Food and Agriculture Organization of the United Nations

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Key actions to curb antimicrobial resistance

Policy brief for parliamentarians

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Abbreviations

AMR	antimicrobial resistance
AMU	antimicrobial use
FAO	Food and Agriculture Organization of the United Nations
NAP	national action plan
R&D	research and development
UNEP	United Nations Environment Programme
WHO	World Health Organization
WOAH	World Organisation for Animal Health

1 Introduction

Antimicrobial resistance (AMR) is now one of the main global threats to public health and development, and it could challenge most of the achievements made in health care in the twentieth century. In the absence of strong global, regional and national responses, it is estimated that bacterial AMR will be directly responsible for 39 million deaths and associated with 169 million deaths between 2025 and 2050 *(1)*. AMR threatens global food security as agrifood systems face increasing pressure to provide safe, nutritious food for the growing global population. According to the World Bank *(2)*, AMR could lead to a 1.1–3.8% reduction in global gross domestic product by 2050, with the significant effect on the agriculture sector.

Misuse and overuse of antimicrobials, including antibiotics, in humans, animals and plants is the primary reason for the emergence and spread of AMR within and among sectors, including the environment. Systemic challenges, such as limited capacity to diagnose and treat infections, sub-optimal access and quality of health-care delivery and insufficient coverage of vaccination programmes for human and animal populations, contribute to AMR. Inadequate access to water, sanitation and hygiene in communities, poor infection prevention and control in health-care facilities and insufficient hygiene and biosecurity practices on farms exacerbate the problem *(3)*. Furthermore, pollution caused by inadequate management of effluents and wastes in sectors such as the pharmaceutical industry, health-care facilities, agriculture and plant production and households accelerate the spread of AMR *(4)*.

ANTIMICROBIALS

Antimicrobials are agents used to prevent, control and treat infectious diseases in humans, animals and plants. They include antibiotics, antifungals, antiviral agents and antiparasitic medicines. Disinfectants, antiseptics, other pharmaceuticals and natural products may also have antimicrobial properties.

AMR occurs when bacteria, viruses, fungi or parasites no longer respond to antimicrobials. As a result of such drug resistance, antibiotics and other antimicrobial medicines become ineffective, and infections become difficult or impossible to treat, increasing the risk of disease spread, severe illness, disability and death. Resistance can develop and spread in and among animals, humans, plants and the environment While AMR is a natural process; it is accelerated by human behaviour, mainly:

- misuse and overuse of antimicrobials;
- poor infection prevention and control;
- pollution and poor waste and wastewater management

2 Key global actions taken to prevent and mitigate AMR

- In 2015, the World Health Assembly adopted a Global Action Plan on AMR *(5)*, with five strategic objectives and interventions to contain the threat. The Plan recognizes the importance of a One Health approach, with coordination among the human, animal, agricultural, plant and environmental sectors and called on countries to develop national action plans (NAPs) on AMR. The Global Action Plan was endorsed and welcomed by the governing bodies of FAO, UNEP and WOAH. According to the Tracking AMR Country Self-assessment Survey *(6)*, 178 countries had developed multisectoral NAPs on AMR by September 2024.
- In 2016, the first high-level meeting on AMR *(7)* was held during United Nations General Assembly, where heads of state committed themselves to take a broad, coordinated approach to address AMR in multiple sectors through their NAPs. The political declaration of the meeting *(8)* also called for establishment of the Inter-Agency Coordination Group.
- In 2019, the Inter-Agency Coordination Group submitted a report *(3)* to the United Nations Secretary-General calling for coordinated action between the Tripartite (FAO, WHO and WOAH) and UNEP and recommending that accountability and global governance be strengthened by establishment of a One Health Global Leaders Group on AMR, the AMR Multistakeholder Partnership Platform and the Independent Panel on Evidence for Action against AMR.
- In 2019, a Tripartite Joint Secretariat for AMR was established for better cooperation and coordination of the AMR-related activities of FAO, WHO and WOAH. The secretariat is hosted by WHO, which became the Quadripartite Joint Secretariat on AMR in 2022, when UNEP formally joined the partnership. The vision and joint work of the Quadripartite are guided by the Strategic Framework for Collaboration on AMR *(9)* developed by the four organizations.

