



Evaluation of FAO's role and work on antimicrobial resistance (AMR)

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Evaluation of FAO's role and work on antimicrobial resistance (AMR)

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Contents

Abstract.....	v
Acknowledgements.....	vi
Acronyms and abbreviations.....	vii
Executive summary.....	viii
1. Introduction.....	1
1.1 Purpose.....	1
1.2 Scope and objective.....	1
1.3 Methodology.....	3
1.4 Limitations.....	3
1.5 Structure of the report.....	4
2. Background and context.....	5
2.1 Context.....	5
2.2 Project portfolio.....	6
3. Findings.....	11
3.1 Relevance.....	11
3.1.1 Relevance of FAO's role in the overall AMR architecture.....	11
3.1.2 Relevance of the approach and design of FAO's work on AMR.....	14
3.2 Coherence.....	17
3.2.1 Compatibility of FAO's AMR work with other interventions in the field.....	17
3.2.2 Links between FAO and the AMR scientific community.....	19
3.2.3 Alignment of FAO's AMR activities within the Organization.....	20
3.3 Effectiveness.....	21
3.3.1 Results to date.....	21
3.3.2 Quality of FAO's AMR publications.....	32
3.4 Partnerships.....	34
3.4.1 FAO within the Tripartite.....	34
3.4.2 FAO partners at global, regional and national level.....	37
3.5 FAO's institutional arrangements and operational capacity.....	38
3.6 Sustainability.....	43
3.6.1 Sustainability of FAO's AMR results.....	43
3.7 Cross-cutting issues.....	46
3.7.1 Gender.....	46
3.7.2 The One Health approach.....	47
3.7.3 Monitoring and evaluation.....	49
4. Conclusions and recommendations.....	51
4.1 Conclusions.....	51
4.2 Recommendations.....	55
Matrix of findings, conclusions and recommendations.....	57
References.....	58
Appendix 1. List of FAO AMR projects covered in this evaluation.....	64
Appendix 2. Results chain for FAO's work on AMR.....	66
Appendix 3. People interviewed.....	67
Appendix 4. Resume of AMR meetings by Tripartite organizations.....	74
Appendix 5. List of M&E frameworks.....	75
Annexes.....	76

Figures and tables

Figures

Figure 1: Geographic coverage of extrabudgetary projects and Technical Cooperation Programmes (TCPs) on antimicrobial resistance (AMR)	8
Figure 2: Mapping project objectives against the four focus areas of the FAO Action Plan on AMR (2016–2020) (FAO-AP)	9
Figure 3: Sectors actively involved in developing and implementing AMR National Adaptation Plans (NAPs)	22
Figure 4: Global AMR survey: Changes observed in results associated with the four FAO AP focus areas over the past five years.....	24
Figure 5: Map of countries with Assessment Tool for Laboratories and AMR Surveillance Systems (ATLASS) assessment missions.....	28
Figure 6: FAO AMR publications by year	33
Figure 7: Distribution of personnel allocating more than 70 percent of their time to AMR by division and contract type.....	40
Figure 8: FAO's AMR resources – core and extrabudgetary	41
Figure 9: Internal survey: (a) delays in delivering AMR projects and (b) key reasons for delays by region.....	43
Figure 10: External survey: Distribution of responses on changes in government resource allocation.....	44
Figure 11: External survey: Distribution of responses on government capacity to continue AMR work without FAO support.....	44
Figure 12: Internal survey: (a) whether systematic gender reviews were conducted to inform FAO's work on AMR (b) the perception of FAO's AMR work from a gender-focused approach	46
Figure 13: Divisional membership of the AMR-WG at FAO headquarters	48
Figure 14: External survey: Distribution of FAO's work on AMR by sector.....	49

Tables

Table 1: Linkages between corporate outputs and AMR-related results.....	40
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Abstract

Antimicrobial resistance (AMR) is the ability of microorganisms to fight antimicrobial compounds, reducing the efficacy of treating diseases in humans, animals, and plants. AMR risk is outpacing human population growth, owing to misuse of antimicrobials in large quantities in food systems, and is a serious threat to food security and sustainable development.

FAO, with the World Health Organization (WHO), the World Organization for Animal Health (OIE), and the United Nations Environment Programme (UNEP), is supporting countries in developing and implementing their One Health National Action Plans on AMR. The eventual aim is to ensure sustainable use of antimicrobials to minimize AMR risks, in alignment with the Global Action Plan on AMR. The scope of the evaluation covers FAO's entire work on AMR up to early 2020 and its role in the global AMR architecture. It examines FAO's organizational and institutional set-up for AMR work.

FAO has a strong mandate to work on AMR, implementing activities in 45 countries and providing far-reaching support on AMR National Action Plans (NAPs). FAO's technical expertise is a key comparative advantage in its work on AMR. It is underpinned by strong scientific grounding of FAO's work, engendered in its AMR working groups and supported by its collaboration with research centres, universities and the Tripartite organizations. Nevertheless, the work is relatively recent and, given the long impact pathways, it has had limited results. A comprehensive strategic and programmatic approach would increase the likelihood of achieving results in combating AMR.

FAO should prioritize its work in a long-term strategy on AMR that recognizes the seriousness of the threat and is fully integrated into the Organization's Strategic Framework. The strategy should set out FAO's long-term role in combating AMR and that of its divisions and offices, as well as its approach at country and regional level. FAO should consolidate its work on AMR through a strong programmatic approach with a central coordination and management structure that links with the Regional Offices and is supported by dedicated core funding.

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This evaluation was managed, and the report was drafted by Anshuman Bhargava, Evaluation Specialist, under the guidance and leadership of Rachel Sauvinet Bedouin, Senior Evaluation Officer, from OED. The evaluation team consisted of two independent consultants: Paul Rossiter (Lead Evaluation Consultant) and Ana Mateus (AMR Expert). The team was supported by Douglas Charivanda and Doan Hoang Phu in conducting country case studies in Zimbabwe and Viet Nam respectively. Sara Holst, Evaluation Specialist and Sarah Jaff, Administrative Assistant in OED, provided valuable support throughout the evaluation process.

Acronyms and abbreviations

AMR	Antimicrobial resistance
AMR-WG	FAO AMR Working Group
AMU	Antimicrobial use
ATLASS	Assessment Tool for Laboratories and AMR Surveillance Systems
COAG	Committee on Agriculture
COVID-19	Coronavirus disease 2019
ECTAD	Emergency Centre for Transboundary Animal Diseases
EPT-2	Emerging Pandemic Threats Programme – Phase II
FAO	Food and Agriculture Organization of the United Nations
FAO-AP	FAO Action Plan on AMR (2016–2020)
FAP-AP2	FAO Action Plan on AMR (2021–2025)
FAO-PMP-AMR	FAO Progressive Management Pathway for AMR
FFS	Farmer field school
GAP	(Tripartite) Global Action Plan on AMR
GHSA	Global Health Security Agenda
IACG	United Nations Interagency Coordination Group on Antimicrobial Resistance
IAEA	International Atomic Energy Agency
KAP	Knowledge, Attitudes and Practices
LEGN	FAO Development Law Branch
MPTF	AMR Multi-Partner Trust Fund
NAP	National Action Plan
NORAD	Norwegian Agency for Development Cooperation
NSA	FAO Animal Production and Health Division
OECD	Organization for Economic Co-operation and Development
OER	FAO Office of Emergencies and Resilience
OIE	World Organisation for Animal Health
PMP	Progressive Management Pathway
RAF	Regional Office for Africa
RAP	Regional Office for Asia and the Pacific
REU	Regional Office for Europe and Central Asia
RLC	Regional Office for Latin America and the Caribbean
RNE	Regional Office for the Near East and North Africa
SADC	Southern African Development Community
TCP	Technical Cooperation Programme
TrACSS	Tripartite AMR Country Self-assessment Survey
UNEP	United Nations Environment Programme
USAID	United States Agency for International Development
WAAW	World Antimicrobial Awareness Week
WHO	World Health Organization

