National Action Plan on Antimicrobial Resistance

(2024-2028)

Government of Nepal
Quality Standards and Regulation Division
Ramshahpath, Kathmandu, Nepal

(Unofficial Translation)

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Contents

List of Abbreviations and Acronyms

ADICD	Animal Disease Investigation and Control Division
AH/s	Animal Hospital/s
AHRC	Animal Health Research Center
AITC	Agriculture Information and Training Center
AMC	Antimicrobial Consumption
AMS	Antimicrobial Stewardship
AMU	Antimicrobial Use
AMR	Antimicrobial Resistance
AMSP	Antimicrobial Stewardship Programme
APUA	Alliance for the Prudent Use of Antibiotics
AST	Antimicrobial Susceptibility Testing
AWaRe	Access, Watch, Reserve Class of Antimicrobials
CDC	Curriculum Development Center
CFPCC	Central Fisheries Promotion and Conservation Center
CRVH	Central Referral Veterinary Hospital
CSD	Curative Service Division
CTEVT	Council for Technical Education and Vocational Training
CVL	Central Veterinary Laboratory
DAH	Directorate of Animal Health
DDA	Department of Drug Administration
DFTQC	Department of Food Technology and Quality Control
DoAA	Department of Ayurveda and Alternative Medicine
DoC	Department of Custom
DoE	Department of Education
DoEnv	Department of Environment
DoHS	Department of Health Services
DoI	Department of Industry
DLS	Department of Livestock Services
DTC	Drug and Therapeutic Committee
EDCD	Epidemiology and Disease Control Division

EDP	External Development Partners
EML	Essential Medicine List
EQAS	External Quality Assurance System
ESBL	Extended-Spectrum Beta-Lactamase
FAO	Food and Agriculture Organization
FGD	Focus Group Discussion
FSMS	Food Safety Management System
FWD	Family Welfare Division
GAP	Global Action Plan
GARP	Global Antibiotic Resistance Partnership
GHP	Good Husbandry Practice
GLASS	Global Antimicrobial Resistance Surveillance System
GMP	Good Management Practice
GVP	Good Veterinary Practice
HCAI/s	Healthcare-Associated Infections
HEPA	High-Efficiency Particulate Air
HIV	Human Immunodeficiency Virus
IACG	Interagency Coordination Group
IEC	Information Education and Communication
IEE	Initial Environment Examination
I/NGOs	International Non-Governmental Organisations
IoM	Institute of Medicine
IPC	Infection Prevention and Control
MDR	Multidrug Resistant
MoALD	Ministry of Agriculture and Livestock Development
MoCIT	Ministry of Communication and Information Technology
MoEST	Ministry of Education, Science and Technology
MoF	Ministry of Finance
MoFAGA	Ministry of Federal Affairs and General Administration
MoFE	Ministry of Forest and Environment

MoHP	Ministry of Health and Population
MoSD	Ministry of Social Development
MRLs	Maximum Residual Limits
MS	Medical Superintendent
MSS	Minimum Service Standard
M&E	Monitoring and Evaluation
NAFLQML	National Animal Feed and Livestock Quality Management Laboratory
NAP	National Action Plan
NARTC	National Ayurvedic Research and Training Center
NCASC	National Centre for AIDS And STD Control
NCC	National Coordinating Center
NGO/s	Non-Government Organisation/s
NHEICC	National Health Education Information and Communication Center
NHRC	National Health Research Council
NHPC	Nepal Health Professional Council
NHTC	National Health Training Center
NLRMPO	Nepal Livestock Resource Management and Promotion Office
NPC	National Planning Commission
NPhC	Nepal Pharmacy Council
NPHL	National Public Health Laboratory
NRA	National Regulatory Authority
NSSD	Nursing and Social Security Division
NTC	National Tuberculosis Control Center
NTWC	National Technical Working Committee
NVC	Nepal Veterinary Council
NVPL	National Vaccine Production Laboratory
OIE	World Organization for Animal Health
OPMCM	Office of the Prime Minister and Council of Minister

QSRD	Quality Standards and Regulation Division
SOP	Standard Operating Procedure
STG	Standard Treatment Guideline
STI	Sexually Transmitted Infection
STP	Standard Treatment Protocol
TWC	Technical Working Committee
UNEP	United Nations Environment Programme
VPDs	Vaccine-Preventable Disease/s
VSDRL	Veterinary Standards and Drug Regulatory Laboratory
WHO	World Health Organization

Executive Summary

Antimicrobial resistance (AMR) is one of the major public health issues globally. World Health Organization has listed it as one of the top ten global public health threats facing humanity. Addressing this issue promptly is crucial to preserving the achievements made in the health and medicine sector thus far. Antimicrobial resistance is attributed to approximately 1.3 million deaths worldwide annually, with a projected global economic loss of 1 to 3 trillion US Dollars by 2030. It is estimated that by 2030, AMR could force up to 28 million people into extreme poverty.

In May 2015, the 68th World Health Assembly endorsed the Global Action Plan (GAP) on Antimicrobial Resistance (GAP-AMR) to tackle AMR and urged the member states to develop their own National Action Plan on AMR in alignment with GAP-AMR by May 2017. Nepal also expressed its commitment to develop a National Action Plan to combat AMR at the United Nations General Assembly on 21 September 2016.

Various policy documents, including the National Health Policy, 2076 (2019), the Fifteenth Five-Year Plan, and the National Animal Health Policy, 2078, issued by the Government of Nepal have prioritized AMR as an important public health issue and have highlighted the need to address without delay.

To contain AMR, this multisectoral NAP has been developed in coordination and collaboration with the relevant sectors and stakeholders. The five strategic priorities identified for the NAP-AMR are as follows:

1. Improve awareness and understanding of AMR through effective communication, education, and training,
2. Strengthen the knowledge and evidence related to AMR through surveillance and research,
3. Reduce the incidence of infection through effective infection prevention and control,

4. Optimize the use of antimicrobial agents in the human, animal, and food sectors,
5. Ensure sustainable resources for the containment of AMR along with promoting investment in research and innovation.

Each strategic priority has its own set of objectives, and various strategic interventions under these objectives and various activities based on such strategic interventions have been proposed. Within each strategic priority and focus area, strategic interventions including the key activities and key outputs for those interventions have been provided along with timelines for completion - short (within 1 year), medium (between 1 and 3 years), and long-term (between 3 and 5 years).

Various committees have been proposed for the implementation of this action plan. Provisions have been made for coordination and collaboration with all three tiers of government. It is expected that resources will be managed with the support of all three tiers of government, development partners and nongovernmental organizations.

The NAP-AMR also includes the monitoring and evaluation (M&E) plan to assess the quality of the activities being implemented and track the progress.

The primary objective of the NAP-AMR is to ensure the rational use of antimicrobials and contain AMR. This plan is expected to improve awareness and understanding regarding AMR in Nepal, reduce inappropriate antimicrobial consumption and optimize antimicrobial use. It is expected that the NAP-AMR will improve IPC in Nepal and eventually contribute substantially to AMR containment in the country.

The development of a comprehensive and integrated approach at the national, provincial, and local levels has been ensured to address AMR. At the same time, all sectors of "One Health" and stakeholders including all professional organizations, academia, civil societies, media, and consumer groups will be engaged in the successful implementation of this National Action Plan.

This NAP is expected to bring greater coordination and cooperation among "One Health" stakeholders to contain AMR, which will aid in the management of patients, reduce morbidity and mortality, and achieve SDGs and Universal Health Coverage.

1. Background

Antimicrobial resistance has emerged as a major public health issue worldwide. With the emergence of resistance in bacteria, fungi, parasites, and viruses that cause human illnesses, medical treatment of infections faces a heightened challenge. Antimicrobial resistance is attributed to approximately 1.3 million deaths worldwide annually, with a global economic loss of 1 to 3 trillion US Dollars by 2030, according to a World Bank projection. It is estimated that by 2030, AMR could force up to 28 million people into extreme poverty. In addition, in low-income countries, the cost of medical treatment resulting from AMR is projected to increase by 25 percent, which, in turn, jeopardizes the achievements of the SDGs 2030.

Recognizing the threat early on, health ministers from the South-East Asia Region, including Nepal, signed the Jaipur Declaration on Antimicrobial Resistance in 2011 (WHO SEARO, 2011).

In May 2015, the 68th World Health Assembly endorsed the Global Action Plan (GAP) on Antimicrobial Resistance (GAP-AMR) based on a "One Health" approach to tackle AMR. The GAP emphasizes the importance of multi-sectoral involvement in addressing the problem of AMR.

In 2016, the global commitment to combat AMR was further strengthened by the high-level meeting on AMR at the United Nations General Assembly, in which global leaders reiterated their commitment to act on AMR through a political declaration that was adopted as a UN General Assembly resolution (UN, 2016). At the global level, the United Nations Secretary-General has established the Interagency Coordination Group (IACG) to improve coordination among international organizations and to ensure effective global action against this threat to health security. The IACG is co-chaired by the UN Deputy Secretary-General and the Director-General of WHO and includes high-level representatives of relevant UN agencies, other international organizations, and individual experts across different sectors.

In Nepal, the Public Health Service Act, 2075 (2018) prohibits the sale or distribution of antibiotics without a medical prescription and requires maintaining quality standards of consumables, including food and meat. The National Health Policy, 2076 (2019) highlights the need to develop a national action plan to reduce AMR and effectively regulate and control the misuse of antibiotics. It is notable that the Nepal Health Sector Strategy 2015–2020 also identifies AMR as a public health challenge and implementation of One Health approach to address AMR. Likewise, this National Action Plan builds on the "One Health Strategy, 2076" (2019) endorsed by the Council of Ministers.

The National Action Plan on Antimicrobial Resistance with the following strategic priorities has been developed to address the AMR problems nationally:

1. Improve awareness and understanding of AMR through effective communication, education, and training,
2. Strengthen the knowledge and evidence related to AMR through surveillance and research,
3. Reduce the incidence of infection through effective infection prevention and control,
4. Optimize the use of antimicrobial agents in the human, animal, and food sectors,
5. Ensure sustainable resources for the containment of AMR along with promoting investment in research and innovation.