- In 2020, the Global Leaders Group on AMR was established by the Quadripartite, with high-level representation of various sectors working on AMR. The group is independent and provides global advice and advocacy. It works to maintain urgency, public support, political momentum and the visibility of the AMR challenge across sectors.

- In 2022, the AMR Multi-stakeholder Partnership Platform was established by the Quadripartite and presented at the third Global High Level Ministerial Conference on AMR, in Oman. The members of the Platform are governments, intergovernmental organizations, United Nations agencies, research and academic organizations, civil society, the private sector and philanthropic organizations. The role of the Platform is to catalyse a global movement for action on AMR in the human, animal, agriculture, plant and environmental sectors among different disciplines and at various levels.

- Four high-level ministerial conferences on AMR have been organized, two in Netherlands (Kingdom of the), in 2014 and 2019, and on each in Oman (2022) and Saudi Arabia (2024). The third meeting resulted in the Muscat Manifesto, which contains three global targets: (i) Reduce the total amount of antimicrobials used in agrifood systems by at least 30–50% by 2030 through national and global actions. (ii) Preserve critically important antimicrobials for human medicine by ending the use of medically important antimicrobials for growth promotion in animals and for non-phytosanitary purposes in plants. (iii) Ensure that "Access" group antibiotics *(10)* represent at least 60% of all antibiotic consumption in humans by 2030. The fourth high-level conference on AMR led to adoption of the Jeddah Commitments *(11)* and agreement to formalize the biannual global meetings and to use a "troika" system, whereby three countries would guide each meeting.

- In 2023, the Quadripartite convened the first Global Joint Summit of Human and Veterinary Medicines Regulatory Authorities *(12)* to discuss elimination of over-the-counter sales of antibiotics. The Summit, which brought together over 250 participants from 100 countries, identified steps to strengthen the function of regulatory authorities and collaboration among sectors to reduce AMR at national level.

- In 2023, the Quadripartite launched the One Health Legislative Assessment Tool for Antimicrobial Resistance *(13)* to support countries in analysing their national and regional legislation relevant to AMR in all sectors. The Tool can be used to identify legal gaps and weaknesses and improve legal preparedness to prevent and address the challenges of AMR and ensure sustainable implementation of NAPs.

- In 2024, the second High-Level Meeting on AMR *(14)* was held during Seventy-ninth session of the United Nations General Assembly, where world leaders approved a political declaration *(15)* that acknowledged the multidimensional nature of AMR, which requires both multi-sectoral and sector-specific approaches and interventions in human heath, agriculture, animal health and environmental sectors. The declaration identified six areas of commitment: governance, financing, access, multi-sectoral response, research, development and innovation and surveillance and monitoring. The aim is for a 10% reduction in the annual number of human deaths associated with AMR by 2030, from a baseline of 4.95 million deaths a year in 2019. The declaration includes a target of least 70% of antibiotics used for human health globally to be in the WHO Access group of antibiotics *(10)*, which have relatively minimal side-effects and low potential for AMR. In the animal health and agriculture sector, United Nations Member States called for a meaningful reduction in the quantity of antimicrobials used globally in the agrifood systems by 2030. In the environment sector, the declaration calls for strengthening waste and wastewater management in key sectors, integrating environmental aspects into NAPs on AMR, addressing research gaps, and advancing environmental surveillance methods. The declaration calls for strengthening of global, regional and national AMR governance. It calls for sustainable national financing for AMR and US$ 100 million in catalytic funding to ensure that at least 60% of countries have funded their multisectoral NAPs on AMR by 2030. Countries are encouraged to report the results of high-quality sector-specific surveillance of AMR and antimicrobial use (AMU) by 2030 to global surveillance systems and proposed integrated systems. The next High-Level Meeting on AMR is proposed for 2029.

- AMR has consistently been on the agendas and meeting communiques of the G20, G7, BRICS and G77 political forums, helping to maintain the global political momentum on AMR.