Executive summary

1. This evaluation assesses the work of the Food and Agriculture Organization of the United Nations (FAO) on antimicrobial resistance (AMR). It traces the contribution of FAO's work and assesses its results to date at global, regional and national level. It draws lessons from processes that could inform future decisions by programme teams, donors, FAO senior management and Governing Bodies, national governments and the Tripartite organizations on FAO's role in the international AMR architecture.
2. The following conclusions and recommendations aim to complement FAO's new Action Plan on AMR (FAO-AP2) and provide insights into the development of FAO's new Strategic Results Framework and future work on AMR. It focuses on FAO's AMR work from 2015 to mid-2020, examining FAO's achievements and the likelihood of effectiveness. It covers both programmatic and operational aspects and examines the AMR technical capacities of divisions and offices, as well as regional and national capacities. Importantly, it looks at FAO's internal arrangements to ensure they are appropriate to the aims of its AMR Action Plans.

Conclusion 1. AMR is an undisputed global threat and minimizing it requires concerted collaborative action at all levels. FAO has a strong mandate to work on AMR in the food and agriculture sectors. It is well positioned to deliver on AMR and is moving in the right direction. The COVID-19 pandemic has made it more urgent that FAO prioritize its global role and work on AMR.

Conclusion 2. Despite its strong positioning, FAO lacks an AMR strategy that demonstrates its organizational commitment. This hampered progress on the FAO AMR Action Plan (2016–2020) (FAO-AP) and does not reflect well on its global commitment to AMR. There is less than full acknowledgement of the work required across the antimicrobial and food value chains and in adopting a true One Health approach. It has further affected the emphasis placed on sectors associated with food and agriculture in the Tripartite's AMR work, as well as FAO's global influence and visibility on AMR.

Conclusion 3. There is no overarching AMR management team or structure coordinating the entirety of FAO's work on AMR. FAO has relied heavily on the dedication of voluntary members of the AMR Working Groups (AMR-WGs) for internal coordination and knowledge sharing. This is not reflective of the ambitions of FAO's current plan and even less so of its role in tackling AMR and the seriousness of the issue. Over the course of the evaluation, the evaluation team observed FAO's growing commitment to tackling AMR, however, a multidisciplinary approach that sets out the role of all relevant divisions and offices at both headquarters and regional level is not yet evident.

Conclusion 4. FAO's work on AMR remains aligned with its Tripartite responsibilities and is guided by the WHO-led Global Action Plan (GAP) on AMR. There has been close normative cooperation between the three organizations and closer collaboration is evolving at implementation level through the strengthening of the AMR Multi-Partner Trust Fund (MPTF) mechanism, the Tripartite AMR workplan and the Tripartite monitoring and evaluation (M&E) framework. The United Nations Environment Programme's (UNEP) recent collaboration with the Tripartite organizations on AMR is a positive sign and an important step towards a true One Health approach. However, there are further opportunities for FAO to strengthen its role in the food and agriculture sectors and for closer collaboration.

Conclusion 5. Beyond the Tripartite, FAO has played a strong role in coordinating and collaborating with a wide range of actors on AMR and is making a good effort to broaden its partnering network. However, at all levels, greater systematic coordination with national, regional and global actors is required, along with the engagement of stakeholders along the food and

antimicrobial value chains. Furthermore, for greater efficiency, there needs to be a clear understanding of all key stakeholders' roles linked to AMR.

Conclusion 6. FAO's technical expertise is a key comparative advantage in its work on AMR. It is underpinned by the strong scientific grounding of FAO's work, engendered in its AMR-WG personnel and supported by its collaboration with research centres, universities and the Tripartite organizations. FAO's recent scientific publications on AMR were reviewed by a panel of AMR experts established for this evaluation and found to be of consistently high relevance and quality. FAO's online repository has been a trustworthy source of information on AMR in food and agriculture. The model FAO uses to generate scientific knowledge for its work on AMR is strong and can be replicated in other areas of its work.

Conclusion 7. Because of the multidisciplinary nature of AMR and the close connections between animal, environmental and human health, a One Health approach is necessary at all levels. Even though there are some promising examples of the approach being advocated by FAO in its work with government counterparts, it has not been able to demonstrate a true One Health approach internally or through its work with a wider array of stakeholders.

Conclusion 8. Through the FAO-AP, FAO has delivered a substantive programme of work in the food and agriculture sectors, implementing AMR activities in 45 countries and providing far-reaching support on AMR National Action Plans (NAPs). The four FAO-AP focus areas are interrelated and it was sensible to address them in parallel. The activities and outputs of the focus areas are essential to building a strong foundation for future AMR work. Still, FAO's work to achieve optimal antimicrobial use (AMU) has had limited results. A comprehensive strategic approach would increase the likelihood of strong results on combating AMR.

Recommendation 1. FAO should prioritize its work in a long-term strategy on AMR that recognizes the seriousness of the threat and is fully integrated into the Organization's Strategic Framework. The strategy should set out FAO's long-term role in combating AMR and that of its divisions and offices, as well as its approach at country and regional level. It should be based on analyses of FAO's comparative advantages and AMR risks along the relevant value chains, while identifying key partnerships and stakeholders at all levels. It further needs to be underpinned by a theory of change that clarifies the links between its activities and expected goals. The strategy should consider how FAO intends to engage on issues of One Health and gender, also based on appropriate analyses. The strategy should set targets and outcome-based indicators to measure progress and achievements.

Recommendation 2. Reducing the global threat of AMR is a substantial task and FAO has the mandate for the food and agriculture sectors, which requires strong leadership and advocacy at all levels. To achieve this, FAO should consolidate its work on AMR through a strong programmatic approach with a central coordination and management structure that links with the Regional Offices and is supported by dedicated core funding over the next biennium. The multidisciplinary approach should be strengthened to take fully into account all of FAO's core technical areas and their connections to AMR. This would give FAO greater visibility on its AMR role and demonstrate its commitment to AMR risk reduction.

Recommendation 3. FAO should sustain and strengthen its scientific approach to AMR at all levels, through greater engagement with the AMR-WGs, an enhanced role for the Reference Centres in supporting AMR work at all levels, and broader scientific collaboration.

Recommendation 4. FAO should consider innovative approaches in order to make progress in focus areas where resource and socioeconomic constraints are hindering behavioural change across value chains and hampering commitment to combat the threat of AMR.

1. Introduction

1.1 Purpose

1. This evaluation aims to provide accountability for the Food and Agriculture of the United Nations' (FAO) engagement in combatting antimicrobial resistance (AMR), as well as on results of FAO's AMR work. It seeks to trace the contribution of FAO's work and assess results to date at the global, regional and national levels. It draws lessons from implementation processes that could inform future decisions by FAO's programme teams,¹ donors, senior management and Governing Bodies, as well as national governments and the Tripartite organizations on FAO's role in the international AMR architecture.
2. The FAO Action Plan on AMR (2016–2020) (FAO-AP) ended recently and a new Action Plan (FAO-AP2) has been developed. The conclusions and recommendations of this evaluation will complement the new plan and provide insights into the Organization's strategic vision of FAO's role and work on AMR as it develops its new Strategic Results Framework. The evaluation will also inform the next phases of projects associated with FAO's work on AMR.

