shortages of essential antimicrobial agents in healthcare settings</p>	<p>5.2.3.1. Reports on stockouts of essential antimicrobials in hospitals to be discussed at the National Drugs and Therapeutics Committee</p> <p>5.2.3.2. Documented evidence of response to shortages of essential antimicrobial agents in healthcare settings within the specified timeframe to be reviewed at institutional DTC/AMS committee</p>	<p>MOH -MSD NDTC, National AMS committee, Institutional DTC/ AMS committee</p>	<p>Y 1-5</p> <p>Y 1-5</p>

Strategic intervention 5.3. Optimize the use of antimicrobials in human health through AWaRe classification, guidelines, prescriber awareness and stewardship.			
<p>5.3.1. Adopt the AWaRe classification of antimicrobials in human health sector including primary care and the private health sector</p>	<p>5.3.1.1. Appoint an expert committee to adopt the AWaRe classification into the Essential List of antimicrobials and develop relevant procedures and guidelines for implementation in healthcare settings of different levels including primary care in a stepwise manner.</p> <p>5.3.1.2. Expert committee meetings to develop procedures and guidelines and a plan for adopting the AWaRe classification into the essential list of antimicrobials</p> <p>5.3.1.3. Conduct advocacy programmes/ training sessions for relevant staff on procedures and guidelines.</p> <p>5.3.1.4. Implement the procedures to adopt and monitor the use of AWaRe classification of antimicrobials in state sector and private sector healthcare settings in a stepwise manner</p>	<p>5.3.1.1. Availability of an Expert committee to adopt the AWaRe classification of antimicrobials and to develop relevant procedures and guidelines and a plan for implementation in healthcare settings of different levels.</p> <p>5.3.1.2. Availability of procedures and guidelines and a plan for implementation to adopt the AWaRe classification of antimicrobials.</p> <p>5.3.1.3. Number of advocacy programmes/ training sessions conducted for relevant staff categories.</p> <p>5.3.1.4. Number of private sector and state sector hospitals and quality assurance, of TH/ PGH/DGH/BH using the AWaRe classification of antimicrobials each year and the number of private sector pharmacies selling watch and restricted group of antimicrobials</p>	<p>MOH, PHSRC, NMRA</p> <p>Y 1</p> <p>Y 1</p> <p>Y 1</p> <p>Y 2-5</p>
<p>5.3.2. Review guidelines for prescribing antimicrobials and availability at different levels of</p>	<p>5.3.2.1. Endorse the revised guidelines on empiric use of antimicrobials at national level</p>	<p>5.3.2.1. Availability of nationally endorsed revised guidelines on empiric use of antimicrobials</p>	<p>MOH</p> <p>Y 1</p>

Strategic intervention 5.3.

Optimize the use of antimicrobials in human health through AWaRe classification, guidelines, prescriber awareness and stewardship.

<p>healthcare settings inward/OPD/ community</p>	<p>5.3.2.2. Identify other relevant guidelines on the use of antimicrobials for specific indications and availability at different levels of healthcare settings inward/ OPD/community.</p> <p>5.3.2.3. Develop an electronic version with user friendly algorithms and visual guides to facilitate the use of guidelines.</p> <p>5.3.2.4. Conduct training sessions for prescribers to ensure adherence to guidelines.</p> <p>5.3.2.5. Identify groups of experts in relevant professional colleges and associations at provincial and regional levels to encourage the optimal use of antimicrobials</p>	<p>5.3.2.2. Availability of a list of relevant guidelines on the use of antimicrobials for specific indications.</p> <p>5.3.2.3. Availability of an electronic version with user friendly algorithms and visual guides</p> <p>5.3.2.4. Number of training sessions conducted for prescribers in state sector and private sector at provincial and district level</p> <p>5.3.2.5. Availability of expert groups in relevant professional colleges and associations at provincial and regional levels to encourage the optimal use of antimicrobials</p>	<p>National AMS committee</p> <p>Institutional DTC/ AMS committee</p>	<p>Y 2-5</p>
<p>5.3.3. Establish and facilitate the operation of AMS programmes and ensure mechanisms to review prescribing practice</p>	<p>5.3.3.1. Appoint an integrated national AMS committee to develop the structure, mechanisms, guidelines, standards and tools for AMS programme according to WHO recommendations.</p> <p>5.3.3.2. Develop the structure, mechanisms, guidelines, standards and tools to implement and monitor the AMS programme at national, subnational and institutional levels</p>	<p>5.3.3.1. to 5.3.3.2. A national coordinating mechanism with guidelines, standards and tools to implement and monitor the AMS programme is established</p>	<p>MOH</p>	<p>Y 1</p> <p>Y 1-2</p>