3 Prioritization of AMR globally, regionally, nationally and locally

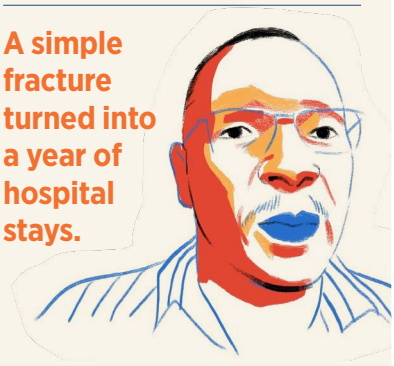
If implemented globally, interventions to tackle AMR in multiple sectors is expected to bring a return of US$ 7–13 for every US$ 1 spent by 2050.

Economic case for AMR investment, being prepared by the Quadripartite Technical Group on the Economics of AMR

- **High mortality**: AMR contributes to almost 5 million deaths globally a year *(16)*, and it is estimated that the number could rise to 8.22 million a year by 2050 *(1)*. Almost one in five deaths due to AMR are of children under 5 years.
- **Significant morbidity**: AMR is responsible for significant morbidity in health-care facilities. AMR can result in treatment failures, longer hospital stays and increased requirements for intensive care and for expensive medications.
- **Shorter life expectancy**: AMR will be responsible for a loss of 1.8 years of life expectancy globally by 2035 if there is no stronger response to the problem.
- **Economic impact**: AMR could cost the world US$ 412 billion a year in additional health-care costs and US$ 443 billion per year in lost workforce productivity by 2035[1]. It has also been estimated that there will be a fall of 1.1% in global gross domestic product after 2030, even in the best-case scenario *(2)*.
- **Reduced agricultural productivity**: AMR and the loss of effectiveness of antimicrobials could increase rates of animal mortality and morbidity, adversely affect agricultural productivity and result in food insecurity for approximately 2 billion people *(17)*.
- **Linked to pollution**: Microbial stressors, such as pollution, create favourable conditions for microorganisms to develop resistance in humans, animals and the environment.
- **Association with climate change**: The climate crisis has numerous impacts on ecosystems, human health, animal health and food production, which also affect AMR. Higher temperatures can be associated with increases in AMR infections. Extreme weather patterns such as floods and climate-induced migration can contribute to AMR *(4)*.
- **Disproportionate impact on low- and middle-income countries**: Although AMR affects everyone, it could incapacitate fragile health and agrifood systems in low- and middle-income countries with poor waste and wastewater management systems. The impact of AMR is disproportionately high in such countries.
- **Dry pipeline for research and development (R&D)**: The pipeline for newer antimicrobials against priority pathogens is insufficient and unequal across sectors. We are therefore running out of effective treatment options *(18)*.
- **Challenges to access**: Particularly low- and middle-income countries but also some high-income countries and vulnerable populations have difficulty in accessing diagnostics and quality-assured essential medicines for infectious conditions, especially those complicated by AMR.
- **Impact on Sustainable Development Goals**: AMR may prevent attainment of several Goals, including those related to public health, food security and water *(3)*.

“

A simple fracture turned into a year of hospital stays.



John Kariuki Muhia
Nairobi, Kenya

John’s story with AMR began with a fall that fractured his hip. After surgery, the incision site became infected, spreading to his bloodstream and proving to be multi-drug resistant, taking a year to clear. This struggle involved multiple interventions and hospital stays, nearly resulting in the loss of his kidney function. A father who used to love playing football with his kids, John can now only watch them play and needs crutches to move around.

1 Economic case for AMR investment, being prepared by the Quadripartite Technical Group on the Economics of AMR

4 Key challenges to tackling AMR nationally

Examples of challenges in advancing a national AMR agenda and preventing antimicrobial-resistant infections are listed below.