1.2 Scope and objective

3. The evaluation was initially envisioned as the final evaluation of FAO's Fleming Fund funded AMR project. However, following a request by the 127th session of the Programme Committee, the scope of the evaluation was extended to include the programmatic aspects of FAO's work on AMR, to assess the entire work of FAO on AMR, as well as its positioning and role in combating AMR. As the primary catalyst for FAO's AMR activities can be traced back to the adoption of resolution 4/2015 at the thirty-ninth session of the FAO Conference, this evaluation focuses on FAO's work on AMR from 2015 to mid-2020. It does not cover in detail any projects started after that date. A complete list of FAO projects considered in this evaluation can be found in Appendix 1.
4. Since the bulk of FAO's work on AMR is recent, with activities that have long impact pathways, this evaluation assesses FAO's progress on achieving results and the likelihood of effectiveness at the global, regional and national level. It covers both programmatic and operational aspects and examines current technical capacities for AMR within the divisions and offices engaged through the AMR Working Group (AMR-WG) and associated regional and national capacities. It assesses FAO's internal structures to ensure that the delivery methods and institutional arrangements are appropriate to the aims of the FAO-AP. This is particularly important, as FAO's work on AMR spans multiple divisions and offices and is implemented by headquarters, Regional and Country Offices.
5. The evaluation covers three key dimensions: (1) FAO's role in the global AMR architecture; (2) the organizational and institutional set-up of FAO's AMR work; and (3) FAO's effectiveness in achieving overarching results, such as supporting countries in reducing or optimizing the use of antimicrobials to address AMR. The latter includes a range of outputs and outcomes set out in the FAO-AP. The evaluation team used these to create a results chain for AMR work carried out between 2015 and 2020 (see Appendix 2), which maps the main components of FAO's AMR projects.
6. The following key criteria guided the evaluation:

¹ Programme team refers to all FAO personnel working on AMR, including project technical personnel.

- a. Relevance of FAO's AMR work – whether it has the right strategy and activities to respond to national, regional and global needs, particularly in terms of the four focus areas of the FAO-AP:
 - i. Improve awareness of AMR and related threats.
 - ii. Develop capacity for the surveillance and monitoring of AMR and antimicrobial use (AMU) in food and agriculture.
 - iii. Strengthen governance related to AMU and AMR in food and agriculture.
 - iv. Promote good practices in food and agriculture systems and the prudent use of antimicrobials.

In this regard, the evaluation examines any changes in context during the five-year period to assess the extent to which FAO's AMR work has adapted in order to remain relevant. It also assesses the degree to which FAO's work reflects the full extent of its comparative advantage at national, regional and global level.

- b. Internal and external coherence of FAO's AMR work – internal coherence pertains to the synergies and linkages between FAO's AMR work and other projects and activities within the Organization. External coherence is the consistency of FAO's AMR work with the AMR interventions of key international, regional and national stakeholders. This includes complementarity, harmonization and coordination with those stakeholders, and the extent to which the collaboration adds value while avoiding duplication of effort.
- c. The likelihood of effectiveness, or progress made on achieving results - this includes an assessment of factors that have contributed to the achievement or non-achievement of results per the four focus areas of the FAO-AP.
- d. The efficiency of FAO's AMR work, in terms of timeliness, cost-effective implementation and use of human and material resources. The evaluation also assesses the efficiency of the Organizational setup for managing AMR, including the coordination of AMR projects and activities. It notes any unintended effects of related FAO work – for example, laboratory and epidemiology capacity development work within the Emerging Pandemic Threats programme, Phase II (EPT-2) and Global Health Security Agenda (GHSA) initiatives – that have supported AMR work, or vice versa.
- e. Assessing the enabling and hindering factors in the sustainability of results and related benefits at national and regional level once FAO support has been reduced or re-orientated. Some of the enabling factors include ownership and commitment by stakeholders concerned, capacity developed, policy or regulatory changes attributed to FAO that address AMR and/or result in resource utilization and mobilization for AMR.
- f. The evaluation also assesses whether the following cross-cutting issues have been sufficiently incorporated into FAO's AMR work:
 - i. Gender issues – also how gender-related work has influenced the effectiveness and outcomes of FAO's AMR work. While the FAO-AP does not mention gender, some AMR donor funding proposals and project documents have highlighted it.
 - ii. The One Health approach – in light of the emphasis stakeholders have placed on the multidisciplinary and multisectoral nature of AMR and the need to recognize the interconnectedness of human health, animal health and environmental health.
 - iii. Monitoring and evaluation (M&E) – the development and utilization of M&E tools.

1.3 Methodology

7. To accurately capture all the different aspects of FAO's AMR work, the evaluation uses a number of methodological approaches and data sources. It takes a consultative and transparent approach with all internal and external stakeholders. The evaluation team triangulated evidence to validate its analysis and to support its conclusions and recommendations. The evaluation was supported by an internal Evaluation Reference Group, comprising personnel across FAO offices and divisions. Its role was to provide input during the inception phase on the evaluation terms of reference and to support the compilation of FAO AMR documents.
8. Because of its broad scope, the evaluation was conducted in two phases. The first phase focused on the role and work of FAO on AMR at the global level, while the second phase assessed its role and work at regional and country level. The first-phase analysis is based on semi-structured key informant interviews and an in-depth review of relevant documentation. In the first phase, around 65 interviews were conducted with individuals from all FAO departments and divisions working on AMR, as well as representatives from key partner organizations, donors and other institutions. An additional 43 interviews were conducted in the inception phase to develop the overall design of the evaluation. All key AMR documents were reviewed, from AMR-WG meeting minutes and AMR project documents to the Tripartite and FAO Council documents. The interviews and document review were guided by the key evaluation criteria in the evaluation terms of reference and a results chain was developed for this evaluation and the FAO-AP. At the end of the first phase, the evaluation team prepared an initial draft summarizing the evidence collected and the evaluation findings.
9. Analysis in the second phase was based on five case-study countries and complemented by a global survey of all countries involved in FAO's work on AMR. The countries were selected as a representative sample, so that all regions, funding sources, and different sizes of FAO's AMR country work (in terms of length of engagement and total funding) were covered. These were Armenia, Peru, Ukraine, Viet Nam and Zimbabwe. The evaluation team interviewed key national stakeholders in each country, including FAO personnel, government counterparts and national partners. In addition, it analysed 98 responses to the global survey from 35 other countries. Forty-three percent of those were from government counterparts in ministries of agriculture, environment and health, while the rest were FAO personnel directly involved in AMR activities.
10. Because of the technical nature of the subject, the evaluation team also convened a panel of AMR experts from a broad spectrum of disciplines: plant health, land, water, human health, environment, fisheries, aquaculture and animal health. The panel included representatives of other key international organizations, research institutions, academia and the private sector. They advised the evaluation team on the technical soundness of certain FAO AMR publications, including the FAO-AP. The team also used data collected on country missions for the Evaluation of FAO's Emerging Pandemics Threats Programme – Phase II (EPT-2) (FAO, 2021d), as one of the projects covered by that evaluation was on AMR.

1.4 Limitations

11. The main limitations on the evaluation arose from the need to collect data remotely because of the COVID-19 pandemic. This led to slow response times in communicating with country-level stakeholders, as they were, understandably, occupied with pandemic-related issues in their countries. In addition, online connectivity was a major issue in some

countries, hampering virtual interviews, while the evaluation team was unable to travel to assess activities in the field. However, to overcome these issues, national consultants were hired to conduct interviews with farmers, extension workers and other stakeholders that could not be reached virtually in Viet Nam and Zimbabwe. Live interpretation was used to overcome language barriers in meetings for Armenia and Ukraine.