Strategic intervention 5.3. Optimize the use of antimicrobials in human health through AWaRe classification, guidelines, prescriber awareness and stewardship.			
	<p>5.3.3.3. Implement the AMS programme at national, subnational and institutional levels according to the guidelines and plans.</p> <p>5.3.3.4. Monitor the implementation of AMS programme according to the standards and monitoring mechanisms such as point prevalence surveys (PPS) to identify the gaps and areas for improvement.</p>	<p>5.3.3.3. AMS programme is functional, at national, subnational and institutional levels and expanded according to the plan and generates following data</p> <ul style="list-style-type: none"> • Percentage of TH/PGH/DGH/primary care facilities & private hospitals with AMS of the eligible/selected institutions • Percentage of hospital patients (adults and pediatric) receiving antimicrobials according to AWaRe categories • Percentage of in-patients surgical procedures with appropriate timing and duration of surgical antibiotic prophylaxis 	Y 2-5
5.3.4. Improving diagnostic stewardship to support AMS programmes	<p>5.3.4.1. Identify the needs and develop plans for improvement of diagnostic stewardship for implementing AMS through the integrated national AMS committee. (Combine with activities for laboratory capacity assessment and development under priority area 3)</p> <p>5.3.4.2. Implementing the plan for improving diagnostic stewardship</p>	<p>5.3.4.1. List of essential diagnostic facilities for different levels of hospitals and plan for improvement</p> <p>5.3.4.2. Annual assessment on % of different levels of state sector & private hospitals with access to essential diagnostics without stockouts</p>	MOH Y 2-5

Strategic intervention 5.3. Optimize the use of antimicrobials in human health through AWaRe classification, guidelines, prescriber awareness and stewardship.			
5.3.5. Identification and elimination of economic incentives that encourage inappropriate use of antimicrobial agents	5.3.5.1. Appoint a team of experts with representation of pharmaceutical industry to identify economic incentives that encourage inappropriate use of antimicrobial agents.	5.3.5.1. Reports of the team of experts with representation of pharmaceutical industry on economic incentives encouraging inappropriate use of antimicrobials	MOH, NMRA, Representatives of pharmaceutical industry
	5.3.5.2. Develop and adopt a code of conduct to discourage the inappropriate promotion of antimicrobial prescriptions.	5.3.5.2. Availability and evidence of acceptance of the code of conduct for prescribers and pharmaceutical industry to discourage the inappropriate prescription of antimicrobials.	
	5.3.5.3. Regulate and control the antimicrobial promotional practices by industry.	5.3.5.3. Evidence of regulating and controlling the antimicrobial promotional practices by industry.	
Strategic intervention 5.4. Monitor the use of antimicrobials in human health			
5.4.1. AMS programme to conduct PPS/Prescription audits to monitor use of restricted & watch categories and surgical antibiotic prophylaxis in healthcare settings	5.4.1.1. Develop a plan and methodology for conducting PPS or prescription audits to monitor the use of restricted & watch categories of antimicrobials and surgical antibiotic prophylaxis in acute care settings	5.4.1.1. Availability of a plan and methodology for conducting PPS/ Prescription audits to monitor the use of restricted & watch categories.	MOH
	5.4.1.2. Conduct PPS/prescription audits linked with activities 5.3.1.4. and 5.3.3.4 in state sector hospitals	5.4.1.2. Availability of reports on PPS/ prescription audits with institutional level AMS committee	

Strategic intervention 5.4. Monitor the use of antimicrobials in human health			
	5.4.1.3. Review the findings of PPS and prescription audits at institutional and national level at regular intervals to identify trends and measures for improvement	5.4.1.3. Availability of evidence of regular meetings to review the reports of PPS/prescription audits at national level to support the decision-making process of the integrated AMS committee	MOH, PHSRC Y 2-5
5.4.2. Monitor antimicrobial prescribing practices in private sector	5.4.2.1. Conduct PPS/prescription audits in private healthcare settings linked with activities 5.3.1.4. and 5.3.3.4 5.4.2.2. Review the findings of PPS and prescription audits at institutional and national level at regular intervals to identify trends and measures for improvement	5.4.2.1. Availability of reports on PPS/prescription audits at institutional level 5.4.2.2. Availability of evidence of regular meetings to review the reports of PPS/prescription audits at national level to support the decision-making process.	
5.4.3. Monitor antimicrobial dispensing practices in private sector	5.4.3.1. Develop/review the plan and methodology for conducting audits to monitor the dispensing of antimicrobials in private sector community pharmacies and health institutions 5.4.3.2. Conduct audits on dispensing of antimicrobials in private sector community pharmacies and health institutions 5.4.3.3. Review the findings of audits on dispensing of antimicrobials in private sector community pharmacies and health institutions at regular intervals to identify trends and measures for improvement	5.4.3.1. Availability of a plan and methodology for conducting audits to monitor the dispensing of antimicrobials in private sector community pharmacies and health institutions. 5.4.3.2. Reports of audits on dispensing of antimicrobials in private sector community pharmacies and health institutions 5.4.3.3. Evidence of reviewing the findings of audits on dispensing of antimicrobials in private sector community pharmacies and health institutions at regular intervals to identify trends and measures for improvement	MOH, PHSRC NMRA Y 1 Y 1-5 Y 1-5