2. Situation Analysis

2.1 AMR in humans and animals

Nepal has a high prevalence of infectious and communicable diseases that contribute to higher morbidity and mortality. Nepal is one of the 30 countries with a high prevalence of AMR in the world. According to the report on Nepal Burden of Disease, 2019, the most common infectious diseases include respiratory infections, tuberculosis, and typhoid infections, among others. Increasing antimicrobial resistance makes the treatment of infections more challenging.

In Nepal, the livestock sector alone contributes to around 13% of the national gross domestic product and over a quarter (27%) of the agricultural gross domestic product. With increasing demand for livestock products, livestock farming is growing at an annual rate of around 1.23%. Factors such as the use of antibiotics as growth promoters in animals and agriculture, poor husbandry practices, lack of awareness of good management practices (GMP), and irrational use of antibiotics have contributed to AMR development in the livestock sector.

2.1.1 Human health sector

Many studies on antibiotic prescribing patterns in Nepal have shown that most patients were unnecessarily prescribed more than one antibiotic concurrently without bacterial confirmation or susceptibility testing. Antimicrobials are commonly prescribed for conditions that do not require antibiotics, such as colds, coughs, and diarrhoea. Moreover, self-medication is common in Nepal, and most people do not comply with the physician-directed duration of treatment. In addition, pharmaceutical companies with vested interests offer incentives to physicians to prescribe "their" brand of drugs.

According to a study, it has been found that 74.1% of hospitals in Nepal do not have wastewater treatment facilities. Another study showed that due to inadequate infection prevention and control practices, and monitoring of healthcare quality

standards, healthcare-associated infections with highly resistant bacterial pathogens are rapidly increasing in hospitals.

Studies have shown a high prevalence of methicillin-resistant Staphylococcus aureus (MRSA) in tertiary care hospitals in Kathmandu valley. Penicillin-resistant Neisseria gonorrhoea infection is also on the rise in hospitals, and systematic surveillance of AMR is needed to detect the emergence of resistant strains and guide effective treatment. Recently, it has been found that most antibiotics are becoming less effective due to the development of resistance by bacteria. Amoxicillin, ciprofloxacin, and norfloxacin, which are used for Escherichia coli infections, are effective only in <40% of cases, and even worse, are effective in <20% of pneumonia cases caused by Klebsiella spp, studies indicate.

2.1.2 Animal health sector

Veterinary medicines and feed supplements worth tens of millions of rupees are sold in Nepal every year. According to a study, almost 13% of the total veterinary expenditure was under the category of "antibiotics". Likewise, another study shows the growing trends in antibiotic sales. Veterinary drugs are dispensed through para vets or retail outlets that have suboptimal storage facilities and personnel with limited veterinary training. Studies in Nepal have found that retailers and distributors do not have adequate knowledge of the effective dosage and possible side effects of veterinary drugs. Tetracycline, enrofloxacin, neomycin-doxycycline, levofloxacin, colistin, and tylosin are the most commonly consumed antibiotics in Nepal, with ampicillin, amoxicillin, ceftriaxone, and gentamicin being the most inappropriately prescribed ones.

Farmers use antibiotics in feed to compensate for poor farm sanitation and hygiene to get more returns. Owing to the ignorance regarding drug withdrawal periods and the negative impact on animal and human health, as well as long-term use, animal products arriving on the market could contain antimicrobial residues above the permitted level, which promotes the development of AMR. Safe and judicious use of antibiotics is still not practiced in dairy farms, and the risk to public health due to residues in milk is high. Studies have shown pork meat to be highly contaminated with antibiotic-resistant Campylobacter spp.; the high prevalence of AMR patterns in

avian pathogenic *E. coli* strains isolated from broiler chickens has also been revealed. These findings suggest the need for effective surveillance, monitoring mechanisms and interventions for controlling the misuse of antibiotics.

Studies have also found inadequate regulations and guidelines for the use of veterinary drugs and limited AMR surveillance in the veterinary field. The Antibiotic Sensitivity Test reports from the Central Veterinary Laboratory (CVL) have demonstrated increasing resistance to a wide range of antibiotics. In a large annual sampling from different locations and various animals/products (poultry, buffalo meat, dairy farms products, and milk samples) (n = >1,000), isolates including *E. coli, S. aureus, Streptococcus spp., Micrococcus,* and *Pasteurella* were found to be highly resistant to enrofloxacin, amoxicillin, and colistin sulphate and less sensitive to tetracycline, gentamicin, and levofloxacin.

Farmers commonly use antibiotics for farm animals without consulting veterinarians. Additionally, over-prescription, under-prescription, empirical antibiotic therapy, and irrational prescription of broad-spectrum antibiotics (intended for rapid cure) by veterinarians have all contributed to antibiotic resistance. Veterinary health workers and paravets who prescribe medicines, including antibiotics, need to be provided with an orientation on AMR.

This is a broad overview of the AMR situation in Nepal. The following sections provide information regarding the AMR situation according to the strategic priorities of the action plan.

2.2 Awareness and understanding of AMR

The first strategic objective of the NAP-AMR is to address AMR by improving the awareness and understanding of AMR through effective communication, education, and training. All stakeholders, including the general population, need to be sensitized on the "One Health" approach to address AMR. This includes understanding and awareness regarding AMR, antibiotics, and their optimal use. The "One Health" approach for AMR containment targets the following sectors - human health, animal health (including agriculture/plant health, food, and feed), and the environment. Incorporation of AMR and related topics in all relevant professional courses is also

included as a strategic intervention. This comprehensive approach simultaneously targets the general population of farmers, policymakers, and professionals in all relevant sectors. These professionals include those who are currently in service or private practice, along with those who will be starting their respective careers after the completion of their studies.

There is ample evidence that several factors play a role in the over-prescription or inappropriate use of antibiotics in the community. These include patient-related issues, interests of pharmaceutical companies, financial incentives for prescribers or drug sellers (pharmacists), lack of knowledge and understanding among all stakeholders, peer pressure, poor healthcare systems, and gaps in regulations. A few studies conducted in Nepal have clearly shown that knowledge and awareness about common health problems, medicines, and antibiotics can be increased through interventions among schoolteachers, school children, and drug retailers. A dedicated and systematic approach is needed to collect baseline data and information to guide targeted evidence-based interventions.

2.3 Surveillance of AMR

Surveillance is one of the primary measures to contain AMR. There are several reports and research studies on AMR patterns in Nepal, but these are limited to tertiary care hospitals and laboratories. As a result, they may not adequately reflect the overall antimicrobial susceptibility trends across the country.

Laboratory surveillance for AMR in Nepal started as early as 1999 with a limited number of participating laboratories and few organisms. Since 2004, the NPHL has been conducting this program at the national level and has been designated as the National Coordinating Center (NCC) for AMR surveillance. The ten different organisms monitored by the national AMR surveillance program included Vibrio cholerae, Shigella spp., Streptococcus pneumoniae, Haemophilus influenzae, N. gonorrhoeae, Salmonella typhi, and paratyphi, then in 2009, extended-spectrum beta-lactamase (ESBL)-producing E. coli was also included. In 2013, MRSA was added, and in 2016, multidrug-resistant (MDR) Klebsiella spp. and MDR Acinetobacter were added as well. Currently, 26 sites (hospitals/laboratories) are included in AMR surveillance for 10 priority organisms, and the results are reported to the Global Antimicrobial

Resistance Surveillance System (GLASS). However, expansion of lab sites, upgrading of laboratory infrastructure, and training of human resources will be required to tackle AMR.

In the veterinary sector, seven laboratories, including CVL, five provincial veterinary laboratories distributed across the country and the National Avian Disease Investigation Laboratory in Chitwan participate in AMR surveillance of four priority bacteria – E. coli, Salmonella, Enterococci and Campylobacter. There is a need to strengthen the reporting mechanism in the surveillance of AMR in the veterinary sector.

Studies have suggested that common bacteria isolated from animals in Nepal, such as E. coli, Bacillus, Campylobacter, Salmonella, Pseudomonas, Staphylococci, and Streptococci, have developed resistance against commonly used antimicrobials such as gentamicin, amoxicillin, enrofloxacin, ceftriaxone and even colistin. It is imperative to strengthen laboratories and scale up AMR surveillance and expand its scope to include samples from a wider spectrum of sources – including animal, environmental, and food samples – to align with the principles of a "One Health" surveillance system. Further, it is important to link the data and information on surveillance of antibiotic use and consumption with lab-based AMR surveillance for developing effective strategies to tackle the problem, especially at the institutional level.

2.4 Infection prevention and control

The infection prevention and control (IPC) program is a key intervention for containing AMR. Functional IPC programs reduce the rates of healthcare-associated infections and volume of antimicrobial consumption (AMC) and are vital in preventing AMR. Although infection prevention and control in healthcare settings is included as one of the components in the Minimum Service Standards (MSS) for hospitals, not all hospitals have functional IPC programs. Only a few hospitals have developed their own IPC policy and have formed IPC committees. Although infection prevention and control applies primarily to healthcare facilities, it also involves infection prevention at the population level. Therefore, a multisectoral coordination is necessary.

Nepal has a good immunization coverage of >80%. At present, 10 vaccines against 13 types of antigens are being provided free of charge through the National Immunization Program in Nepal. Vaccines help reduce the incidence of infections, and, consequently, reduce the need to use antimicrobials. Similarly, IPC programs are needed at all animal health facilities. In animals, vaccines against bacterial infections such as hemorrhagic septicemia, black quarter and anthrax in cattle and buffalo, and cholera and mycoplasma-mediated disease in fowls have decreased the incidence of infections, thereby reducing antibiotic use.

This NAP contributes to carrying out these programs effectively and responsibly through infection prevention systems with biosafety and biosecurity in the laboratories and through compliance with the IPC guidelines in the healthcare facilities.