12. There was also the possibility of a confirmation bias, as the evaluation was guided by the results chain. Still, the team ensured that there were no leading questions and a broader group of key informants was engaged to avoid any bias. The multidisciplinary expert panel and responses to the global survey allowed the team to triangulate its evidence.

1.5 Structure of the report

13. The report follows the key evaluation questions, covering the relevance, coherence, effectiveness, efficiency and sustainability of FAO's work on AMR, as well as the cross-cutting issues on gender, the One Health approach, and monitoring and evaluation (M&E). The report includes the following appendices:

Appendix 1. List of AMR projects covered in this evaluation

Appendix 2. Results chain for FAO's work on AMR

Appendix 3. List of people interviewed

Appendix 4. Resume of AMR meetings by Tripartite organizations

Appendix 5. List of M&E frameworks

2. Background and context

2.1 Context

14. AMR refers to the ability of a micro-organism² to survive in the presence of an antimicrobial compound, when it was previously unable to do so. Because of AMR, human and animal (terrestrial and aquatic) antimicrobials (antibiotics, anti-parasiticides, anthelmintics, fungicides and antivirals) and crop antimicrobials (pesticides, such as antibiotics and fungicides) that were once effective treatments for disease lose their efficiency or become completely ineffective. This reduces our ability to successfully treat infections, leading to increased mortality, more severe or prolonged illnesses, agricultural production losses and, ultimately, more vulnerable livelihoods and food security. Antimicrobial-resistant micro-organisms can develop and move between animals, plants and humans by direct exposure or through the food chain and the environment (WHO, 2017a). Even if used in a responsible and prudent way, unwanted antimicrobial residues may be present in products of animal origin and in animal waste, contaminating the environment. Between 75 percent and 90 percent of antimicrobials used in livestock are excreted, mostly unmetabolized (FAO, 2020a).
15. AMR is a major global threat to human and animal health and of increasing concern to plant health (Review on Antimicrobial Resistance, 2016). It has implications for both food safety and food security and the economic wellbeing of millions of farming households. The human health consequences and economic costs of AMR are estimated, respectively, at 10 million human fatalities a year and a 2–3.5 percent decline in global gross domestic product, corresponding to a loss of USD 100 trillion from the world economy by 2050 (Review on Antimicrobial Resistance, 2016).
16. It is widely acknowledged that AMR requires a multidisciplinary and multisectoral approach encompassing the interface of humans, terrestrial and aquatic animals, plants and the environment. As a multidisciplinary organization, FAO can bring expertise on aquatic and terrestrial animal health and production, food safety, crop production, forestry and natural resource management, as well as all relevant regulatory aspects, and contribute to international efforts to tackle AMR.
17. AMR has been a key priority for FAO and its Members, as evident in the two resolutions adopted by the FAO Conference in 2015 and 2019 (FAO, 2015b; FAO, 2019e) and Programme Committee's interest in the topic. Resolution 6/2019 recognized the importance of addressing the growing global threat of AMR everywhere through a coordinated, multisectoral One Health approach in the context of the 2030 Agenda for Sustainable Development (FAO, 2019e). It also noted the United Nations General Assembly's establishment of the ad hoc Interagency Coordination Group on AMR (IACG), which submitted its recommendations on sustained effective global action to address AMR to the Secretary General in April 2019 (IACG, 2019). The 127th session of the Programme Committee underlined the need to raise the visibility of FAO's AMR work at all levels and reiterated the need for an AMR indicator in the Organization's Strategic Results Framework. It also encouraged FAO to continue working in close cooperation with the World Organisation for Animal Health (OIE), the World Health Organization (WHO) and, more recently, the United Nations Environment Programme (UNEP) to combat AMR.
18. While FAO's engagement on AMR issues can be traced back to 2000 (WHO, 2000), its key AMR-related activities began in 2015 with its contribution to the development of the WHO-

² Bacteria, fungi, viruses, and parasites.

led Global Action Plan on AMR (GAP) (WHO, FAO and OIE, 2019a) and the commitment of FAO Members to work on AMR, as demonstrated by the adoption of resolution 4/2015 at the thirty-ninth session of the FAO Conference (FAO, 2015a). The FAO-AP was developed as a result.

19. The overall aim of the FAO-AP was to minimize the impact of AMR by implementing the GAP, highlighting the need to adopt a One Health approach (FAO, 2016a). FAO works with its global partners, WHO and OIE, through the Tripartite initiative, formed in 2010 to share responsibilities and coordinate global activities to address health risks at the animal-human-ecosystem interface (FAO, OIE and WHO, 2010). The Tripartite also signed a memorandum of understanding on One Health and AMR in 2018 and established a Multi-Partner Trust Fund for AMR (MPTF) in 2019 to support its collaborative work. FAO also has growing links with UNEP on the environmental impact of AMU. Other partners include regional economic communities and their bodies, the private sector, academia, civil society organizations and financial institutions.
20. Internally, FAO's activities on AMR fell under Strategic Objective (SO) 2, SO4 and SO5 until 2019. In 2020–2021, they also fall under SO1 and SO3. The activities span multiple departments and have been coordinated through the interdepartmental AMR-WG, set up in 2015 under the responsibility of the Chief Veterinary Officer. The Group brings together FAO officers from Animal Production and Health Division (NSA), the Land and Water Division, the Plant Production and Protection Division, the Fisheries Division, the Legal Office, the International Plant Protection Convention, the Office of Communications, the Food Systems and Food Safety Division (formerly the Office of Food Safety), the Secretariat of the Codex Alimentarius Commission (Codex), the Joint FAO/International Atomic Energy Agency (IAEA) Division and FAO Strategic Programme teams SP2 and SP4. The FAO Regional Offices and five Sub-regional Offices each assign an officer to participate in the AMR-WG (COAG, 2016). Personnel from the FAO Liaison Offices are also part of the Group. The weekly meetings provide an opportunity to share information, agree priorities and coordinate activities. There is also a regional AMR-WG in the FAO Regional Office for Asia and the Pacific that includes national consultants across the region. Furthermore, some Country Offices have specific full- or part-time AMR officers to implement activities, depending upon the project and funding.

2.2 Project portfolio

21. FAO's work on AMR until early 2020 was largely implemented through 12 donor-funded projects and six Technical Cooperation Programme (TCP) projects. These were primarily funded by the United Kingdom of Great Britain and Northern Ireland (through the Fleming Fund), the United States Agency for International Development (USAID), the Norwegian Agency for Development Cooperation (NORAD) and the Russian Federation. The European Commission has recently funded FAO work on AMR through a project in Latin America and the Caribbean, which began in February 2020. The United Kingdom of Great Britain and Northern Ireland and the Governments of the Netherlands and Sweden have contributed through the AMR MPTF for Tripartite activities. FAO has also recently partnered with Mars Incorporated to expand its work on AMR. The TCPs, AMR work done through Codex³ and

³ Codex normative work is also funded in part by WHO. Specific work on foodborne AMR is funded by the Republic of Korea (which hosts the Codex Ad Hoc Intergovernmental Task Force on AMR).

AMR work in the Near East and North Africa region (RNE),⁴ as well as a few countries in West and Central Africa,⁵ are funded from FAO's core funding.