Strategic intervention 5.4. Monitor the use of antimicrobials in human health			
5.4.4. Monitor registration of pharmacies and private health institutions	5.4.4.1. Review and update criteria for renewing registration of pharmacies and private health institutions to include the AMS practices.	5.4.4.1. Availability of updated criteria for renewing registration of pharmacies and private health institutions to include AMS practices.	Y 1
	5.4.4.2. Use the updated criteria for renewing registration of pharmacies and private health institutions to ensure the practice of AMS	5.4.4.2. Evidence of using updated criteria for renewing registration of pharmacies and private health institutions to ensure the practice of AMS	Y 2-5
Strategic intervention 5.5. Ensure uninterrupted access to quality assured antimicrobials in the animal (terrestrial /aquatic) and plant health sector.			
Priority action	Activities	Monitoring and Evaluation Indicators	Responsibility
5.5.1. Regulate and monitor registration, waiver of registration, manufacturing, importation, labeling, advertising, distribution, transport, storage, sale, and disposal of antimicrobial products.	5.5.1.1. Establish/update of registering mechanism, prescription, manufacturing, importation, distribution, transport, storage, sale, disposal of antimicrobials in VDCA, DAPH 5.5.1.2. Establish/update of regulatory mechanism monitor registration, waiver of registration, manufacturing, importation, labeling, advertising, distribution, transport, storage, sale, prescription regulations and disposal of antimicrobial products at VDCA	5.5.1.1. Registering mechanism or register 5.5.1.2. Regulations or Gazette notification	DAPH DAPH Y 1-2 Y 1-2

Strategic intervention 5.5. Ensure uninterrupted access to quality assured antimicrobials in the animal (terrestrial/aquatic) and plant health sector.				
5.5.2. Establish a mechanism for quality assurance of antimicrobials used in the terrestrial and aquatic animal health and plant health sectors.	5.5.1.3. Establish a NVQ level 3 certification training programme for farm shops	5.5.1.3. Certificate delivery system	DAPH	Y 1-2
	5.5.1.4. Develop a monitoring tool for registration, waiver of registration, manufacturing, importation, labeling, advertising, distribution, transport, storage, sale, and disposal of antimicrobial products	5.5.1.4. Monitoring system	DAPH	Y 1-2
	5.5.1.5. Appoint of a technical committee for development of SOPs in random monitoring in food chain and aquatic health	5.5.1.5. Established committee/ TWG	DAPH	Y 1
	5.5.1.6. Develop SOPs for random monitoring/surveys of antimicrobial usage in food chain in livestock and aquatic health	5.5.1.6. Availability of SOP	DAPH	Y 1-2
	5.5.1.7. Update the monitoring mechanism on local production of antimicrobials in animal health	5.5.1.7. Monitoring system	DAPH	Y 1-5
	5.5.2.1. Develop a regulation for random quality testing for antimicrobials in the market	5.5.2.1. Regulation developed	DAPH	Y 1-5
	5.5.2.2. Establish a regulatory mechanism of quality of antimicrobials in animal farms (Livestock, Aquatic farms)	5.5.2.2. Regulation developed	MOA, MOF	Y 1-2

Strategic intervention 5.5.

Ensure uninterrupted access to quality assured antimicrobials in the animal (terrestrial/aquatic) and plant health sector.