- **Multisectoral coordination**: As AMR is a complex, One Health problem, with drivers and solutions in many sectors, a robust multi-sectoral coordination mechanism is necessary for sharing data and joint decision-making, including among parliamentarians. This is inadequate in most contexts.
- **Lack of leadership in policy advocacy**: The priorities in policies for AMR include preventive action through interventions to reduce the need for and use of antimicrobials, robust waste and wastewater management systems, investment in local manufacture of antimicrobials, pooled, sustainable procurement, resilient supply chains and incentives for behaviour change. Influential champions are necessary to translate these policies into action.
- **Legislative and regulatory gaps**: Robust national regulatory, legislation and policy frameworks are essential. Some legislation and regulations related to AMR and/or manufacturing, use and disposal of antimicrobials may, however, be incomplete, outdated or not enforced, which can limit the functions of regulatory agencies *(19)*. For example, in many countries, there are no legal provisions to enforce environmental standards for antimicrobial discharges from health-care facilities, farms or manufacturing plants *(20)*.
- **Fragmented legislation and regulations**: While it is important that each sector-specific issue be regulated by its own legislation, legislation should also be established to regulate procedures and entry points for coordination among all sectors relevant to AMR. Such integration does not imply single, integrated laws; however, it is important that all laws can be implemented in a synergistic, coherent manner. International coordination of regulations is also necessary when relevant.
- **Lagging multisectoral NAP–AMR implementation**: Although 90% of countries have an NAP, implementation has been lagging and not balanced across sectors, mainly due to lack of strong, accountable multisectoral governance mechanisms and robust implementation structures and to inadequate regulations and enforcement *(8)*.
- **Inadequate financing of AMR interventions**: Only 11% of countries with a NAP have financial provision for its implementation in their national budgets *(14)*. This results in overreliance on donor funding, which may be provided ad hoc and be less sustainable than domestic financing from national budgets. In some countries, there is no funding at all, either from the budget or donors, for NAP implementation. Appropriate allocation for AMR is not legally regulated to ensure sustainable financing when political will begins to wane. Few countries have developed economic cases to show the direct benefits and co-benefits of investing in AMR.
- **Low-quality health-care delivery**: Tackling AMR relies on the capacity, strength and resilience of health systems, access to antibiotics and diagnostics, clinical guidelines, enforcement of regulations, infection prevention and control and water, sanitation and hygiene in health-care facilities *(21)*. For example, in understaffed, poorly resourced health-care facilities, there is a high incidence of health-care-associated infections associated with multi-drug resistance.

Only 40 (23%) of the 177 countries had a national monitoring system to collect and report data on antimicrobial consumption at national level, including antibiotic prescribing and appropriate use in health facilities.

Tracking AMR country self-assessment survey 2023 (8)

In understaffed, poorly resourced health-care facilities, there is a high incidence of health-care-associated infections associated with multi-drug resistance.