22. The total budget for FAO's AMR activities to April 2020 can be estimated at around USD 28 million.⁶ Around 40 per cent of the contributions for its AMR work in early 2020 were from a single project.⁷ However, multiple donors are committing to future work on AMR, mainly for joint Tripartite activities through the AMR MPTF.
23. The projects cover multiple regions, but most activities are concentrated in Africa and South and Southeast Asia, in line with the funding of the Fleming Fund and USAID. There are also projects in Latin America and the Caribbean and Central Asia and Eastern Europe. There are four country-specific TCPs on AMR in the Maldives, Papua New Guinea, Thailand and Ukraine.⁸ AMR projects are being implemented in 45 countries overall, with six of those covered by FAO's Regional Office for Europe and Central Asia (REU), 10 by FAO's Regional Office for Africa (RAF), 13 by FAO's Regional Office for Latin America and the Caribbean (RLC), 15 by FAO's Regional Office for Asia and the Pacific (RAP) and one by (RNE). Figure 1 maps the coverage of FAO's AMR projects.

⁴ Except for Sudan (covered under GCP /GLO/710/UK).

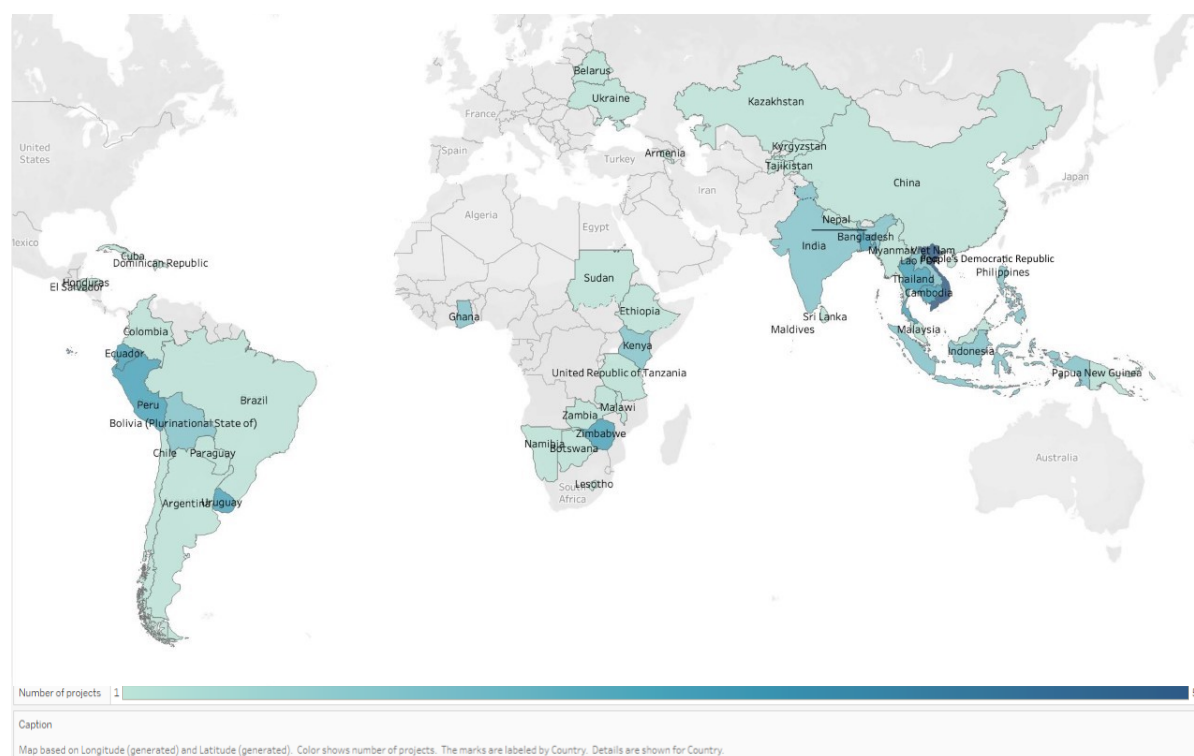
⁵ Burkina Faso, the Congo, Liberia, Senegal and Togo.

⁶ Excluding AMR MPTF contributions. There is insufficient information on precise contributions from the GHSA project and core funding.

⁷ Fleming Fund II GCP/GLO/710/UK "Engaging the food and agriculture sectors in sub-Saharan Africa and South and South-east Asia in the global efforts to combat antimicrobial resistance using a One Health approach".

⁸ See Appendix 1 for more details.

Figure 1: Geographic coverage of extrabudgetary projects and Technical Cooperation Programmes (TCPs) on antimicrobial resistance (AMR)



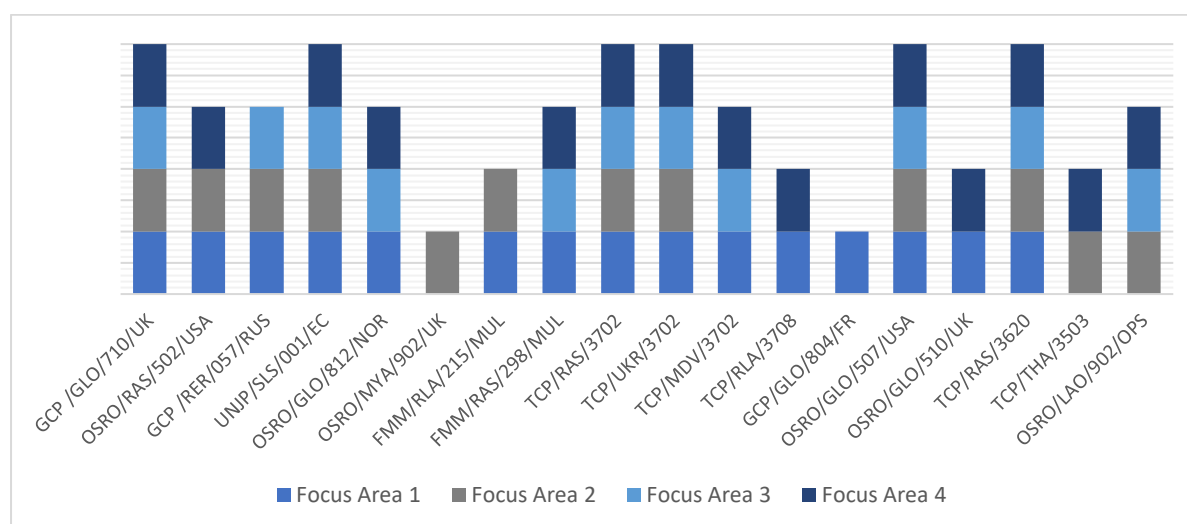
Source: Created by evaluation team on Tableau software and based on AMR project documents. Modified to comply with [UN, 2020. Map of the World](#).

* Note: See Annex 1. Terms of reference for more details. The map does not include countries that are part of individual ATLASS training courses and projects set up after the finalization of the evaluation terms of reference. These include projects in Burkina Faso, Cameroon, Cote d'Ivoire, the Democratic Republic of the Congo, the Congo, Guinea, India, Liberia, Mali, Morocco, Senegal and Sierra Leone. Also, the number of AMR projects does not reflect the total funding allocated to each country. A map based on budgets could not be created, as data on funding by country are not available.