<p>5.5.3. Establish laboratory capacity needed for quality assurance of antimicrobials used in the terrestrial and aquatic animal health sector.</p>	<p>5.5.3.1. Identify a laboratory in DAPH and FVMAS to develop chemical composition analysis of antimicrobials commonly used in veterinary sector</p> <p>5.5.3.2. Identify necessary capacity development in the labs or subunit of laboratory</p> <p>5.5.3.3. Apply for funding for necessary laboratory capacity development</p> <p>5.5.3.4. Develop laboratory and establish quality testing of antimicrobials used in veterinary and aquatic health</p>	<p>5.5.3.1. DG/DAPH communication /authorization</p> <p>5.5.3.2. Report of capacity assessment</p> <p>5.5.3.3. Funding application</p> <p>5.5.3.4. Project report and evidence of performance</p>	<p>DAPH</p>	<p>Y 1</p> <p>Y 1-2</p> <p>Y 2</p> <p>Y 3</p>
<p>5.5.4. Develop a programme for post- marketing surveillance of antimicrobials used in the terrestrial and aquatic animal health sector</p>	<p>5.5.4.1. Strengthen the regulatory provision for post marketing surveillance of veterinary pharmaceuticals at VDCA.</p> <p>5.5.4.2. Develop a programme for post marketing surveillance of veterinary pharmaceuticals at VDCA</p>	<p>5.5.4.1. Regulation</p> <p>5.5.4.2. Programme on post marketing surveillance</p> <p>5.5.4.3. Progress report</p>	<p>DAPH, MOF</p>	<p>Y 1-2</p> <p>Y 2-5</p> <p>Y 2-5</p>

Strategic intervention 5.6 Optimize the use of antimicrobials in the animal (terrestrial /aquatic) and plant health sector.					
5.6.1. Prepare guidelines to ensure prudent and responsible use of antimicrobials in accordance with international standards according to animal species and/or production sector	5.6.1.1. Identify multisectoral committees to develop guidelines on prudent usage of antimicrobial in companion animals, livestock, and aquaculture	5.6.1.1. Committee established	DAPH, MOF	Y 1	
	5.6.1.2. Develop guidelines on prudent usage of antimicrobial in companion animal, livestock and aquaculture and ensure strict adherence to regulations governing the use of antimicrobials in with penalties for non-compliance	5.6.1.2.1. Availability of guidelines 5.6.1.2.2. Documented evidence of adherence to regulations 5.6.1.2.3. reports of VDCA			Y 2
	5.6.1.3. Identify high risk antimicrobials in livestock sector and companion animals and develop regulations developed	5.6.1.3. Lists of antimicrobials regulations developed in livestock sector and companion animals			Y 2
	5.6.1.4. Identify high risk antimicrobials used in aquatic health sector and develop regulations to control the use and introduce consumption regulations to nonfood aquaculture sectors	5.6.1.4. Regulations developed to control the use of high-risk antimicrobials in aquatic health sector		DAPH, MOF	Y 3
	5.6.1.5. Encouraging use of probiotics in nonfood species culture and implementation of BMPs for non-food aquaculture sectors	5.6.1.5. Monitoring BMP and probiotic use		MOF	Y 1-5
	5.6.1.6. Monitoring effluents for selected antimicrobial residues (with Env sector)	5.6.1.6. Reports of effluent monitoring		MOF	Y 1-5

Strategic intervention 5.6 Optimize the use of antimicrobials in the animal (terrestrial /aquatic) and plant health sector.				
5.6.2. Initiate antimicrobial stewardship programmes and monitoring systems for antimicrobial usage in terrestrial /aquatic animal and plant health	5.6.2.1. Establish committees to develop antimicrobial stewardship programmes in companion animals, livestock and aquaculture	5.6.2.1. Committee established	DAHP, DOA, MOF	Y 1
	5.6.2.2. Develop antimicrobial stewardship programmes in companion animal with support of professional body of companion animal practitioners' association in Sri Lanka.	5.6.2.2. Antimicrobial Stewardship programme for companion animals	DAHP	Y 2-5
Strategic intervention 5.7 Regulate the use of antimicrobials in the animal (terrestrial /aquatic) and plant health sector.				
5.7.1. Develop a monitoring system for the usage of antimicrobial agents of importance in veterinary /aquatic and plant health.	5.7.1.1. Develop regulatory provision to monitor antimicrobial residues in food of animal origin and animal feed	5.7.1.1. Regulation or Gazette notification	DAHP, MOF	Y 1-5
	5.7.1.2. Obtain accreditation for the VRI lab for antimicrobial residue testing in livestock products	5.7.1.2. Accreditation for the required scope		Y 1-5
5.7.2. Establish national standards for Maximum Residue Limits for Veterinary Drugs in food of animal origin (terrestrial and aquatic)	5.7.2.1 Establish a technical committee to develop standards for maximum residues limited for veterinary drugs in food of animal origin	5.7.2.1. Committee established	DAHP, MOF	Y 1-5
	5.7.2.2. Develop standards for maximum residues limited for veterinary drugs in food of animal origin	5.7.2.2. Standards endorsed		Y 1-5