- **Lack of access to human and animal health care**: Lack of access to health services for humans and animals leads people to rely on informal sources of health care, which may not be quality assured or even effective. This can lead to use of more antimicrobials, inappropriate use of antimicrobials, including substandard and falsified products, persistence of infection or spread of infection.
- **Lack or weak surveillance of AMR and AMU**: Surveillance data are essential to understand the magnitude of AMR and the national situation on the use of antimicrobials in different sectors. Surveillance data is necessary to establish and implement strategies to ensure appropriate use of antimicrobials and control the transmission of AMR among sectors.
- **Insufficient investment in agrifood systems**: In many parts of the world, antimicrobials are still used to promote growth in farm animals in the place of systematic investment in biosecurity and better husbandry practices and measures. Most of these antimicrobials end up in the environment due to poor waste and wastewater management practices. Farmers may not have the necessary competence or incentive to change their AMU practices, and there may be lack of access to effective alternatives *(22)*. Use of antimicrobials in crop production is also high. Promoting prevention and alternatives and restricting or prohibiting use of antimicrobials for non-therapeutic purposes in the absence of a risk assessment, especially for antimicrobials of critical importance, are some of the most powerful regulatory tools for reducing AMR.
- **Discharge of antimicrobials into the environment**: Because of insufficient investment in prevention and management, lack of awareness, weak regulations, weak enforcement capacity and suboptimal standards, in many countries there are extensive discharges of antimicrobials and AMR organisms into the environment from pharmaceutical manufacturing plants, terrestrial and aquatic animal production facilities, crop production, health-care facilities and households. Control of antimicrobial pollution from different sources is key to curbing AMR and safeguarding the longevity of antibiotics for all. Environmental contamination with antimicrobials, antimicrobial residues, AMR genes and resistant microorganisms can result in the emergence and probably also the transmission and spread of AMR *(23)*.
- **Lack of awareness about AMR**: In most parts of the world, there is little awareness about AMR, appropriate AMU, the environmental impacts of AMR and best practices, partly because of the complexity of the issue and also because of underinvestment in awareness-raising, including in long-term, nationwide campaigns *(24)*. Awareness is a prerequisite for behaviour change; however, the practices used in various situations tend to stagnate.
- **Lack of education on AMR in primary, secondary and tertiary education**: AMR has not been a part of education, especially in curricula for education on health and well-being, despite some early successes. According to the Tracking AMR Country Self-Assessment Survey 2023 *(6)*, only 38 of 177 countries surveyed (21.4%) reported that schoolchildren and youth received any education on AMR. Appropriate use of antimicrobials and AMR are also not taught in curricular or noncurricular activities at most universities, even in training of future health, animal health, agriculture and environment professionals, although several successful models are available.
- **Lack of incentives for AMR R&D and weak evidence base**: There is a "market failure" for new antimicrobials, as they are usually reserved as a last resort, which limits sales, preventing pharmaceutical companies from recuperating their investment in R&D *(25)*. As a result, several large pharmaceutical firms have either reduced or stopped allocating resources for R&D of antimicrobials *(26)*. Furthermore, AMR interventions in many regions are not based on implementation research or good-quality evidence, increasing the probability of failure. There has also been underinvestment in R&D for diagnostics, vaccines and alternatives to antimicrobials.

Control of antibiotic pollution from antibiotic manufacturing plants is key to safeguarding the longevity of antibiotics for all.

5 How parliamentarians can contribute to curbing AMR

The ways in which parliamentarians can advance the AMR agenda in their countries and beyond are summarized in Table 1.

TABLE 1.
How parliamentarians can contribute to curbing AMR

Critical domain	Actions
1 **Strengthen legislation** 	• Promote use of the Quadripartite One Health Legislative Assessment Tool *(13)* to identify gaps in AMR-related legislation in their country. • Support legislation that introduces obligations and responsibilities to: (i) rational use and safe disposal of antimicrobials in humans, animals and plants; (ii) reduce circulation of substandard and falsified medicinal products; (iii) reduce the need for antimicrobials by improving animal and plant health to increase resilience to disease and reduce discharges; (iv) deliver quality-assured health care for infections in communities and hospitals; (v) improve access to animal health care; (vi) improve animal production, biosecurity and good agricultural practices; (vii) regulate access and disposal of antimicrobials as plant protection products (pesticides); and (viii) minimise the release of antimicrobials into the environment. • Empower AMR-relevant regulatory agencies, such as a medicines regulator, agriculture authority, environment regulator or agencies responsible for the quality of health-care delivery, with appropriate legislation, finances and functional autonomy. • Ensure accountability from regulatory agencies and that regulations respect international standards. • Avoid non-comprehensive laws that regulate specific domains or sectors, creating legal fragmentation.