2.5 Optimum use of antimicrobials

One of the main drivers of AMR is the inappropriate use of antibiotics. Overuse of antibiotics, their intake without medical prescription, ignorance of full course, doses, self-medication practices, untimely use, and misuse make the microorganisms resistant to antibiotics. Therefore, the optimal use of antibiotics in the human, animal, livestock, food, and feed sectors, and proper disposal of antimicrobials from manufacturing units, healthcare facilities, farms, and residential areas are important. Unless all stakeholders are aware of the need to optimize the use of antibiotics and understand the "One Health" nature of AMR and the extent of resistance, behaviour changes to ensure the appropriate use of antimicrobials will remain challenging. Regular and effective surveillance of the antimicrobial consumption (AMC) pattern contributes to ensuring the optimal use of antibiotics.

Despite antibiotics being prescription drugs in Nepal as per the Drug Act 2035 (1978), they are freely available over the counter for human or animal use. Although standard treatment guidelines (STGs) were endorsed by the MoHP in 2014, they are not being used widely, as shown by various studies. However, the revised version of the STGs was approved in 2023.

In Nepal, the drug regulatory authority responsible for licensing as well as monitoring the quality of antibiotics is the Department of Drug Administration (DDA). The DDA also regularly audits samples (medicines) from the market (retail pharmacies) for substandard quality or counterfeits. However, there is no active surveillance on antibiotic consumption or their appropriate prescription.

The Veterinary Standards and Drug Regulatory Laboratory (VSDRL) under the Department of Livestock Services (DLS) regulates veterinary drug use and veterinary vaccines imported into the country. It also serves as an OIE focal laboratory for reporting the antimicrobials used in animals. Recently, the DLS banned the use of antibiotics for growth promotion in pre-mix feeds, but a monitoring system to check and enforce the ban is not that effective.

Currently, there are 55 domestic pharmaceutical companies producing antibiotics in Nepal. Among these, eight companies also manufacture drugs, including antibiotics, for the animal sector. However, only 28 companies are certified as Good Manufacturing Practices (GMP) compliant, and among them, only one company produces drugs for animals.

The 50th meeting of the Drug Advisory committee has recommended an immediate ban on the import of colistin for use in animal feed to the DDA. The surveillance of antibiotic residues in food products such as meat, milk, and fish, is the responsibility of the Department of Food Technology and Quality Control (DFTQC), which conducts residue testing for selected chemicals including antibiotic residues. DFTQC has a structure set up with a testing facility for antibiotic residue in its National Food and Feed Reference Laboratory (NFFRL). The National Food Safety Policy- 2076 (2019) has been approved by the Government of Nepal, which focuses on developing standards (Maximum Residue Level) for drug residues in animal-origin foods.

2.6 Investment, research, and innovation

Globally, new antibiotics are being developed continually, but they are thought to be insufficient to mitigate the growing antimicrobial resistance. Therefore, conserving the effectiveness of available antimicrobials is the need of the hour. There is a need to conduct further studies and research to devise strategies to protect the newer antimicrobials from resistance and use them judiciously.

Operational research on antibiotic resistance, the use and consumption of antibiotics, awareness and understanding of AMR and antibiotics, infection prevention and control, behavioural changes in antibiotic consumption, and antimicrobial stewardship (AMS) is required.

It is necessary to conduct studies to understand the behaviour, incentive, and capacity of all the stakeholders and to develop and implement innovative strategies. Considering the rich cultural heritage and ancient knowledge of herbal medicines, in vitro and in vivo studies are necessary for developing alternatives to antimicrobials for humans, animals as well as agriculture.

Multi-stakeholder engagement in studies, research, and innovation, aligned with the 'One Health' approach, and the direct involvement of all three tiers of government, according to their authorities and responsibilities under federalism, as well as development partners including the WHO, can be seen as further opportunities to contain AMR.

3. Country Response

3.1 Developing the National Action Plan on AMR

This NAP has been developed with high-level political commitment with multi-stakeholder engagement and in line with the "One Health" strategy to combat antimicrobial resistance (AMR).

The National Health Policy, 2076 (2019) has prioritized the containment of AMR as a major health agenda. The National Steering Committee - AMR, and the National Technical Working Committee (NTWC) – AMR haven been formed to respond to the issue of AMR institutionally. Similarly, various thematic committees have also been provisioned for the implementation of the activities within the strategic interventions.

During the development of the NAP-AMR, each sector conducted sectoral meetings with representation from all relevant stakeholders for the containment of AMR on each strategic objective and drafted sector-wise interventions, and activities, with a timeline and key outputs. The sectoral drafts were compiled, and the compiled draft was discussed within the NTWC-AMR. The inputs and recommendations received from the discussion were incorporated into the draft which was then submitted to the Steering Committee-AMR for approval. The suggestions and inputs from the Steering Committee were also incorporated into the draft before sharing it with the Ministry of Finance and the National Planning Commission for their input and suggestions. The final draft that incorporated their feedback was then submitted to the cabinet for endorsement.

3.2 Governance Mechanism

The mechanisms listed below are in place with the representation of relevant stakeholders for the implementation, feedback, monitoring, and evaluation of this action plan. These mechanisms will carry out the effective implementation of the NAP-AMR, provide insights for the formulation of policy and plan formulation, and aid in resolving implementation challenges. The human resources required for

providing technical support to the following Committees will be managed by the relevant ministries themselves or with the support of partner agencies working in the field of AMR.

3.2.1 National Steering Committee (NSC) - AMR

There will be a National Steering Committee – AMR chaired by the Secretary of the Ministry of Health and Population, with its secretariat based at the Quality Standards and Regulation Division (QSRD), Ministry of Health and Population.
The composition of the committee is listed below:

Secretary, Ministry of Health and Population	Chair
Additional Health Secretary, Quality Standards and Regulation Division	Member
Joint Secretary, Ministry of Finance	Member
Joint Secretary, Ministry of Home Affairs	Member
Joint Secretary, Ministry of Education, Science, and Technology	Member
Joint Secretary, Ministry of Communication and Information Technology	Member
Joint Secretary, Animal Health Division, Ministry of Agriculture and Livestock Development	Member
Joint Secretary, Environment and Biodiversity Division, Ministry of Forest and Environment	Member
Chief Specialist, Policy, Planning and Monitoring Division, Ministry of Health and Population	Member
Joint Secretary, National Planning Commission	Member
Director General, Department of Ayurveda, and Alternative Medicine	Member
Director General, Department of Drug Administration	Member
Director General, Department of Agriculture	Member
Director General, Department of Food Technology and Quality Control	Member
Director General, Department of Livestock Services	Member
Director General, Department of Environment	Member
Director General, Department of Health Services	Member
Member Secretary, National Health Research Council	Member
Division Chief, Quality Standards and Regulation Division, Ministry of Health and Population	Member Secretary

The terms of reference of the steering committee are provided in Annex 1.

The steering committee will meet at least once a year. The procedures of the meeting will be determined by the committee itself.

There will be a Provincial Steering Committee - AMR chaired by the Secretary of the provincial ministry overseeing health, also consisting of representatives from all "One Health" sectors. The constitution and terms of reference of this committee will be as prescribed by the provincial government. Additionally, in case of a requirement to form the committees relating thereto at the local level, the provincial steering committee will facilitate the formation of such committees at the local levels.

3.2.2 National Technical Working Committee (NTWC) - AMR

There will be a National technical working committee (NTWC)-AMR chaired by the chief of the Quality Standards and Regulation Division of the Ministry of Health and Population, with its secretariat at the same division.
The composition of the NTWC-AMR will be as follows:

Division Chief, Quality Standard and Regulation Division, MoHP	Chair
Director, Curative Service Division (CSD), DoHS	Member
Director, National Public Health Laboratory (NPHL)	Member
Director, Epidemiology and Disease Control Division (EDCD), DoHS	Member
Chief, Animal Disease Investigation and Control Division (ADICD)	Member
Chief, Central Veterinary Laboratory (CVL), DLS	Member
Chief, Veterinary Standards and Drug Regulatory Laboratory	Member
Section Chief, Curative Service, Education and Research Section, PPMD, MoHP	Member
Drug Administrator, Department of Drug Administration (DDA)	Member
Senior Food Research Officer, Department of Food Technology and Quality Control (DFTQC)	Member
Senior Divisional Chemist, Department of Environment (DoEnv)	Member
Director, Animal Health Research Division, NHRC	Member
Chief, Plant Quarantine and Pesticide Management Center	Member
Senior Veterinary Officer, Animal Health Division, MoALD	Member

Senior Veterinary Officer, One Health Section, DLS	Member
Under Secretary, Ministry of Education, Science and Technology	Member
Under Secretary, National Planning Commission	Member
Two clinical pharmacologists of which at least one is female working in academia nominated by MoHP	Member
World Health Organization	Member
Drug Administrator, Quality Standard and Regulation Division	Member Secretary

Terms of reference for the technical working committed are provided in Annex 2.

The technical working committee will meet at least once every three months. The procedures for the meeting of the committee will be determined by itself in coordination with the National Steering Committee.

3.2.3 Thematic committees

For effective implementation of the activities proposed under the strategic priorities of the National Action Plan on Antimicrobial Resistance, thematic committees will be formed with representation of "One Health" stakeholders. The formation and terms of reference of the thematic committee will be approved by the Steering Committee upon recommendation of the Technical Committee on AMR.

The thematic committee will facilitate the implementation of the activities included in the NAP by incorporating them into their annual programs in coordination with the Technical Working Committee.

The thematic committee will meet at least once every three months. The procedures for the meeting of the thematic committees will be determined by the National Technical Working Committee (NTWC) in coordination with the Steering Committee.

4. National Action Plan on Antimicrobial Resistance

Nepal's NAP on AMR (2024-2028) focuses mainly on AMR control, prevention, and management. This action plan has been formulated in alignment with the GAP on AMR adopted by the 68th World Health Assembly.

4.1 Vision

AMR free Nepal.

4.2 Goal

To reduce the mortality, morbidity, and economic impact of AMR through coordination and collaboration amongst all relevant stakeholders and strengthening of the mechanisms established to address AMR in Nepal.