Strategic intervention 5.7 Regulate the use of antimicrobials in the animal (terrestrial /aquatic) and plant health sector.				
	5.7.2.3. Publish the standards for maximum residues limited for veterinary drugs in food of animal origin in the DAPH and FVMAS websites	5.7.2.3. Standards published Web page		Y 1-5
5.7.3. Establish monitoring mechanism using a risk-based approach, for Maximum Residue Limits for Veterinary Drugs in food of animal (terrestrial and aquatic) and plant origin	5.7.3.1. Design and establish an antimicrobial residues screening/ monitoring program in food of animal origin including locally consumed aquaculture products 5.7.3.2. Implement a residue monitoring programme in food of animal origin and animal feed 5.7.3.3. Review information and publish the annual screening results in DAPH and FVMAS websites 5.7.3.4. Develop a programme for the detection of residues of antimicrobials in agriculture produce	5.7.3.1. Monitoring programme established 5.7.3.2. Control programme established 5.7.3.3. Report of annual screening published 5.7.3.4. Antimicrobial residue monitoring system established for agriculture produce	DAPH, MOF	Y 1-5 Y 1-5 Y 1-5 Y 1-5
Strategic intervention 5.8 Monitor the use of antimicrobials in the animal (terrestrial /aquatic) and plant health sector.				
5.8.1. Enact legislation to ensure compliance with the national policies & guidelines on antimicrobial use in terrestrial/aquatic animal & plant Health	5.8.1.1. Establish a technical committee to amend existing act, to regulate antimicrobial in animals 5.8.1.2. Development of national policy to monitor antimicrobials usage in veterinary and aquatic sector 5.8.1.3. Development of national guidelines to monitor antimicrobials usage in veterinary and aquatic sector	5.8.1.1. Committee established with DG/DAPH letter 5.8.1.2. National policy developed 5.8.1.3. Availability of guidelines	DAPH	Y 1 Y 2-3 Y 4-5

Strategic intervention 5.8 Monitor the use of antimicrobials in the animal (terrestrial /aquatic) and plant health sector.			
	5.8.1.4. Publishing the national policy, guideline in DAPH and FVMAS websites 5.8.1.5. Development a programme to monitor antimicrobials usage in animals	5.8.1.4. Website report 5.8.1.5. Annual report on antimicrobials usage in animals	Y 3 Y 1-2
5.8.2. Implement enforcement processes and controls to ensure compliance with legislation on antimicrobial use in terrestrial /aquatic animal and plant health	5.8.2.1. Development of necessary regulation to monitor antimicrobials usage in animals and plants 5.8.2.2. Implement enforcement processes and controls to ensure compliance with legislation on antimicrobial use in terrestrial /aquatic animal and plant health	5.8.2.1. Legislations/ Regulations developed to monitor antimicrobial usage in animals and plants 5.8.2.2. Implementing controls to ensure compliance with legislation / on antimicrobial use in terrestrial / aquatic animal and plant health	Y 1-3 Y 1-3
5.8.3. Establish a regulatory program using a risk-based approach to control veterinary drug residues in food of animal origin (terrestrial and aquatic).	5.8.3.1. Identification of public health risk of the presence of antimicrobials in food of animal origin 5.8.3.2. Development of legislation to minimize or cessation of certain veterinary antimicrobials in food chain at VDCA 5.8.3.3. Development of technical reviewing process of risk of antimicrobials in food of animal origin 5.8.3.4. Development of communication platform from VDCA to professional organizations in terrestrial and aquatic health	5.8.3.1. Risk assessment report 5.8.3.2. Legislation established. 5.8.3.3. Review report 5.8.3.4. Evidence of communications	Y 1-3 Y 1-3 Y 1-3

PRIORITY AREA 6 – Research and Innovation

Strategic objective: Develop the economic case for sustainable investment and increased investment in new medicines, diagnostic tools, vaccines, and other interventions