Critical domain	Actions
2 **Ensure multisectoral coordination and collaboration** 	• Support establishment and appropriate legislation of a ministerial coordination mechanism involving human health, animal health, agriculture, environment and other relevant ministries such as finance and education. • Request periodic reports of multisectoral coordination mechanisms to legislators. • Introduce legislation obliging all parties to collect and share data, including information on data collection and biological samples, to ensure that AMR and AMU data are available to all sectors. • Introduce a legal basis for entities to undertake integrated or coordinated AMR and AMU surveillance. • Advocate for sufficient domestic financing to support operationalization of national multi-sectoral coordination. • Ensure that legislation recognizes the right of civil society, research and academic organizations, vulnerable communities, the private sector and other relevant actors to participate actively in AMR governance. • Encourage governments to participate in multi-sectoral representation in global governance structures, such as the AMR Multi-stakeholder Partnership Platform *(27)* established by the Quadripartite.
3 **Advocate for policies** 	• Evaluate policies in relevant sectors such as education, agriculture, development, environment, water and sanitation to ensure that AMR is included in the mandates and activities of vertical programmes and thematic areas. • Advocate for sustainable pooled procurement and strong supply chains for antimicrobials and diagnostics to prevent disruptions and improve access, while supporting environmental protection. • Advocate for implementation of initiatives and strategies to reduce the requirement for antimicrobials, such as FAO's Reduce the Need for Antimicrobials on Farms for Sustainable Agrifood System Transformation initiative *(22)*. • Promote policies to facilitate international collaboration on AMR, such as sharing of data for decision-making, pooled procurement systems, shared clinical trial platforms and harmonized regulatory standards. • Include AMR-related interventions in development planning, including for official development assistance agencies, their national development strategies and the United Nations Sustainable Development Cooperation Framework, and advocate for "ring-fenced" funds dedicated for AMR. • Promote policies to reduce and eliminate over-the-counter sales of antimicrobials, especially those listed as "watch" and "reserve" in the WHO AWaRe classification of antibiotics *(10)*. • Promote policies and regulations for safe disposal of unused antimicrobials in key sectors.

Critical domain	Actions
4 **Set up accountable governance mechanisms for improved multisectoral NAP implementation** 	• Initiate and support a parliamentary resolution on AMR that outlines the present AMR situation in the country, the status of implementation and strengthening of the NAP and future directions. • Establish a parliamentary subcommittee to oversee coordination among key sectors for implementation of the NAP. • Raise questions in legislative bodies on progress in implementing the NAP in various sectors. • Support a strong, accountable governance mechanism for implementation of the multisectoral NAP, including a well-resourced permanent secretariat and provisions for monitoring and evaluation. • Demand that the government regularly publish progress reports on implementation of its multisectoral NAP on AMR. • Demand that the government comply with requests to share data on AMR, such as with the Global Database for Tracking Antimicrobial Resistance (AMR) Country Self-Assessment Survey *(8)*. • Support parliamentary dialogues on AMR, and foster regular interaction among parliamentarians, the government and others on NAP-AMR implementation and strengthening.
5 **Ensure financing for NAP implementation** 	• Advocate for sustainable financing mechanisms for implementation of multisectoral NAPs on AMR. • Promote the AMR Multi-Partner Trust Fund *(28)* as a pooling mechanism to support country NAP implementation, and advocate for its replenishment. • Promote national economic cases to invest in AMR interventions, and use tools such as the WHO AMR Costing and Budgeting Tool *(29)* for costing the NAP-AMR • Demand that the government make a budgetary allocation from domestic resources for implementation of the NAP-AMR. • Ensure the accountability of spending, and regular submission of expenditure reports to the legislature. Design outcome-driven financing models to attract investors and nontraditional funders; promote public–private partnerships as appropriate. • Ask for details of donor funding for implementation of NAP-AMR, and ensure that reports to donors are shared with the legislature. • Advocate for inclusion of AMR in requests for external funding to bodies such as the Pandemic Fund, the Global Financing Facility, the Global Environment Facility, the Global Fund and Gavi, the Vaccine Alliance. • Promote policies to ensure that funds committed by the country to multilateral funding mechanisms are also used to address AMR-related issues when it is within the remit of their current mandate and the objective of the grant.