4.3 Mission

To promote the health status of people through optimal use of antibiotics.

4.4 Objectives

To reduce the burden of AMR by implementing the National Action Plan on Antimicrobial Resistance through multisectoral coordination and collaborations for the containment of AMR.

4.5 Strategic priorities

The NAP-AMR outlines the following strategic priorities to be implemented in collaboration with all the "One Health" sectors over five years to tackle the public health challenge of AMR in Nepal.

1. Improve awareness and understanding of AMR through effective communication, education, and training.
    (a) Information, Education, and Communication
    (b) Education and training.
2. Strengthen the knowledge and evidence related to AMR through surveillance and research.
    (a) Surveillance of AMR: human, animal, and environment sectors
    (b) Capacity and quality enhancement of laboratories
3. Reduce the incidence of infection through effective infection prevention and control.
    (a) Human health: Healthcare, infection prevention and control
    (b) Animal health: Animal healthcare, infection prevention and control
    (c) Community and community: Sanitation and infection prevention
4. Optimize the use of antimicrobial agents in human, animal, agriculture sector and food.
    (a) Surveillance and regulations for the rational use and consumption of antibiotics
    (b) Rational prescription for and use of antibiotics by health practitioners: Human, animal, and food sectors
    (c) Optimal use and regulation of antibiotics
5. Ensure sustainable resources for the containment of AMR along with promoting investment in research and innovation
    (a) Financing
    (b) Research
    (c) National and international collaboration

5. Interventions, Activities, and Key Outputs

The interventions, activities, and key outputs under the specific objectives of key focus areas of the strategic priorities are elaborated in the following section. Each activity has a timeline, which is classified as short-term (S) with an expected achievement in 1 year; medium-term (M), with an expected horizon of 1–3 years; and long-term (L), with a 3–5-year timeline.

5.1 Strategic Priority 1: Improve awareness and understanding of Antimicrobial Resistance (AMR) through effective communication, education, and training.

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
5.1.1 Communication & IEC (Objective: Increase awareness and understanding of AMR and use of antibiotics through effective information and communication)	5.1.1.1 Assess awareness, understanding, and knowledge of AMR and antimicrobial use (AMU) among key stakeholders of one health including the general population	(a) Update the existing available studies regarding awareness, understanding, and knowledge of AMR and appropriate use of antibiotics across "One Health" sectors.	Short-term (1 year)	MoFE, NHRC, DLS, DFTQC	Other "One Health" agencies	Baseline data and identification of gaps in awareness, understanding, and knowledge of AMR and antibiotic use prepared

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
		(b) Conduct a nationwide baseline survey on awareness and understanding of AMR and knowledge about the use of antibiotics across "One Health" sectors	Short- and Medium-term (1-3 years)	MoHP, MoFE, MoALD	Other "One Health" agencies	
	5.1.1.2 Document the existing communication and resource materials on AMR	(a) Map and identify the expertise of different stakeholders, individuals, and organizations including supporting agencies to document and develop communication resources	Short-term (1 year)	NHEICC, MoFE, AITC	Other "One Health" agencies	Database of existing IEC material available with all the agencies related to the One-health approach prepared
		(b) Prepare a database of IEC materials by scientifically assessing the existing IEC materials on AMR awareness and their use ensuring that all the stakeholders of "One Health" are represented.	Short-term (1 year)	MoFE, AITC, NHEICC	Other "One Health" agencies	
	5.1.1.3 Develop evidence-based IEC materials on containment of AMR and appropriate use of antibiotics targeting the stakeholders of the "One Health" system and their implementation strategy	(a) Identify the gap between the existing level and the required level of knowledge on AMR and conduct workshops to develop evidence-based Information, Educatiotn, and Communication (IEC) materials and a sustained communication program	Short- and Medium-term (1-3 years)	MoALD, MoFE, DFTQC, NHEICC	Other "One Health" agencies	Evidence-based IEC materials and resources on AMR and appropriate use of antibiotics developed Implementation plan for programs on raising awareness about the containment of AMR prepared

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
		(b) Develop targeted programs for stakeholders based on ICE materials and communication programs on AMR to raise awareness about AMR containment and the appropriate use of antimicrobials.	Medium and Long-term (3-5 years)	NHEICC, MoALD, MoFE, DFTQC	Other "One Health" agencies	
	5.1.1.4 Utilize the developed IEC materials and conduct communication programs to promote AMR awareness	(a) Conduct sustainable and effective awareness programs on AMR to raise awareness among academia, professional associations, councils, civil society organizations, municipal bodies, media, and the general public.	Medium and Long-term (3-5 years)	MoALD, MoFE, DFTQC, NHEICC	Other "One Health" agencies	Comprehensive and sustained communication program for AMR containment implemented for each sector World AMR Awareness Week celebrated every year
		(b) Celebrate the World AMR Awareness Week in coordination with various stakeholders	Medium- and Long-term (3-5 years)	MoHP, MoFE, MoALD	Other "One Health" agencies	
5.1.2 Education and Training (Objective: Improve knowledge and capacity development of key professionals and related stakeholders on AMR and its containment through education and training)	5.1.2.1 Strengthen the knowledge and capacity of professionals of all sectors regarding AMR and related topics through education and training	(a) Review and revise the relevant curriculums to include AMR and related topics as the core component of professional education with credit hours according to academic level	Short- and Medium-term (1-3 years)	MoHP, MoFE, MoALD	Related Councils of the Ministries and other "One Health" agencies	Professional curricula revised Training module (pre-service and in-service) content revised, topics on AMR and its containment

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
		(b) Review the curriculum (syllabus) for registration and licensing exams of all relevant professional councils to include topics such as AMR and its containment, appropriate use of antibiotics, disposal of antibiotics, biosafety and biosecurity and revise them in a timely manner.	Short- and Medium-term (1-3 years)	MoHP, MoFE, MoALD	Related Councils of the Ministries and other "One Health" agencies	The training module for licensing of professionals revised with AMR and its related topic
		(c) Revise the training module on AMR and its containment for pre-service and in-service training.	Short- and Medium-term (1-3 years)	MoHP, MoFE, MoALD	Related Councils of the Ministries and other "One Health" agencies	
		d) Develop a module on AMR and incorporate it in the Continuing Professional Development (CPD) program across "One Health" sectors	Short- and Medium-term (1-3 years)	MoHP, MoFE, MoALD	Related Councils of the Ministries and other "One Health" agencies	
	5.1.2.2 Introduce the concept of AMR, its containment, appropriate use of antibiotics, sanitation and hand hygiene, and related topics as part of the secondary and higher secondary curriculum	(a) Develop and incorporate a module on AMR, its containment, appropriate use of antibiotics, sanitation and hand hygiene, and related topics as part of middle and high school curriculum	Medium- and Long-term (3-5 years)	MoHP, MoFE, MoALD	Other "One Health" agencies	AMR and its related topics included in the middle and high school curriculum

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
	5.1.2.3 Strengthen the knowledge, skills, and capacity of key stakeholders including policymakers for behavioural change.	(a) Conduct training needs analysis across all the sectors for AMR containment	Short-term (1 year)	MoHP, MoFE, MoALD	Other "One Health" agencies	Training resources developed for key stakeholders of the "One Health" sector
		(b) Develop training resources including a distance education course on the use of antibiotics and AMR for capacity development among professionals.	Short- and Medium-term (1-3 years)	MoHP, MoFE, MoALD	Other "One Health" agencies	
		(c) Implement training all key stakeholders as per the National Action Plan on AMR	Short- and Medium-term (1-3 years)	MoHP, MoFE, MoALD	Other "One Health" agencies	
	5.1.2.4 Improve interdepartmental and multisectoral ("One Health") coordination to contain AMR	(a) Establish a strategy for interdepartmental communication and coordination for AMR containment and data sharing	Short-, Medium- and Long-term (1-5 years)	NTWC	MoHP, MoFE, MoALD	Mechanisms developed for inter-departmental and intersectoral communication and coordination.
		(b) Strengthen AMR multi-sectoral coordination and AMR risk-sharing among "One Health" stakeholders	Short-, Medium- and Long-term (1-5 years)	NTWC	MoHP, MoFE, MoALD	

5.2 Strategic Priority 2: Strengthen the knowledge and evidence related to AMR through surveillance and research

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
5.2.1 Surveillance of AMR (Objective: Strengthen national surveillance system and coordination structure for AMR surveillance in humans, animals, food & feed, and environment)	5.2.1.1 Strengthen the existing AMR surveillance structures and establish an AMR surveillance governance framework in coordination with the "One Health" stakeholders	(a) Strengthen the National AMR surveillance coordination committee having representation from each sector for integrated AMR surveillance in a "One Health" approach with the mandate to coordinate nationwide surveillance of AMR	Short-term (1 year)	NTWC	MoHP, MoFE, MoALD	AMR surveillance mechanism for "One Health" sectors established National Reference Laboratory for AMR surveillance designated and strengthened
		(b) Revise and approve terms of reference for a National Coordinating Centre (NCC) to implement AMR surveillance in "One Health" sectors	Short-term (1 year)	NTWC	MoHP, MoFE, MoALD	
		(c) Designate and strengthen a National Reference Laboratory with the mandate to coordinate surveillance of AMR in "One Health" sectors	Short-term (1 year)	MoHP, MoFE, MoALD	NTWC	