Priority action	Activity	Monitoring and Evaluation Indicators	Responsibility	Timeframe
Strategic intervention 6. 1				
Develop the economic case for sustainable investment in AMR related activities				
6.1.1. Identify an inter-sectoral stakeholder group to develop the economic case through a needs assessment in the area, evidence-based use of interventions and effective mobilization of resources and conduct a cost benefit analysis to quantify the expected return on investment, considering reduced healthcare costs, increased productivity, and saved lives due to more effective antibiotics	<p>6.1.1.1. Establish a multisectoral expert group to promote investments in research and innovation to develop environmentally friendly disease management techniques and sustainable aquaculture systems.</p> <p>6.1.1.2. Summarize the available evidence to assess the impact of AMR on each sector</p> <p>6.1.1.3. Assess the urgency of needs to minimize the impact of AMR on health expenditure and healthcare outcomes to make recommendations on prioritizing interventions</p> <p>6.1.1.4. Convene periodic meetings to assess the ongoing needs to update the NACAMR</p>	<p>6.1.1.1. Availability of an identified group of experts for this purpose from all sectors</p> <p>6.1.1.2. Summary report on available AMR data</p> <p>6.1.1.3. Availability of report on recommendations on prioritizing interventions</p> <p>6.1.1.4. Availability of reports</p>	All sectors	<p>Y 1</p> <p>Y 1</p> <p>Y 1</p> <p>Y 1 - 5</p>

Strategic intervention 6.1 Develop the economic case for sustainable investment in AMR related activities				
6.1.2. Measure the economic impact of AMR to justify AMR-related interventions and influence the government to develop strong policies supporting the development of new medications and vaccines connected to AMR/infections.	6.1.2.1. Design a methodology to conduct the economic impact survey	6.1.2.1. Availability of an establish methodology to conduct economic impact survey	All sectors	Y 2 - 5
	6.1.2.2. Conduct the economic impact surveys to support policy development	6.1.2.2. Availability of publications on economic impact surveys		
	6.1.3.1. Identify a separate budget line for AMR-related activities from each sector	6.1.3.1. Allocation and utilization of funds on AMR-related interventions	All sectors	Y 1 - 5
Strategic intervention 6.2 Prepare an economic case for sustainable investment in new medicines, diagnostic tools and vaccines				
6.2.1. Assessment-based introduction of newer antimicrobials, new diagnostic tools, and vaccines for the prevention of infections among humans, animals and plants through a group of experts	6.2.1.1. Convene periodic meetings of the multisectoral expert groups to assess the needs for newer antimicrobials, new diagnostic tools, and vaccines and to make recommendations to the focal point	6.2.1.1. Availability of reports/ recommendation documents from the expert group	All sectors	Y 1
	6.2.2.1. Establish a technical expert group to review potential for vaccine production based on research and development locally in animal health sector	6.2.2.1. Availability of a technical expert group	DAPH	Y 1 - 5
6.2.2. Support research and development of novel vaccines in the veterinary sector	6.2.2.2. Review potential for vaccine production based on research and development locally in animal health sector and publishing the outcome of reviewing in DAPH website or as a manuscript/report	6.2.2.2. Publish the outcome of reviewing in DAPH website or as a manuscript/report		

Strategic intervention 6.2 Prepare an economic case for sustainable investment in new medicines, diagnostic tools and vaccines				
	6.2.2.3. Review the vaccines produced in the international market with potential significance in controlling emerging diseases in animal health sector and publish a manuscript/report	6.2.2.3 Publish a manuscript/report		
6.2.3 Promotion of local manufacturing of relevant antimicrobials, antiseptics and disinfectants	6.2.3.1 Develop policies to support local manufacturers	6.2.3.1 Availability of the policy	MOH, DAPH, DOA	Y 1 - 5
Strategic intervention 6.3 Provide strategic leadership in basic research on infectious diseases, and AMR				
6.3.1. Create a multisectoral expert group to identify current gaps in knowledge and prioritize research topics related to AMR in all sectors	6.3.1.1. Establish multisectoral expert groups 6.3.1.2. Convene periodic meetings	6.3.1.1. Availability of an identified group of experts for this purpose from all sectors 6.3.1.2. Reports from the above expert group	All sectors	Y 1
6.3.2. Identify AMR as a research priority by NHRC, NSF, NRC, MRI, VRI and universities	6.3.2.1. Include AMR in the national R&D priority list	6.3.2.1. Identified AMR as a priority by NHRC, NSF, NRC, MRI, VRI and universities	All sectors	Y 5
6.3.3. Establish links with local and international research partnerships to support basic scientific research on infectious diseases and AMR	6.3.3.1. Liaise with funding agencies	6.3.3.1. List of partnerships and amounts of funding/grants received	All sectors	Y 5
6.3.4. Conduct a review of operational research done according to the priorities identified in 6.3.	6.3.4.1. Organise knowledge-sharing events with professional groups 6.3.4.2. Make recommendations to utilize research findings to optimize the AMR interventions	6.3.4.1. Publications and projects completed/ events held 6.3.4.2. Report on research findings and recommendations	All sectors	Y 1 - 5