24. These projects have been implemented since October 2015 and been expanded. In early 2020, the USAID-funded GHSA project started its AMR activities in Africa and will run to 2024. Most of FAO's AMR projects are ongoing, accounting for 90 percent of all AMR funding.
25. The implementation of donor-funded projects and TCPs is covered by teams at headquarters, regional and country levels. In some countries, implementation is led by the Emergency Centre for Transboundary Animal Disease (ECTAD), a joint platform between NSA and the Office of Emergencies and Resilience (OER). Key AMR activities at FAO headquarters include the work of the Legal Office to develop a methodology to analyse AMR-relevant legal frameworks in the food and agriculture sector; the development of AMR tools (the Assessment Tool for Laboratory and AMR Surveillance Systems (ATLASS) and the Progressive Management Pathways [PMP]); and international regulatory work through the Codex Secretariat and the International Plant Protection Convention (IPPC).
26. Projects at regional and national levels include a wide range of activities that support the preparation and implementation of National Action Plans (NAPs) on AMR, the analysis of regulatory frameworks, supporting laboratories and fieldwork on AMR surveillance, promoting multisectoral One Health coordination on awareness-raising and promoting the adoption of good practices for infection prevention and control and the responsible use of antimicrobials by food and agriculture stakeholders. The projects include target outputs

and activities aligned with the FAO-AP, with each project targeting one or more of the FAO-AP focus areas. Figure 2 maps the project objectives against the four focus areas. Focus areas 1 (raising awareness) and 4 (promoting good practices) are covered by most projects. The other two focus areas are covered by nearly two-thirds of the AMR projects. Due to overlapping areas of work, there is no breakdown of resource allocation to each focus area.

Figure 2: Mapping project objectives against the four focus areas of the FAO Action Plan on AMR (2016–2020) (FAO-AP)



Source: Created by the evaluation team based on AMR Project documents.

27. Through its AMR portfolio, FAO supports countries in developing cross-sectoral national AMR strategies and NAPs to reduce the threat of AMR in agriculture (crops and livestock), aquaculture, forestry and the environment, as well as its impact on food systems. This can include the development of regulations to support responsible AMU, the detection and prevention of AMR and the establishment of surveillance systems with the long-term goal of slowing the development of AMR within the food and agricultural sectors.
28. At the regional and continental level, FAO's work involves engaging bodies such as the African Union and regional economic communities – for example, the Southern African Development Community (SADC), the Economic Community for West African States, the Association of Southeast Asian Nations (ASEAN), the South Asian Association for Regional Cooperation (SAARC), the Comité Veterinario Permanente del Mercosur and the Secretariat of the Andean Community (CAN) – through World Antimicrobial Awareness Week (WAAW) and key activities associated with the FAO-AP (establishing surveillance networks, evaluating and revising regulatory frameworks and legislation and formulating AMR communication strategies, for instance).
29. Through the Tripartite, FAO is heavily involved in the M&E framework for the GAP (WHO, FAO and OIE, 2019a), which includes the Tripartite AMR Country Self-assessment Survey (TrACSS) for monitoring the implementation of AMR NAPs. Other FAO Tripartite activities include regional and country-level collaboration, the development of a database to monitor AMU, the development of a Global Framework for Development and Stewardship to Combat AMR and, more recently, collaboration with OIE and WHO to develop a One Health assessment tool on AMR-relevant legislation.

30. There are numerous other initiatives and activities with AMR components, for example, REU's collaboration with the Swedish University of Agricultural Sciences to develop a manual of practical approaches to AMU by veterinarians and livestock producers and engagement with industry bodies (Magnusson et al., 2019). FAO is also a key player in global activities, including: the Global AMR Research and Development Hub; the OIE ad hoc Working Group on AMR; the Joint FAO/WHO Expert Meeting in collaboration with OIE on Foodborne Antimicrobial Resistance: Role of the Environment, Crops and Biocides; the Organisation for Economic Co-operation and Development (OECD)-led Expert Steering Group on AMR; and the ad hoc Codex Intergovernmental Task Force on Antimicrobial Resistance. FAO is establishing a global network for its work on AMR. Ten institutions have been identified as (future) FAO Reference Centres for AMR (five⁹ have been designated so far and there are four candidates for FAO Reference Centres on Aquaculture Biosecurity).

⁹ In Denmark, Germany, Thailand, the United Kingdom of Great Britain and Northern Ireland and the United States of America.

3. Findings

3.1 Relevance

3.1.1 Relevance of FAO's role in the overall AMR architecture

31. AMR risk is growing in line with or faster than the human population, amid its increased consumption and budget for meat and other animal products, the intensification of livestock production systems and the widespread use of antimicrobials in both animals and humans (McKenna, 2015; Van Boeckel et al., 2015; WHO, 2020). Genes conferring resistance to antimicrobials have been found in bacteria isolated from foods of plant origin, possibly through soil, water, insects, animal intrusion, manure or human handling (FAO, 2018a). The COVID-19 pandemic has magnified the threat posed by AMR (JPIAMR, 2016). Consequently, to maintain the efficacy of antimicrobials, an immediate, coordinated, multisectoral and multidisciplinary approach is needed.
32. Apart from public health, AMR is a serious global challenge for food security and sustainable development and is directly linked to multiple Sustainable Development Goals (SDGs).¹⁰ This makes AMR a highly relevant topic for FAO and ties it directly to key technical divisions under FAO's Natural Resources and Sustainable Production stream,¹¹ including Fisheries, Forestry, Animal Production and Health, Land and Water, Plant Production and Protection, as well as Food Systems and Food Safety and the Development Law branch of the Legal Office. These divisions cover areas that are crucial to Tripartite collaboration under the One Health approach.

Finding 1. FAO has strong track record of collaborating with key international organizations working on AMR, notably through the Tripartite agreement. Global collaboration on AMR has increased since 2014, with FAO's contribution to the development and adoption of the WHO-led GAP. The development of the FAO-AP, aligned with the GAP, has reinforced its role in combating AMR within the Tripartite. FAO's increasing work on AMR coincides with the rise in potential challenges associated with AMR.

Finding 2. FAO has a strong mandate for its global work on AMR in the food and agriculture sectors, as confirmed by the United Nations General Assembly, FAO's partners and Members.

33. Since at least 2000, FAO has collaborated with WHO and OIE to develop a joint approach to combating the risk of AMR. A summary of key meetings by the three organizations on AMR is presented in Appendix 4. FAO initially took part in the Tripartite through its food safety role, with its involvement in animal health involvement beginning in 2000, when representatives from both disciplines attended a meeting organized by WHO to consider progress made on AMR control in livestock (WHO, 2000). The collaboration continued with a series of joint WHO, FAO and OIE meetings and workshops and, in 2015, WHO, with significant input from FAO and OIE, published the GAP, endorsed by the World Health Assembly later that year. The GAP sets out the main areas of work for FAO in the food and agriculture sectors, including livestock production and health, defining its expected outputs and contributions to the global effort to combat AMR.
34. FAO continues to collaborate with OIE and WHO and a list of some of its major consultations since the publication of the GAP can be found in Appendix 4. Its collaboration at global level extends to other organizations, including producers and the feed industry,

¹⁰ SDGs 1, 2, 3, 6, 12, 14 and 15.