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
	5.2.1.2 Establish National Antimicrobial Resistance (AMR) surveillance standards in "One Health" sectors	(a) Develop a National guideline for AMR surveillance with standards for AMR surveillance sites including active and passive surveillance and diagnostic stewardship in "One Health" sectors	Short- and Medium-term (1-3 years)	MoHP, MoFE, MoALD	Other "One Health" agencies	National AMR surveillance standards established in "One Health" sectors Consolidated annual report of National AMR surveillance with data from all the sectors published and disseminated
		(b) Develop standardized protocol and Standard operating procedure (SOPs), methodologies for sample testing and Antimicrobial Susceptibility Testing (AST) in all sectors	Short- and Medium-term (1-3 years)	MoHP, MoFE, MoALD	Other "One Health" agencies	
		(c) Organize Annual consultation to strengthen AMR surveillance program in "One Health" sectors and publish sectoral AMR surveillance report	Short-term (1 year)	MoHP, MoFE, MoALD	Other "One Health" agencies	
		d) Organize a national annual consultation and dissemination workshop to strengthen the AMR surveillance program and dissemination of integrated AMR surveillance reports of "One Health" sectors	Short-, Medium- and Long-term (1-5 years)	MoHP, MoFE, MoALD	Other "One Health" agencies	

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
	5.2.1.3 Standardize data analysis and information management for AMR surveillance	(a) Standardize AMR surveillance data management across sectors by developing surveillance standards for data collection, reporting, collation & analysis	Short- and Medium-term (1-3 years)	MoHP, MoFE, MoALD	Other "One Health" agencies	AMR surveillance database available across "One Health" sectors AMR surveillance report published and utilized for an update of standard treatment protocol Annual AMR surveillance reports shared at the global level (GLASS)
		(b) Implement mechanisms to collate and analyze AMR surveillance data into useful information and make an online database available to all stakeholders and policymakers for updating the Standard Treatment Protocol (STP) and other evidence-based decision-making	Short- and Medium-term (1-3 years)	MoHP, MoFE, MoALD	Other "One Health" agencies	
		(c) Conduct capacity-building training for participating laboratories including private sectors for data reporting, collation, and analysis	Short-, Medium- and Long-term (1-5 years)	MoHP, MoFE, MoALD	Other "One Health" agencies	
		(d) Ensure sharing of national AMR surveillance data at the global level (GLASS)	Short-, Medium- and Long-term (1-5 years)	MoHP, MoFE, MoALD	Other "One Health" agencies	

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
	5.2.1.4 Establish a surveillance system for antimicrobial residues and contaminants in the animal, food, agriculture, feed, and environment sectors	(a) Review and strengthen the organizational structure of the animal, food, and environment laboratory to incorporate appropriate human resources for surveillance of antimicrobial residues and contaminants in "One Health" sectors	Short- and Medium-term (1-3 years)	MoFE, MoALD	MoHP, DLS, DFTQC	National standards and surveillance systems for antibiotic residue established
		(b) Develop a national framework for surveillance and regulation of antibiotic residues				
		i. Food from an animal product such as meat, milk, egg, and fish	Short- and Medium-term (1-3 years)	VSDRL	Other "One Health" agencies	
		ii. Processed food and feed	Short- and Medium-term (1-3 years)	DFTQC, DLS	Other "One Health" agencies	
		(c) Develop a national framework for surveillance of antibiotic residues in the environment including effluents from farms, and factories (pharmaceutical industry, food, animal feed, meat, dairy, and fish processing industries)	Short- and Medium-term (1-3 years)	DoEnv	Other "One Health" agencies	

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
		(d) Develop the standards for determining the Maximum Residual Limit (MRL) of antimicrobials				
		i. Food from an animal product such as meat, milka	Short- and Medium-term (1-3 years)	VSDRL	Other "One Health" agencies	
		ii. Processed food, feed, milk, and milk products	Short- and Medium-term (1-3 years)	DFTQC	Other "One Health" agencies	
		(e) Develop standards for antibiotic residues in industrial effluents, emissions, and waste from farms, human health care, and veterinary care settings	Short- and Medium-term (1-3 years)	DoEnv, MoFE	Other "One Health" agencies	
		(f) Collate and analyze antibiotic residue surveillance data into useful information and publish the report annually				
		i. Food from the animal	Short- and Medium-term (1-3 years)	VSDRL, CVL	Other "One Health" agencies	

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
		ii. Processed food and feed	Short- and Medium-term (1-3 years)	DFTQC	Other "One Health" agencies	
		iii. Environment	Short- and Medium-term (1-3 years)	DoEnv	Other "One Health" agencies	
5.2.2 Laboratory capacity (Objective: Strengthen microbiology laboratory capacity for AMR surveillance in "One Health" sectors)	5.2.2.1 Strengthen capacity for laboratory-based surveillance of antimicrobial resistance in "One Health" sectors.	(a) Define and develop Standard Operating Procedures (SOPs) for microbiology laboratories for Antimicrobial Sensitivity Testing (AST)and standards for quality assurance in "One Health" sectors				A strategic plan for strengthening microbiology laboratories in "One Health" sectors for AMR Surveillance developed and implemented
		i. Human Health	Short- and Medium-term (1-3 years)	NPHL	Other "One Health" agencies	
		ii. Animal health	Short- and Medium-term (1-3 years)	CVL	Other "One Health" agencies	
		iii. Food and feed	Short- and Medium-term (1-3 years)	DFTQC, DLS	Other "One Health" agencies	

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
		iv. Environment	Short- and Medium-term (1-3 years)	DoEnv	Other "One Health" agencies	
		(b) Assess and strengthen the current laboratory capacity for AMR surveillance based on the standards developed for microbiology laboratories in "One Health" sectors	Short-term (1 year)	MoHP, MoFE, MoALD	Other "One Health" agencies	
		(c) Develop a national strategy based on the laboratory assessment to strengthen microbiology laboratory capacity in all sectors	Short- and Medium-term (1-3 years)	NPHL, CVL, DFTQC, DLS, MoFE	Other "One Health" agencies	
		(d) Develop a plan for external quality assurance (EQAS) of all laboratories for AMR surveillance for all laboratories across "One Health" sectors	Medium- and Long-term (3-5 years)	NPHL, CVL, DFTQC	Other "One Health" agencies	

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
	5.2.2.2 Strengthen and enhance the capacity of the designated National Coordinating Center (NCC) for Antimicrobial Resistance Surveillance across "One Health" sectors	(a) Establish a National Coordinating Center (NCC) and strengthen its capacity for molecular level identification, confirmation, and detailed characterization of target pathogens for AMR surveillance and external quality scheme and increase capacity of established National Biorepository in humans, animal, food & feed sector, and environment to address AMR	Medium- and Long-term (3-5 years)	NPHL	Other "One Health" agencies	National Coordinating Center (NCC) designated, and its capacity strengthened for molecular level identification and detailed characterization of the target pathogen
		(b) Conduct joint training workshops for bacterial identification, antimicrobial susceptibility testing (AST), and data harmonization including all sectors	Short-, Medium-, and Long-term (1-5 years)	NPHL	Other "One Health" agencies	

5.3 Strategic Priority 3: Reduce the incidence of infection through effective infection prevention and control (IPC)

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
5.3.1 Infection Prevention and Control (IPC) in healthcare (Objective: Develop and implement infection prevention and control plans and strategies in healthcare settings	5.3.1.1 Ensure the implementation of infection prevention and control guidelines in all healthcare facilities	(a) Designate and bring into operation a National focal unit to oversee infection prevention and control with defined terms of reference and scope	Short-term (1 year)	MoHP	Other "One Health" agencies	National focal Unit for IPC designated, and its terms of reference and scope defined National IPC Guidelines for all levels of healthcare facilities developed and disseminated National IPC implementation plan with M&E framework endorsed and implemented National HCAI surveillance system established and implemented in identified facilities Infrastructure for Infection Prevention and Control (IPC) upgraded in hospitals
		(b) Develop national IPC guidelines and establish IPC standards for different levels of healthcare facilities	Short-term (1 year)	CSD	Other "One Health" agencies	
		(c) Establish and strengthen IPC committees in health care facilities and ensure coordination with the Antimicrobial Stewardship Committee	Short-term (1 year)	CSD	Other "One Health" agencies	
		(d) Incorporate IPC as quality indicators (QI) in existing healthcare facility guidelines and standards	Short-, Medium-, and Long-term (1-5 years)	MoHP	Other "One Health" agencies	

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
		(e) Conduct an IPC implementation assessment and develop an IPC implementation framework targeting all levels of healthcare facilities with a monitoring and evaluation framework	Short-, Medium-, and Long-term (1-5 years)	CSD	Other "One Health" agencies	
		(f) Develop and implement standardized surveillance programs on healthcare-associated infections (HCAIs) in hospitals with reporting mechanisms	Short-, Medium-, and Long-term (1-5 years)	NPHL	Other "One Health" agencies	
		(g) Develop skilled human resources for Infection Prevention and Control (IPC) for all kinds and levels of hospitals in a phased manner	Medium-, and Long-term (3-5 years)	MoHP	Other "One Health" agencies	
		(h) Develop Infection Prevention Infrastructure for environmental control in operation theatre (OT) and intensive critical care units (ICU) of hospitals	Medium-, and Long-term (3-5 years)	MoHP	Other "One Health" agencies	
		(i) Ensure appropriate immunization of the health care workers against Vaccine-Preventable Diseases (VPDs)	Short-, Medium-, and Long-term (1-5 years)	MoHP	Other "One Health" agencies	

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
5.3.2 Infection Prevention and Control (IPC) in Animal Health (Objective: Develop and implement infection prevention and control plans and interventions in veterinary settings, and animal husbandry and food sector)	5.3.2.1 Establish a mechanism to ensure the development and implementation of infection prevention and control (biosafety and biosecurity) measures in all animal health and livestock production settings including fisheries as well as the food and feed sector	(a) Designate a National focal unit to oversee infection prevention and control with defined terms of reference and scope to oversee infection prevention and control in livestock, fisheries, and the food sector	Short-, Medium-, and Long-term (1-5 years)	DLS, DFTQC, MoHP	Other "One Health" agencies	National focal unit for IPC in the animal sector designated Standards, protocols, and guidelines for IPC in animal and food sectors established and implemented IPC program for the animal and food sector implemented and monitored
		(b) Develop policies, guidelines, and standard protocols, Standard Operating Procedures (SOP) on infection prevention and control (biosafety and biosecurity) in animal health, livestock and fisheries, animal husbandry, and food & feed sector	Medium-, and Long-term (3-5 years)	DLS, DFTQC, MoHP	Other "One Health" agencies	
		(c) Train veterinary and food safety professionals of all levels on biosafety and biosecurity principles and practices	Medium-, and Long-term (3-5 years)	DLS, DFTQC, MoHP	Other "One Health" agencies	
		(d) Include biosafety, biosecurity, hygiene & sanitation, and infection prevention and control in pre-service, in-service education, and training curricula of professionals working in animal health and the food and feed sector	Medium-, and Long-term (3-5 years)	AITC, NVC	Other "One Health" agencies	