Critical domain	Actions
6 **Improve the quality of health care** 	• Call on the government to increase investment in sustainable health system strengthening and universal health coverage. • Promote national and local mechanisms to improve the quality of prevention, diagnosis and treatment of infectious diseases. • Call for national, evidence-based, standard treatment guidelines for infections in alignment with the AWaRe classification of antibiotics *(10)* in the WHO List of Essential Medicines. • Ensure routine nationwide collection of data on AMR and antimicrobial consumption from health-care facilities and health systems, and promote its reporting to the Global Antimicrobial Resistance and Use Surveillance System (GLASS) *(30)*. • Support national accreditation systems aligned with international standards to ensure the quality of health-care delivery. • Ensure appropriate regulatory systems to prevent the circulation of substandard and falsified medicinal products for treating infectious conditions, and ensure prompt reporting to the WHO Global Surveillance and Monitoring System *(31)*. • Promote pre-service and in-service training in AMR for health-care workers. • Ensure that health care related legislation includes environmental considerations to prevent and curb AMR by reducing discharges from health care facilities into the environment.
7 **Promote investment in agricultural systems and animal health** 	• Promote national and local mechanisms to improve the quality of prevention, diagnosis and treatment of infectious diseases in animals. • Regulate progressive phasing out of the use of antimicrobials for growth promotion, starting with an immediate end to the use of antibiotics categorized as the highest priority critically important antimicrobial agents on the WHO List of Medically Important Antimicrobials *(32)* and the recommendations of the WOAH List of Antimicrobial Agents of Veterinary Importance *(33)*. • Encourage the government to join the FAO's Reduce the Need for Antimicrobials on Farms for Sustainable Agrifood System Transformation initiative *(22)* to reduce the need for antimicrobials on farms, and promote economic incentives for farmers and producers. • Promote vaccination strategies for diseases in aquatic and terrestrial food-producing animals on the WOAH priority list *(34)* to reduce use of animals and ensure the health of animals and humans. • Strengthen biosecurity measures and legislation of animal and plant health, and promote good agriculture and husbandry practices through legislation to reduce the need for antimicrobials and ensure safe disposal. • Call on the government to ensure investments in farmer education programmes and appropriate training for veterinarians and veterinary extension workers in preventive actions, biosecurity, AMU, vaccination and environmental dimensions of AMR. • Call on the government to give farmers and food companies incentives to adhere to standard practices of antibiotic use, through grants, subsidies and promotion of alternative methods. • Ensure that agriculture legislation includes environmental considerations to prevent and curb AMR by reducing discharges from terrestrial and aquatic animal production facilities and crop production sites into the environment.

Critical domain	Actions
8 **Improve environmental interventions** 	• Strengthen environmental legislation to prevent and curb the environmental dimensions of AMR in key sectors. • Demand that the government identify and target priority AMR-relevant pollutants and improve surveillance and reporting of such pollutants through national environmental surveillance systems or One Health integrated surveillance. • Promote nationwide awareness, communication and understanding of the role and contribution of the environment to AMR and adoption of best practices to prevent and address it. • Call for responsible pharmaceutical manufacturing and regulations aligned with the WHO Guidance on wastewater and solid waste management for manufacturing of antibiotics *(20)* and the UNEP report Bracing for superbugs – strengthening environmental action in the one health response to antimicrobial resistance *(4)*. • Promote use of pollution limits, as proposed in guidance to increase transparency in pharmaceutical procurement in all sectors *(35)*. • Advocate for investment in research on effective management of antimicrobial residues in wastewater and waste. • Address research gaps and promote knowledge generation on the environmental aspects of AMR.
9 **Engage communities** 	• Promote legislation that recognizes communities' rights to participation and access to information, including information on AMR and AMU. • Use all opportunities to describe to the public appropriate use of antimicrobials and AMR, the impact of the environment on AMR and best practices to reduce AMR. • Ask health-care providers and veterinarians in your constituency about the local situation, and find locally adapted solutions. • Participate in and promote commemoration of World AMR Awareness Week *(36)* and other public health campaigns in the constituency and nationally. • Engage communities, young people, AMR survivors and civil society groups for better understanding and joint action.
10 **Promote education on AMR and One Health in schools and universities** 	• Advocate for inclusion of AMR and One Health in the curricula of primary and secondary schools, nationally and locally. • Secure funding for the design and implementation of educational programmes on AMR and One Health in schools and school systems. • Visit schools to engage young people and motivate them to learn more about appropriate use and disposal of antibiotics and AMR. • Call for inclusion of appropriate use and disposal of antimicrobials and AMR in the curricula or non-curricular activities of universities, based on successful models in other regions. • Raise resources for professional development for teachers and educators to equip them with skills for delivering age-appropriate, context-specific, gender-sensitive, lively learning content on AMR and One Health.