¹¹ Per the current FAO organizational chart (FAO, 2021a).

which have attended certain AMR meetings. Through the Tripartite collaboration and the GAP, WHO and OIE continue to recognize the role of FAO in the global AMR architecture and help identify the areas where its abilities can be put to best use. It is also encouraging that UNEP is starting to engage with FAO and the Tripartite on AMR in the environment.¹²

35. FAO's mandate on AMR has also been strengthened by the United Nations General Assembly and other global and regional forums. A high-level meeting of the General Assembly on AMR in 2016 reaffirmed the GAP as the blueprint for tackling AMR, along with FAO's key role in supporting the development and implementation of NAPs and AMR activities at the national, regional and global level (United Nations General Assembly, 2016). This was re-emphasized by the IACG on AMR in its final report to the United Nations Secretary General in 2019 (IACG, 2019). In its 2017 communiqué, the G20 group of nations recognized the threat posed by AMR, saying it "strongly support(ed) the work of the WHO, FAO and OIE on AMR" (G20, 2016). Continental and regional organizations, such as the African Union and the European Union, also work closely with FAO to address AMR in their respective regions and to support the work of FAO in other areas (European Union funding supports FAO AMR projects in Latin America and the Caribbean). International bodies and regional financial institutions, such as the World Bank, the OECD and the World Economic Forum (WEF) have also highlighted the global threat posed by AMR and the important global position of the United Nations and FAO in addressing it (WEF, 2013; World Bank, 2017; OECD, 2018).
36. Crucially, FAO's Members endorse its role in the global effort against AMR, as expressed at the FAO Council and Programme Committee meetings (FAO, 2015b). Members clearly recognize that FAO is better placed to work on AMR in food and agriculture than any other organization at present. There is also widespread trust in FAO among Members, based on a mix of key qualities, including technical strength, ability to respond to and assist in emergencies, capacity-building and neutrality (both politically and on trade issues).¹³ Government counterparts across 40 countries where FAO is implementing its AMR projects strongly supported the importance of combating AMR and FAO's role in it. They valued FAO's technical support and capacity-building initiatives, and its work on collaboration and coordination the most.¹⁴

Finding 3. FAO has comparative technical and organizational advantages in delivering a broad programme of work on AMR, with expertise in key sectors related to food and agriculture and a strong global presence. This is evident in its Tripartite collaboration, close working relationships with national governments and regional organizations, and its ability to influence policy change. However, FAO's focus on certain countries does not align fully with the scale and importance of AMR issues. FAO's AMR work is also very much centred on animal health, food safety, aquaculture and regulatory frameworks. While the focus on these areas is understandable, given their relative importance in the fight against AMR, other sub-sectors also need to be fully engaged. FAO's comparative advantage in some countries has been diminished by the presence of other development actors with a strong local presence.

37. Globally, the Tripartite organizations are seen as worldwide leaders in combating AMR, according to all stakeholder groups interviewed and government partners surveyed. The GAP is considered the main plan for work on AMR, and organizations such as the Fleming

¹² UNEP participation in a FAO AMR working group (AMR-WG) meeting in 2020.

¹³ As covered in recent FAO evaluations (FAO 2019a and FAO 2019b).

¹⁴ For more detail, see Annex 2 for the results of the external AMR survey.

Fund¹⁵ and the International Livestock Research Institute (ILRI) have closely aligned their work with its objectives. There are also numerous organizations focusing on specific aspects of AMR. These range from donor bodies, other international organizations (CGIAR, OECD, UNEP and the World Bank), regional organizations, universities and research centres to development and non-profit organizations and pharmaceutical alliances. Each of these play an important role in the AMR architecture and have contributed to the global fight against AMR. FAO's comparative advantages lie in its broad programme of work, which allows it to deliver on multiple fronts (animal, plant and environment) in the One Health arena, its collaboration with the Tripartite, close working relationships with national governments and its global presence.

38. FAO has a strong track record of global achievement in animal and zoonotic disease control, plant disease and pest control, aquaculture and food safety, all of which are components of a One Health approach. It has had major achievements in three main disciplines relevant to its work on AMR: animal health (the global eradication of rinderpest), human health (contributing to the elimination of river blindness in West Africa) and food safety (the establishment and operation of Codex).¹⁶ FAO has also proved pragmatic in joining forces with OIE to establish the Global Framework for Transboundary Animal Diseases to tackle rapidly transmissible animal diseases and in forging an alliance between NSA and OER to create ECTAD, an operational unit that provides rapid support for animal disease emergencies in Africa and Asia. The country ECTAD units have been implementing projects on emerging zoonotic diseases, collaborating closely with OIE and WHO (USAID, 2019). These projects have key parallels with FAO's AMR work, for example, building the capacity of government laboratories, supporting national surveillance systems and enhancing One Health collaboration at national and sub-regional levels. FAO's AMR work has also benefited from some of its other programmes. For instance, the FAO Progressive Management Pathway for AMR approach (FAO-PMP-AMR) (FAO, n.d.b.)¹⁷ is partly modelled on the Progressive Control Pathway for Foot-and-Mouth Disease developed by FAO and the European Commission for the Control of Foot-and-Mouth Disease.
39. Data from key informant interviews confirm that the Organization has significant comparative advantages in leading certain components of AMR work in the food and agriculture sectors, especially through its close collaboration with national governments. As a United Nations specialized agency and based on its organizational setup, FAO's main partners at country level are national ministries of agriculture, environment and health. FAO has a long history of working with these authorities on a range of issues. In some cases, FAO is based in ministerial departments for closer coordination. For example, its ECTAD office in Bangladesh is in the same compound as the Ministry of Fisheries and Livestock. Similarly, at regional level, through its existing work, FAO has forged close collaborations with various organizations. This has given it the opportunity to liaise with government counterparts on AMR NAPs, issues of AMU regulation and other key AMR matters. Interviewees did not suggest any other organizations or mechanisms that could carry out FAO's global role and responsibilities in the food and agriculture sectors.

¹⁵ The Fleming Fund is a UK aid programme assisting countries in Africa and Asia to tackle AMR. Its large number of country grants provide funding for AMR work, focusing on laboratory capacity and surveillance.

¹⁶ Listed as one of FAO's 10 greatest achievements (FAO, 2015c).

¹⁷ The FAO-PMP-AMR guides Members in putting their NAPs into action. Its progressive approach enables specific sectors to make step-by-step improvements with a view to sustainable AMU and managing AMR.

40. FAO's technical disciplines cover most, if not all, elements of the food and agriculture sectors. Its technical expertise ranges from animal health and production, fisheries and aquaculture, plant production and protection to food safety, forestry, soil and water management and development law. FAO also has access to additional technical skills through its participation in the former Joint FAO/IAEA Division of Nuclear Techniques (it has been proposed that this become a joint centre between the two organizations) and the Codex Secretariat. However, not all disciplines and units have been fully engaged on AMR. FAO's technical AMR capacity is largely concentrated in animal health and production, followed by aquaculture and food safety. For all other areas, the evaluation team found technical capacity on AMR to be limited. Specific projects and activities have been implemented by the other departments, but they have mostly relied on temporary capacity or external collaboration. Section 3.7.2 on the One Health approach goes into more detail on engaging different disciplines.
41. With a presence in 136 countries, FAO has extensive reach in all continents. Still, its work on AMR does not span all regions and countries. There have been a limited number of countries covered by FAO's work on AMR in RNE and RLC, while the choice of countries in other regions may not always have matched their relative importance in terms of AMR. Where possible, FAO's Regional Initiatives have accommodated certain components of its work on AMR. This was noted in interviews and verified against the list of countries currently involved with FAO's work on AMR. This is important, especially due to the transboundary nature of AMR, as it can spread across countries through international trade and travel. Moreover, the level of engagement on AMR in countries and regions depends largely on the extrabudgetary project resources available. This has hindered programmatic coordination on AMR at the regional level, as discussed in more detail in section 3.5.

3.1.2 Relevance of the approach and design of FAO's work on AMR

Finding 4. The main mechanism for delivering FAO's work on AMR is the FAO-AP. Its four focus areas are consistent with the GAP and provide a strong basis for future AMR work. However, regional and country personnel were not very involved in its development and there is an insufficient focus on the One Health approach, implementation pathways and the broader AMR context. Furthermore, the lack of a FAO strategy setting out the Organization's long-term AMR goals has hindered consistent, sustained programming and a full multidisciplinary approach across the food and agriculture sectors.