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
		(e) Promote vaccination of food-producing and companion animals against diseases of public health importance to prevent infection and apply biosecurity and biosafety measures in outbreak response	Short-, Medium-, and Long-term (1-5 years)	DLS	Other "One Health" agencies	
		(f) Develop and disseminate guidelines on Good Husbandry Practice (GHP), Good Veterinary Practice (GVP), and Good Aquaculture Practice to improve IPC in animal health settings	Short- and Medium-term (1-3 years)	DLS	Other "One Health" agencies	
		(g) Implement and promote Good Husbandry Practice (GHP), Good Veterinary Practice (GVP), Good Management Practice (GMP), FSMS (Food Safety Management System), Good Aquaculture Practice, Good Agriculture Practice in all settings of animals & food and feed production	Short- and Medium-term (1-3 years)	MoALD, DFTQC	Other "One Health" agencies	
		(h) Develop, implement, and monitor the national plan for IPC in the animal and food sector	Short- and Medium-term (1-3 years)	DLS, DFTQC	Other "One Health" agencies	

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
5.3.3 Infection prevention in the community through healthy diet, lifestyle, and sanitation (Objective: Strengthen infection prevention and control in the community to limit the development and spread of AMR)	5.3.3.1 Promote personal hygiene, health diet and lifestyle through behavioral change communication activities	(a) Develop behavioral change communication and social mobilization campaigns to promote IPC in the community	Short- and Medium-term (1-3 years)	NHEICC, AITC	Other "One Health" agencies	Behavioural change communication and social mobilization campaigns developed and implemented
		(b) Implement IPC campaigns in the school and community and different vulnerable groups in collaboration with academic institutions, community-based organizations, mother's groups, farmers groups, and related stakeholders	Short-, Medium-, and Long-term (1-5 years)	NHEICC, AITC	Other "One Health" agencies	
		(c) Conduct comprehensive public awareness program on Vaccine-Preventable Diseases (VPDs) in the community	Short-, Medium-, and Long-term (1-5 years)	FWD	Other "One Health" agencies	
		(d) Expand the "My health, My Responsibility" program to all levels	Short-, Medium-, and Long-term (1-5 years)	DoAA	Other "One Health" agencies	

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
	5.3.3.2 Strengthen adherence to hygiene practices to prevent infection in the community	(a) Celebrate the Global Handwashing Day	Short-, Medium-, and Long-term (1-5 years)	NHEICC	Other "One Health" agencies	Hygiene practices followed for IPC control in the community Curriculum module developed to educate and train the children on personal hygiene
		(b) Develop a module to educate and train children about the importance of personal hygiene at the school level through a school health program	Medium-, and Long-term (3-5 years)	NSSD	Other "One Health" agencies	
		(c) Enhance awareness of IPC and sanitation amongst farmers, food and animal handlers and traders	Short- and Medium-term (1-3 years)	AITC	Other "One Health" agencies	
5.3.4 Reduce the environmental spread of AMR (Objective: Reduce environmental contamination with antimicrobial residues and resistant pathogens)	5.3.4.1 Develop strategies to reduce the impact of AMR on the environment	(a) Develop, revise & strengthen environmental standards and guidelines related to registration (licensing) of farms, pharmaceutical factories, slaughterhouses, wet markets, aquaculture units, food and feed processing units, healthcare facilities, and veterinary care facilities	Medium-, and Long-term (3-5 years)	MoHP, MoALD, MoFE	Other "One Health" agencies	Legislation, strategy, and plans required to reduce the environmental impact of AMR developed and implemented

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
		(b) Develop, revise, and implement necessary guidelines based on the Initial Environment Examination (IEE) and Environment Impact Assessment (EIA) and implement	Medium-, and Long-term (3-5 years)	MoFE	Other "One Health" agencies	
		(c) Establish the required mechanism as well as review and revise the existing acts and policies to implement mechanisms for the disposal of expired or unused antibiotics.	Medium-, and Long-term (3-5 years)	DDA	Other "One Health" agencies	
		(d) Develop and implement a strategic plan to reduce the impact of AMR on the environment.				
		i. Develop necessary legislation for environmental risk assessment to reduce the environmental spread of AMR; develop tools for environmental risk assessment, develop SOPs; and conduct awareness program	Short-, Medium-, and Long-term (1-5 years)	MoFE	Other "One Health" agencies	
		ii. Define standards and monitor antibiotic residues and bacterial load in effluents	Short- and Medium-term (1-3 years)			

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
		iii. Disinfect the treatment plants to reduce bacterial load and prevent the spread of AMR	Short- and Medium-term (1-3 years)			
		iv. Prepare and implement the sector-specific manuals and guidelines to improve the environmental management of AMR	Short- and Medium-term (1-3 years)			

5.4 Strategic Priority 4: Optimize the use of antimicrobial agents in human, animal, and food sectors

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
5.4.1 Regulation of access to quality antimicrobials (Objective: Ensure access to antimicrobial medicines with appropriate regulations on their use.	5.4.1.1 Strengthen National Regulatory Authority (NRA) capacity to improve access to quality-assured, safe, and efficacious antimicrobial medicines	(a) Review and reform the organizational structure of the National Regulatory Authority (NRA) and other sectoral regulatory authorities as required for the containment and prevention of AMR	Short- and Medium-term (1-3 years)	DDA	Other "One Health" agencies	The structures of the National Regulatory Authority and the sectoral authorities strengthened Uninterrupted availability of quality-assured, safe, and efficacious antibiotics ensured Guideline on safe disposal of expired and antimicrobials developed and implemented
		(b) Revise the National Essential Medicine List (NEML) based on the Access, Watch, and Reserve (AWaRe) category of antibiotics by the World Health Organization	Short-term (1 year)	DDA	Other "One Health" agencies	
		(c) Develop a guideline on safe disposal of antimicrobials and enforce it.	Short- and Medium-term (1-3 years)	DDA	Other "One Health" agencies	
		(d) Identify unlicensed pharmacies and vendors and enforce regulations to prohibit the unethical practice and sale of antimicrobial as Over-the-Counter (OTC) medicines in human and animal health	Short-, Medium-, and Long-term (1-5 years)	DDA	Other "One Health" agencies	

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
		(e) Conduct regular post-marketing surveillance (PMS) and quality testing of antimicrobials used for human and animal health and publish a report annually	Short-, Medium-, and Long-term (1-5 years)	DDA	Other "One Health" agencies	
		(f) Develop and enforce guidelines on the sale of Reserve category antimicrobial medicines listed in the National Essential Medicine List (NEML) through hospital pharmacies on the recommendation of a doctor.	Short-, Medium-, and Long-term (1-5 years)	DDA	Other "One Health" agencies	
		g) Implement the pharmacovigilance program in healthcare facilities and ensure effective management of the use of antimicrobial medicines.	Short-, Medium-, and Long-term (1-5 years)	DDA	Other "One Health" agencies	
		(h) Develop a guideline on forecasting, quantification, storage, and distribution of essential antimicrobial medicines for uninterrupted supply	Short- and Medium-term (1-3 years)	DDA	Other "One Health" agencies	

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
		(i) Periodically test the herbal products claiming to have anti-infective properties for the presence of any antibiotic substance	Medium- and Long-term (3-5 years)	DDA	Other "One Health" agencies	
	5.4.1.2 Develop appropriate legal and institutional structure and promote intersectoral coordination for regulations on the use of antimicrobial agents in livestock and fisheries	(a) Establish a Veterinary Regulatory Division within the Department of Drug Administration with human resources from the veterinary sector for enforcement of regulation on the use of antimicrobials in the animal (livestock and fisheries) sector	Short- and Medium-term (1-3 years)	MoHP, MoALD	Other "One Health" agencies	Animal health sector representation strengthened in the National Regulatory Authority for regulatory enforcement of antibiotic use in animal health Enforcement of regulations on the use of antibiotics in feed and feed premix
		(b) Ban the use of antimicrobials as growth promoters in animal feed	Short- and Medium-term (1-3 years)	MoALD	Other "One Health" agencies	Standard treatment guidelines developed for the use of antimicrobials in the animal health sector and implemented
		(c) Develop a National Essential Medicine List (NEML) for the animal health sector and standard treatment guidelines for the treatment of animals (livestock and fisheries)	Short- and Medium-term (1-3 years)	MoALD	Other "One Health" agencies	

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
		(d) Ensure regulation of quality, storage, labeling, use etc. of domestically produced and imported feed and feed premix.	Short-, Medium-, and Long-term (1-5 years)	DLS, DFTQC	Other "One Health" agencies	
		(e) Develop and implement the required regulations to regulate antibiotic use in freshwater, inland fisheries, aquaculture, and beekeeping	Short- and Medium-term (1-3 years)	MoALD	Other "One Health" agencies	
		(f) Review and revise regulations of withdrawal period for food products produced from animals, that have used antibiotics, and reared for the production of milk, eggs, and meat	Medium- and Long-term (3-5 years)	MoALD	Other "One Health" agencies	
		(g) Develop and revise national standards, guidelines, and procedures in alignment with the Codex Alimentarius Commission and WOAH guidelines on antimicrobial resistance	Short-, Medium-, and Long-term (1-5 years)	DLS, DFTQC	Other "One Health" agencies	