Priority Area 7 – Environmental safety Strategic objective: Prevent contamination to ensure the safety of environment

Priority action	Activity	Monitoring and Evaluation Indicators	Responsibility	Timeframe
Strategic intervention 7.1 Conduct a rapid national assessment of risks for AMR / antimicrobial compound residues and AMR pathogens in the environment				
7.1.1. Develop a road map for environmental risk assessment and management for AMR for the country	7.1.1.1. Establish a multistakeholder action planning consortium to codevelop the road map 7.1.1.2.-Develop the road map	7.1.1.1. Committee established 7.1.1.2. Roadmap developed	MOE	Y1
7.1.2. Conduct a Rapid risk assessment of national level for residues of antimicrobial compounds and antimicrobial resistant pathogens in the environment at the national level	7.1.2.1. Appoint a committee comprising relevant sectors to discuss and design the risk assessment method/s and protocols relevant to the country 7.1.2.2. Based on the results develop a risk map for the country.	7.1.2.1. Committee appointed and assessment method/s and protocols established 7.1.2.2. Risk map for the country with high-risk areas		Y2-3
7.1.3. Identify high risk areas and risk reduction methods	7.1.3.1. Select critical pathways of AMR contamination 7.1.3.2. Based on the risk map, identify the laboratories for initial testing 7.1.3.3. Carry out laboratory testing for selected samples from the environment. 7.1.3.4. Develop selected risk assessment scenarios important for the country (agri-food chain and water and sanitation)	7.1.3.1. Report on critical pathways of AMR contamination 7.1.3.2. List of laboratories for initial testing 7.1.3.3. Results of laboratory testing for selected samples 7.1.3.4. Availability of risk assessment scenarios important for the country		Y1-2
7.1.4. Development of a guidance document on safety standards for AMR	7.1.4.1. Preparation of a guidance document on sample collection from the environment and laboratory testing	7.1.4.1. Guidance document on sample collection from the environment and laboratory testing	MOE	Y 2-3

Strategic intervention 7.2 Establish a system for regular monitoring (passive surveillance) of antimicrobial compounds and their metabolites (or residues) or resistant bacteria or antimicrobial resistance genes (ARGs) in water quality			
7.2.1. Develop/strengthen the laboratory facilities, methods and standards methods for monitoring water quality in high-risk areas for antimicrobial compounds and their metabolites (or residues) or resistant bacteria or antimicrobial resistance genes (ARGs)	7.2.1.1. Conduct a reassessment of disposal standards for AMR microbes to see if it contributes to AMR spread in the environment	7.2.1.1. Report of reassessment of disposal standards	MOE, MOE, NWSDB –Water resources ministry
	7.2.1.2. Strengthen 3 laboratories in the (CEA, Government, and NWSDB) country for AMR testing (indicator species for microorganisms, selected residual compounds of antimicrobial compounds)	7.2.1.2. Laboratories in the CEA, Government, and NWSDB are strengthened for AMR testing	
7.2.2. Monitor water quality in high-risk areas for antimicrobial compounds and their metabolites (or residues) or resistant bacteria or antimicrobial resistance genes (ARGs)	7.2.1.3. Develop a capacity-building program for staff involved in the collection of environmental samples	7.2.1.3. Capacity-building programme developed	MOE
	7.2.1.4. Train laboratory staff on AMR testing	7.2.1.4. Trained laboratory staff	
7.2.2.1. Develop a sampling regimen for environmental samples in high-risk areas and carry out testing for AMR agents using available methods	7.2.2.1. Water quality reports on antimicrobial compounds and their metabolites (or residues) Resistant bacteria or antimicrobial resistance genes (ARGs)	Strategic intervention 7.3 Review existing regulations and formulate new regulations and implement legislation and/or regulations to prevent contamination of the environment with antimicrobials. antimicrobial compounds and their metabolites discharged to the environment	
		7.3.1.1. Identify areas (scenarios, institutions with issues etc.) with critical issues for management.	7.3.1.1. Areas (scenarios, institutions with issues etc.) with critical issues for management identified
7.3.1. Implement existing regulations and standards to prevent microbial contamination of water			

Strategic intervention 7.3

Review existing regulations and formulate new regulations and implement legislation and/or regulations to prevent contamination of the environment with antimicrobials. antimicrobial compounds and their metabolites discharged to the environment