Critical domain	Actions
11 **Promote AMR innovation and R&D** 	• Support incentives, both financial and non-financial, for promoting innovation in AMR, especially for newer therapeutics and diagnostics; and ensure that the principles of access are included in such incentive schemes. • Promote research for the development of innovative chemical or biological entities to stay ahead of the constantly evolving drug resistance. Promote knowledge and data-sharing and the work of product development partnerships such as the Global Antibiotic Research and Development Partnership *(37)*. • Promote operational research in countries to test the feasibility and effectiveness of various AMR interventions in national and local contexts to ensure that scaling-up is feasible. • Utilize the Quadripartite One health priority research agenda on AMR *(38)* and the political declaration of the high level meeting on AMR held during Seventy-ninth session of the United Nations General Assembly *(15)* to promote research and knowledge generation across sectors. • Advocate for establishment of "AMR innovation hubs" to ensure coordination among various research projects such as clinical trials and projects in all sectors and that information is shared in the innovation ecosystem in the country. • Highlight the need for knowledge and data generation in all sectors to inform policy-making and priority-setting.

Beyond their national responsibilities, parliamentarians can have a role in promoting regional and global AMR agendas and have global voice on AMR through active participation in a regional or global network of parliamentarians, such as the Parliamentary Fronts against Hunger and the Global TB Caucus, some of which have already started work on AMR issues. Parliamentarians can also help shape the global AMR agenda by joining delegations attending influential global meetings, such as the ministerial meetings on AMR and regional ministerial meetings on environment and health.

6 Sources of standardized information on AMR from various sectors

- Tracking AMR country self-assessment survey (TrACSS) *(6)*: To monitor progress in implementation of NAPs, an annual survey has been administered by FAO, UNEP, WHO and WOAH since 2016. The questionnaire consists of sector-specific questions, and the responses are validated by the national AMR focal point or a multisectoral coordination group. The information is entered onto a searchable dashboard, which can be used to generate national and regional reports.
- Global Antimicrobial Resistance and Use Surveillance System (GLASS) *(30)*: GLASS provides a standardized approach and technical support for the collection, analysis, interpretation and sharing of data on AMR and antimicrobial consumption and supports capacity-building in existing and new national surveillance systems. Its data visualization dashboard makes it easy for users to search for, understand and compare national data.
- ANImal antiMicrobial USE (ANIMUSE) *(38)*: WOAH has been publishing annual reports on AMU in animals from the ANIMUSE database since 2015. Nearly 130 countries reported quantitative data for at least 1 year between 2019 and 2022. Its aim is to help curb AMR through better monitoring of AMU adjusted by animal biomass. It provides user-friendly analyses of AMU in animals for decision-making by its members on its interactive dashboard.
- International FAO Antimicrobial Resistance Monitoring System (InFARM) *(39)*: InFARM is a global information system consisting of an information technology platform and FAO activities to allow countries to generate, collect, collate, analyse and effectively use their data from AMR surveillance and monitoring of animals and food. The dashboards on the InFARM Information Technology platform provide interactive visualizations of AMR data in different user interfaces.

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Annex 1.
Approach to development

A review of literature was undertaken to identify the key challenges in tackling AMR at national level and potential actions that parliamentarians can take to contribute to prevention and mitigation. Academic databases, including Pubmed and Web of science, and policy literature sources were included in the search. Search terms such as “antimicrobial resistance”, “AMR”, “antibiotic resistance”, “policy engagement”, “legislative action”, “health governance” and “parliamentary engagement” were used. Priority was given to documents published during the past decade and those from the Quadripartite organizations. The draft document was prepared by the AMR division at WHO, reviewed by AMR teams in FAO, UNEP and WOAH and revised according to the feedback. The document was also peer reviewed by representatives of organizations involved in engaging parliamentarians on various global health issues, including AMR. Feedback from the peer-review was also included in the draft. The aim of the review was to ensure that the technical content, language and suggestions are appropriate for potential users worldwide. The document was edited by a professional technical editor.

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