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
5.4.2 Surveillance of antimicrobial use and consumption (Objective: Establish the national surveillance system for antimicrobial use and consumption)	5.4.2.1 Develop a national antimicrobial use (AMU) and consumption (AMC) estimation system in human and animal health	(a) Form a committee under the leadership of national drug regulatory body for Antimicrobial Consumption (AMC) surveillance under the "One Health" approach.	Short-term (1 year)	DDA	Other "One Health" agencies	National surveillance system for antimicrobial consumption and use established and operational Capacity of designated focal persons and institutions enhanced for the surveillance of antimicrobial consumption (AMC) and antimicrobial use (AMU) AMR, AMU, and AMC surveillance reports published and disseminated annually as per the "One Health" approach
		(b) Establish an effective data management system through the collection and analysis of the data to measure the manufacturing, import, and consumption of antimicrobials in the human and animal health sector	Short-term (1 year)	DDA	Other "One Health" agencies	
		(c) Conduct joint as well as sectoral training programs for focal persons and related organizations that are designated to monitor antimicrobial consumption in the human and animal health sector	Short- and Medium-term (1-3 years)	DDA, DLS	Other "One Health" agencies	

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
		(d) Monitor the use of antibiotics and designate a focal unit for Antimicrobial Use (AMU) surveillance studies for hospitals	Short-, Medium-, and Long-term (1-5 years)	MoHP	Other "One Health" agencies	
		(e) Develop antimicrobial use (AMU) surveillance tool to measure antimicrobial use in health facilities	Short-, Medium-, and Long-term (1-5 years)	MoHP	Other "One Health" agencies	
		(f) Make provisions for national-level training programs to strengthen the capacity to implement AMU surveillance programs in hospitals	Short-, Medium-, and Long-term (1-5 years)	MoHP	Other "One Health" agencies	
		(g) Organize annual reviews to maintain coordination and cooperation amongst the "One Health" sectors in AMR	Medium- and Long-term (3-5 years)	MoHP, MoALD, MoFE	Other "One Health" agencies	
	5.4.2.2 Promote optimum use of antimicrobials in human health	(a) Conduct the audits of antibiotics use in health care facilities and carry out capacity development programs to ensure the optimum use of antibiotics	Short- and Medium-term (1-3 years)	CSD	Other "One Health" agencies	Capacity of staff to perform antibiotic audits enhanced Provision of hospital pharmacy with a functional Drug and Therapeutic Committee in every hospital

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
		(b) Establish a pharmacy in every hospital and ensure provision for a Drug and Therapeutic Committee to regulate the pharmacy's operation	Short- and Medium-term (1-3 years)	CSD	Other "One Health" agencies	
5.4.3 Antimicrobial stewardship in human health (Objective: Improve appropriate use of antimicrobial medicines in human healthcare)	5.4.3.1 Establish an antimicrobial stewardship program (AMSP) in human healthcare facilities	(a) Collate and analyze incidence data on prevalent and emerging infectious diseases in Nepal	Short-term (1 year)	EDCD	Other "One Health" agencies	Standard Treatment Guidelines developed, disseminated, and regularly updated The Antimicrobial Stewardship Program (AMSP) developed and implemented in selected healthcare facilities
		(b) Develop, implement, and regularly update national Standard Treatment Guidelines (STG) based on infectious disease prevalence and AMR surveillance data	Short- and Medium-term (1-3 years)	CSD	Other "One Health" agencies	
		(c) Adapt the WHO Antimicrobial Stewardship toolkit as per Nepal's context	Medium-term (3 years)	CSD	Other "One Health" agencies	
		(d) Develop a training manual and conduct training of trainers on antimicrobial Stewardship to operationalize AMSP in all health facilities	Medium- and Long-term (3-5 years)	CSD	Other "One Health" agencies	

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
		(e) Implement the Antimicrobial Stewardship (AMS) program at all levels of healthcare facilities in a phase-wise manner starting from tertiary care hospitals and academia. Form and mobilize the Antimicrobial Stewardship Committee in healthcare facilities for this purpose.	Medium- and Long-term (3-5 years)	CSD	Other "One Health" agencies	
5.4.4 Antimicrobial stewardship in animal health (Objective: Improve appropriate use of antimicrobial medicines in animal healthcare)	5.4.4.1 Improve the appropriate use of antimicrobials in animal health	(a) Collate and analyse incidence data on infectious diseases of common occurrence in the animal	Short term (1 year)	DLS	Other "One Health" agencies	Antimicrobial stewardship implemented for the rational use of antimicrobials in the animal sector (livestock and fisheries) Existing legislation revised to prohibit the use of reserved-category antibiotics (which are important for human health) h in the animal sector
		(b) Develop, implement, and regularly update National Standard Treatment Guidelines (STG) based on infectious disease prevalence and AMR surveillance data	Short term (1 year)	DLS	Other "One Health" agencies	

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
		(c) Establish an Antimicrobial Stewardship Program (AMSP) for rational use of antimicrobials in animals including animal husbandry and aquaculture to prevent non-therapeutic use of antibiotics	Medium- and Long-term (3-5 years)	DLS	Other "One Health" agencies	
		(d) Revise the existing legislation to prevent the use of reserve-category antibiotics, which are critically important for human health, in the animal sector.	Short, Medium and Long-term (1-5 years)	MoALD, DDA	Other "One Health" agencies	
5.4.5 Rational use of antimicrobials in community settings (Objective: Improve appropriate use of antimicrobials in the community)	5.4.5.1 Increase awareness among dispensers and farmers on the appropriate use of microbial	(a) Conduct awareness campaigns and orientation programs regarding existing rules, laws and regulations, and rational use of antimicrobials targeted at registered dispensers and farmers	Short, Medium and Long-term (1-3 years)	DDA, DLS	Other "One Health" agencies	Dispensers and farmers informed on the rational use of antibiotics
	5.4.5.2 Monitor antimicrobial use in community settings from community pharmacies for both humans and animals	(a) Employ Antimicrobial use (AMU) surveillance tools to measure antimicrobial use in community settings including standalone clinics and community pharmacies	Medium- and Long-term (3-5 years)	DDA	Other "One Health" agencies	Surveillance on antibiotic use in community settings carried out and an increase in the rational use of antibiotics

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
5.4.6 Regulation of the prescription and dispensing of antimicrobials (Objective: Amend the existing legislation regarding various facets of antimicrobial use)	5.4.6.1 Amend legislation to regulate dispensing, prescription, and residual limits of antimicrobials in "One Health" sectors	(a) Organize consultations with national regulatory bodies and stakeholders to review and make timely amendments to the current legislation to discourage over-the-counter (OTC) sale of antimicrobials	Short-term (1 year)	MoHP	Other "One Health" agencies	Legislation amended to regulate the dispensing of antimicrobials on prescription Reserve category antibiotics dispensed through hospital pharmacies only Antibiotic residue limits in animal products, food products, feed, and environment-regulated Enforcement of regulation on the prescription of antibiotics by registered medical practitioners only in the human and animal health sector
		(b) Organize consultations with National Regulatory bodies and other sectors for the development of legislation for the regulation of antibiotic residue limits in animal products, food products, feed, and the environment	Short-term (1 year)	MoALD	Other "One Health" agencies	
		(c) Review legislation to implement regulatory intervention for categorizing antibiotics as Reserve antibiotics for use in special cases and ensuring they are only used upon prescription	Short-term (1 year)	DDA	Other "One Health" agencies	
		(d) Record and audit the prescriptions of antimicrobial medicines to discourage their sale and dispensing without medical prescriptions.	Short-term (1 year)	DDA	Other "One Health" agencies	

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
		(e) Carry out legal consultation for legislation on the prescription of antibiotics by veterinarians registered in Nepal Veterinary Council (NVC)	Short, Medium and Long-term (1-5 years)	MoHP, MoALD	Other "One Health" agencies	

5.5 Strategic Priority 5: Ensure sustainable resources for the containment of AMR with promoting investment in research and innovation

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
5.5.1 Financing for AMR (Objective: Ensure sustainable investments to address AMR)	5.5.1.1 Prepare a plan to secure sustainable funds with the participation of all "One Health" sectors for the implementation of NAP-AMR	(a) Conduct expert consultation and develop monitoring tools for assessing the impact of AMR	Short- and Medium-term (1-3 years)	MoHP	Other "One Health" agencies	Impact, cost, and benefit of AMR activities assessed Sectoral cost-sharing ensured in "One Health" sectors
		(b) Assess the impact of AMR – morbidity, mortality, and treatment cost due to AMR in the country	Short- and Medium-term (1-3 years)	MoHP, MoALD	Other "One Health" agencies	
		(c) Develop an operational plan (with budget and costing) to implement NAP-AMR	Short-term (1 year)	MoHP, MoALD, MoFE	Other "One Health" agencies	
		(d) Develop a resource mobilization plan for the implementation of the National Action Plan on AMR	Short- and Medium-term (1-3 years)	MoHP, MoALD, MoFE	Other "One Health" agencies	
5.5.2 Research for containment of AMR (Objective: Promote research to combat AMR)	5.5.2.1 Carry out operational research to improve infection prevention and control in human and animal health	(a) Organize expert consultation to identify priority topics for promoting operational research for tackling AMR	Medium-term (3 years)	NHRC, NARC	Other "One Health" agencies	AMR-related topics researched based on the priority Scientific research conducted on alternative medicine

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
		(b) Conduct operational research on topics such as infection prevention control in healthcare facilities, rational use of antibiotics, the practice of biosecurity principles on the farm and behavioral change studies	Short- and Medium-term (1-3 years)	NHRC, NARC	Other "One Health" agencies	
		(c) Promote scientific research to develop an alternative to antimicrobials and adjuvant remedies for the prevention and control of infectious disease	Medium- and Long-term (3-5 years)	DoAA	Other "One Health" agencies	
5.5.3 International Collaboration (Objective: Promote international collaboration and coordination for the implementation of NAP-AMR)	5.5.3.1 Strengthen international collaboration with donors and partners for NAP-AMR implementation	(a) Identify the potential development partners for the implementation of the NAP-AMR	Short- and Long-term (1-5 years)	MoHP, MoALD, MoFE	Other "One Health" agencies	International collaboration strengthened for the implementation of NAP-AMR
		(b) Establish an annual forum on AMR with donors and partners to share information and facilitate coordinated mobilization of resources for prioritized AMR activities	Short- and Long-term (1-5 years)	MoHP, MoALD, MoFE	Other "One Health" agencies	
		(c) Collaborate with thematic and sectoral international organizations to combat AMR	Medium-term (3 years)	MoHP, MoALD, MoFE	Other "One Health" agencies	