	<p>7.3.1.2. Discuss methods of improvement in compliance.</p> <p>7.3.1.3. Select major institutions for possible AMR contamination and offer solutions for management</p> <p>7.3.1.4. Monitor the adoption of regulatory measures for AMR and conduct awareness sessions on the disposal of AMR-causing agents (separation of material at the source to minimize treatment)</p>	<p>7.3.1.2. Reports on discussed methods of improvement in compliance.</p> <p>7.3.1.3. List of major institutions for possible AMR contamination and solutions offered</p> <p>7.3.1.4. Reports of monitoring and conduct awareness sessions</p>	
<p>7.3.2. Develop regulations to prevent contamination of the environment with antimicrobials- antimicrobial compounds and their metabolites discharged to the environment</p>	<p>7.3.2.1. Appoint a committee to identify the need for new regulations and develop them</p> <p>7.3.2.2. Review the evidence-based research for the involvement</p> <p>7.3.2.3. Develop required new regulations based on the review and ground situation</p>	<p>7.3.2.1. Committee appointed</p> <p>7.3.2.2. Report of review</p> <p>7.3.2.3. New regulations developed</p>	<p>MOE</p> <p>Y 3-4</p>
<p>7.3.3. Implement regulations to prevent contamination of the environment with micro-organisms, antimicrobials- antimicrobial compounds and their metabolites discharged to the environment</p>	<p>7.3.3.1. Capacity building and training on implementing new regulations</p> <p>7.3.3.2. Awareness raising on the new regulations developed</p>	<p>7.3.3.1. Evidence of capacity building and training</p> <p>7.3.3.2. Evidence of awareness raising on the new regulations developed</p>	<p>MOE</p> <p>Y 4-5</p>

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Annex I

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Annex II. Key stakeholders for “ End Term Review”

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- National Advisory Committee on AMR
- NAP-IST
- Consultancy team and Sector coordinators

- Officials from Ministry of Health
 - Directors
 - Deputy Director Generals

- Ministry of Agriculture
 - Veterinary Sector
 - Veterinary Research Institute
 - Agriculture Sector
 - Horticultural Crop Research and Development Institute

- Ministry of Environment
 - Environmental Sector

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- State Pharmaceuticals Manufacturing Corporation (SPMC)
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- Private Health Services Regulatory Council
- All Island Private Pharmacy Owners Association
- Independent Medical Practitioners' Association – Sri Lanka
- Sri Lanka Chamber of the Pharmaceutical Industry
- Public Health Department - Colombo Municipal Council
- Private Hospitals
- Hemas Hospital Thalawathugoda;
Hemas Hospital Wattala;
Nawaloka Hospitals PLC;
Lanka Hospitals;
Asiri Central Hospital;
Asiri Surgical Hospital;
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Durdans Hospital;
Ninewells Hospital (Pvt) Ltd.
- Water Supply and Drainage
- World Health Organization - Country Office of Sri Lanka

Annex III. Main areas identified as Strengths, Weaknesses, Opportunities and Threats (SWOT) for NAP-AMR implementation

Strengths (internal/current)	Opportunities (external/future)
<ol style="list-style-type: none"> 1. Existing governance mechanisms 2. Existing policies/regulations 3. Established and sustained high quality services/ programmes 4. Available resources <ul style="list-style-type: none"> • Competent, skilled/trained staff • Infrastructure facilities • Equipment • Government funded routine activities • Stakeholders with technical expertise 	<ol style="list-style-type: none"> 1. New technology 2. Digital health/AI 3. Links with other programmes 4. Funding opportunities 5. External technical support – local or international
Weaknesses /gaps (internal)	Threats/challenges (external)
<ol style="list-style-type: none"> 1. Gaps in policy/legal instruments 2. Funding gaps and implantation gaps technology/ resource limitations 3. Limited staff skills, expertise 4. Staff turnover problems 5. Lack of knowledge/awareness 	<ol style="list-style-type: none"> 1. Adverse demographic/disease epidemiology/climatic changes 2. Economic slowdown, recession 3. Loss of expertise /manpower 4. Difficulty in recruiting staff 5. Lack of prioritization

Annex IV. Operational plan format for costing

Suggested operational plan format for costing of prioritized activities

Example

Priority area 1								
Strategic objective 1.1								
Priority action 1.1.1.								
Activity 1.1.1.1.								
Sub-activity	Unit	Quantity	Date/Time Frame	Level of implementation	Responsible Entity	Cost	Source of Funding	Indicator