Focus Area	Strategic Intervention	Activities	Timeline	Lead Agency	Partner Agencies	Key outputs
5.5.4 National Collaboration (Objective: Strengthen national collaborations with disease control programs to tackle AMR)	5.5.4.1 Strengthen drug resistance containment activities and establish linkages among disease control programs with the national AMR program	(a) Establish functional linkages among national programs such as human disease and animal disease control programs, and vaccination programs to share best practices to combat AMR	Short-, Medium-, and Long-term (1-5 years)	EDCD, NTC, NCASC, DLS	Other "One Health" agencies	Every stakeholder is aware of the NAP-AMR activities conducted across "One Health" sectors and collaboration strengthened for functional linkage, feedback, cost-sharing, and development of new programs
5.5.5 Provincial and local level collaboration (Objective: Strengthen sub-national collaborations to tackle AMR	5.5.5.1 Facilitate prioritization of AMR containment activities at the provincial and local level for tackling AMR	(a) Organize activities to create awareness and sensitization on AMR burden and its containment at the province and local level under the "One Health" approach	Short- and Medium-term (1-3 years)	MoHP, MoALD	Other "One Health" agencies	Increased awareness at the provincial and local level about AMR Provincial and local action plans on AMR aligned with NAP-AMR developed in all the provinces and local level
		(b) Collaborate and coordinate with the provincial and local level governments to develop provincial and local action plans on AMR aligning with NAP-AMR	Short- and Medium-term (1-3 years)	MoHP, MoALD	Other "One Health" agencies	

6. Cost Estimate and Management of Financial Resources

The Ministry of Health and Population, with the support from WHO, has prepared a cost estimate for this Action Plan. The total cost estimate for the implementation of this Action Plan is estimated to be NRs. 4,586 million. The total cost estimate is then disaggregated into five fiscal years. The cost allocation, therefore, is as follows: NRs. 1,132 million for the first year, NRs. 1,118 million for the second year, NRs. 1,085 million for the third year, NRs. 599 million for the fourth year, and NRs. 650 million for the fifth year. Out of the total cost estimate for five years, around two-thirds (61 percent) of the cost will be spent at the federal level, 12 percent will be spent at the provincial level, and 27 percent will be spent at the local level. Of the total cost estimated for implementation of this Action Plan, based on the strategic priority sectors, the first strategic priority will have 15 percent, the second strategic priority will have 28 percent, the third strategic priority will have 41 percent, the fourth strategic priority will have 12 percent, and the fifth strategic priority will have 4 percent of the cost.

Similarly, to implement activities for the four sectors spelled out in this Action plan (human health, animal health, food, and environment), it is estimated that NRs. 2,065 million will be spent on the human health sector, NRs. 1,996 million will be spent on animal health, NRs. 416 million will be spent on the food sector and NRs. 109 million will be spent on the environment sector. For the implementation of the Action Plan, the Government of Nepal, provincial governments, and local governments will manage the resources. Similarly, financial support will also be sought from the development partners and the non-government organizations for the implementation of this Action Plan. For the implementation of the activities outlined in the Action Plan, the concerned ministries/ sectors and their tier of the government will manage the required budget in their annual plans for the implementation of activities falling under their sector.

7. Provisions Related to Monitoring and Evaluation

The National Steering Committee will be responsible for monitoring and evaluation of the implementation of the Action Plan lie with. The monitoring and evaluation of the Action Plan will be a continuous process throughout the implementation period. The National Steering Committee may carry out monitoring and evaluation activities through the National Technical Working Committee. Similarly, with regard to the provincial and local level, the concerned province and local level may form a monitoring and evaluation committee as required to regularly monitor the implementation.

The monitoring and evaluation may also be carried out through an electronic system as required. The review report related to monitoring and evaluation from all sectors of "One Health" and the federal, provincial, and local levels will be submitted to the National Steering Committee through the National Technical Working Committee. The monitoring and evaluation report will be submitted in the approved prescribed format. The format related to monitoring and evaluation has been provided in Annex 3.

8. Provisions Related to Reporting

All sectors of "One Health" and the committees at all levels will submit progress reports annually to the National Steering Committee. The format for the report to be submitted from the local, provincial, and sectoral committees will be approved by the National Steering Committee. The report according to this approved format will be submitted by the local level to the province, the province and the sectoral committee to the National Technical Working Committee. The National Technical Working Committee will submit the compiled report received from all levels to the National Steering Committee.

9. Risks

There is a risk of facing difficulty in regard to the implementation of the strategies identified by this action plan if the financial resources cannot be managed adequately and infrastructure development, improvement in organizational structure, and management of human resources cannot be carried out in a timely manner. Also, the implementation may be at risk if there is a lack of effective coordination and collaboration.

The risk associated with the financial resources will be primarily managed by the Government of Nepal, the federal, provincial, and local governments through the allocation of budget in their respective annual programs for the implementation of the activities listed in this Action Plan. Similarly, the provision put forth by the Action Plan for financial support from the development partners and non-government organizations will also further support in mitigating the risk posed by the financial resource limitations.

The risk will be mitigated through the implementation of this Action Plan through the coordination and collaboration among all stakeholders and sectors and the development of infrastructure and improvement in organizational structures in a timely manner.

10. Modification in Annex

The Ministry of Health and Population will modify the annexures mentioned in this action plan, if required, upon the recommendation from the National Steering Committee.

11. Powers to explain

The National Steering Committee will resolve any predicament if such a predicament arises during the implementation of this Action plan by making the required decisions.

12. Void Provision

If anything contained in this action plan contradicts any provision thereby included in the prevailing laws of Nepal, such provision will be void to the extent of its contradiction.

Annexes

Annex 1: Terms of Reference of The National Steering Committee

In addition to those contained elsewhere in this Action Plan, the National Steering Committee will have the following terms of reference:

- To provide leadership for the coordination and collaboration with all levels of the government and national and international stakeholders for the prevention of anti-microbial resistance.
- To facilitate the implementation of the action plan and make required efforts for the financial management.
- To make required arrangements for the coordination and collaboration with all sectors of "One Health" to achieve public health goals related to anti-microbial resistance.
- To guide and support the National Technical Working Committee.

Annex 2: Terms of Reference of Technical Working Committee

In addition to those contained elsewhere in this Action Plan, the Technical Working Committee will have the following terms of reference:

- To provide the leadership for the implementation of the National Action Plan for Anti-Microbial Resistance with the active participation of all major stakeholders.
- To coordinate with the National Steering Committee in the implementation of the action plan and submit recommendations, if required, in relation to policy provisions during implementation.
- To identify and engage the stakeholders for AMR-related activities.
- To communicate and coordinate among the sectoral committees on AMR effectively.
- To coordinate for the strengthening of surveillance systems related to anti-microbial resistance, use of anti-microbial drugs, and hospital-bound infections.

- To carry out monitoring and evaluation in relation to the overall implementation of the action plan and submit the progress report to the National Steering Committee.

Annex 3: Monitoring and Evaluation Framework

Strategic Priority	Activity	Output	Outcome	Long-term Impact
Strategic Priority 1: Improve awareness and understanding of AMR through effective communication, education, and training.	Organize awareness programs among all related stakeholders of "One Health" sectors and the public. Develop information, education, and communication materials related to anti-microbial resistance and rational use of microbials.	Number of awareness programs related to anti-microbial resistance. Number of AMR-related IEC materials developed	Awareness related to anti-microbial resistance increased among the target group.	Quality health services will have been ensured through the rational use of antimicrobials.
Strategic Priority 2: Strengthen the knowledge and evidence related to AMR through surveillance and research	Conduct surveillance of anti-microbial resistance. Develop an integrated database on anti-microbial resistance.	No. of anti-microbial resistance surveillance sites. Integrated anti-microbial resistance database developed.	Annual report on anti-microbial resistance surveillance. Strengthening and expansion of surveillance system. Use of data in planning and decision-making process.	The morbidity and mortality related to anti-microbial resistance will have reduced.
Strategic Priority 3: Reduce the incidence of infection through effective infection prevention and control.	Develop and institutionalize mechanisms for the prevention and control of incidences of infection. Conduct training on infection prevention	No. of health facilities with institutional mechanisms for infection prevention and control No. of human resources trained in infection prevention and control	Reduction in the rate of infection. Capacity building in infection prevention and control.	Sustainable investment in the sector of anti-microbial resistance will have ensured through strengthened coordination and collaboration among the sectors of "One Health".

Strategic Priority	Activity	Output	Outcome	Long-term Impact
Strategic Priority 4: Optimize the use of antimicrobial agents in the human, animal, and food sectors	Review and make timely revisions in the existing legal and policy documents related to anti-microbial resistance. Make special provisions for the use of Reserve Category antibiotics	No. of revised legal and policy documents Mechanism for prescription and distribution of reserve antibiotics for use in humans and veterinary developed/ formed	The revised policy documents will have been effectively implemented. Optimal use of antibiotics according to their classification.	
Strategic Priority 5: Ensure sustainable resources for the containment of AMR with promoting investment in research and innovation	Ensure and mobilize resources for the AMR activities from "One Health" sectors. Identify and conduct AMR-related research and innovation activities from all sectors of "One Health".	Budget appropriation from the concerned ministry for AMR activities through the inclusion of the activities in the annual plan and programs. The investment made from the concerned sector in AMR-related research.	The activities outlined in the Action Plan will have been implemented after their inclusion in the ministerial annual plan and programs. AMR research will have been conducted in a sectoral or integrated manner and such research will have been institutionalized.	

TECHNICAL SUPPORT BY:

World Health Organization

Nepal