42. Both the FAO-AP and FAO's work on AMR are consistent with the GAP, which is based on core issues repeatedly highlighted by the Tripartite as important for the management of AMR risk. The GAP also sets out the main areas of work and expected outputs for FAO and OIE in the global AMR effort, effectively guiding their working relationship and the division of labour on AMR in livestock. OIE and FAO's alignment with the GAP has led to greater clarity on roles and responsibilities within the Tripartite and across key organizations on AMR. Similarly, the FAO-AP targets the foundational work required in the AMR field with the development of multisectoral AMR NAPs in all countries. Fully operational NAPs are the main tools for delivering the activities and outputs needed to reduce the AMR threat at country level, so their development is a good basis for future AMR work. The three Tripartite organizations are responsible for ensuring that their mandated areas of the GAP are fully incorporated into functioning NAPs for AMR.
43. FAO developed the FAO-AP specifically to address the needs of the food and agriculture sectors and to deliver its elements of the GAP. It was created and developed through the AMR-WG, bringing together as many of FAO's technical specialists as possible under the

leadership of the Chief Veterinary Officer. Its four focus areas stemmed directly from the objectives of the GAP to ensure consistency with the Tripartite AMR approach. The FAO-AP is a lucid, well-presented document that informs the reader of FAO's AMR plans for 2016 to 2020. It was endorsed by FAO's Committee on Agriculture (COAG) and Programme Committee and officially adopted by the FAO Council in 2016 and has since been the template for designing AMR projects for regional and national implementation.

44. On multiple occasions, both the GAP and the FAO-AP have been reviewed and endorsed by the external scientific community, donors and other institutions, For example, the 2016 high-level meeting of the United Nations General Assembly and the United Nations resolution on AMR launched the IACG on AMR to "provide practical guidance for approaches needed to ensure sustained effective global action to address AMR" (United Nations General Assembly, 2016). The recommendations of the final report of the IACG, delivered to the United Nations Secretary General in April 2019, fully endorse the four focus areas of the FAO-AP and were confirmed by the General Assembly in May 2019 (IACG, 2019; United Nations General Assembly, 2019). Interviewees from stakeholder groups consistently said the four focus areas were appropriate for FAO's work on AMR. The focus areas are also reflected in the future FAO priorities listed by survey respondents.
45. The FAO-AP is considered to be highly relevant at regional and country level, with close ties to the GAP and the primary objective of establishing NAPs. However, data from country-level interviews suggest that regional and national personnel were scarcely engaged in its development and would have appreciated an opportunity to contribute, particularly in relation to ensuring its appropriateness to their country context. Internal and external respondents were better engaged in the development of the NAPs and AMR country projects, but only 20 percent contributed to the development of the FAO-AP.
46. The external expert panel established for this evaluation also provided inputs into the overall quality and the relevance of the FAO-AP. The experts gave consistently high scores on both criteria, though they noted a few limitations.¹⁸ They reiterated the significance of the four focus areas and their consistency with the scientific literature, technical reports, national and international workshop recommendation. However, they also noted there was no explanation as to how sectors, such as crops, fisheries and the environment, would be involved in the implementation of the FAO-AP. Some experts also highlighted the lack of implementation pathways with concrete actions and connections to the outcomes. Some experts noted the need for the FAO-AP to place AMR in a broader context that took into account future scenarios involving changes in global food production systems, with an overall risk analysis and acknowledgement of the roles of the pharmaceutical industry, animal production industry and citizens associations (in sanitation, pollution and poverty).
47. Moreover, there is no FAO strategy on AMR to support the action plan. Both OIE and WHO have their own strategies for AMR, with the WHO strategy predating and steering the subsequent development of the GAP (WHO, 2001; OIE, 2016). The GAP contains significant strategic components that apply to all members of the Tripartite. However, these are particularly relevant to WHO and human health, so a strategy for the food and agricultural sectors would have been justified. By not having a strategy, FAO missed an early chance to spell out its own vision on AMR and how long it might take to achieve. If this had been clarified at the outset, the Organization would have had more time and opportunity to

¹⁸ See Annex 3 for more details.

understand the commitment it needed to make, both in terms of capacity, resources and longevity, as well as the need for greater in-house support.

48. The evaluation team did not see any evidence of a FAO risk assessment or analysis of AMR in the food and agriculture sectors or sub-sectors. This could have ensured better targeting of interventions and the design of the FAO-AP. A strategy with clear goals and objectives, both scientific and developmental, could help long-term planning and M&E, with consistent and meaningful performance indicators. It would also allow FAO to develop a more consistent approach to AMR across the agriculture-to-food-consumption continuum.
49. With its own strategy, FAO could take a more targeted approach to its work on AMR and address the concerns raised by the expert panel. For instance, the GAP cites the role and value of consumers as key stakeholders in the work on AMR. However, it does not differentiate between consumers of antimicrobials in the human health sector and consumers of potentially contaminated foods in the food and agriculture sector. Being defined by the GAP, the FAO-AP did not include consumers either. The potential for consumers to bring about changes in producer behaviour was cited by a few key informants in FAO divisions and by FAO respondents in the global survey. A broader FAO AMR strategy with detailed analyses of associated value chains, AMR risks and the One Health approach is key to ensuring that FAO's work on AMR is effective.

Finding 5. The new FAO Action Plan for AMR 2021–2025 (FAO-AP2) will enable the Organization to continue its present role and work on AMR. It addresses most of the key issues associated with the previous plan and is more comprehensive, with clear linkages to the SDGs, a detailed list of key activities, a results framework and monitoring indicators. However, it still needs to be situated within a broader long-term AMR strategy that outlines the Organization's approach at regional and country level. The plan does not sufficiently acknowledge the current needs of all sectors, including crops, soil, water and food safety. Broadening the approach on AMR would allow FAO to redefine and reassert its role in the Tripartite and could prove more interesting to a wider pool of funding agencies.

50. The new five-year action plan for AMR, FAO-AP2, was developed in parallel to this evaluation and the evaluation team briefly reviewed it in the context of its wider findings on FAO's work on AMR prior to its development.
51. The FAO-AP2 is a straightforward evolution of the FAO-AP1 and remains very much aligned with the GAP. It is more comprehensive and ambitious than its predecessor, including a results chain and detailed list of activities. Significantly, it indicates new methodologies and important, innovative aspects of work on AMR that were missing from the previous plan. For example, it emphasizes the need for value-chain analyses and for case studies and surveys on AMU quantities and patterns (Output 4.2). It emphasizes the development of an economic justification for protecting food systems from the impacts of AMR (Output 5.2). The evaluation team believes this work to be highly relevant and part of the knowledge base required to inform awareness-building and to influence policy and, more importantly, practices related to AMU.
52. Even though the new plan is an improvement on the previous one, addressing most of its limitations, FAO-AP2 still needs to be situated within a broader longer-term AMR strategy. For example, the FAO-AP2 spells out more clearly the alignment of FAO's work on AMR with the SDGs. This is important to build wider acceptance of AMR within FAO's core mandates and ensure its sustainability, including additional resourcing, longer term. However, the FAO-AP2 does not outline AMR's position within the broader work of the Organization's divisions and departments. The results framework and indicators are a

welcome development, as we discuss in Section 3.7.3. However, FAO-AP2 does not include outcome-level results indicators that align with M&E for the Tripartite. Similarly, it has a section on funding, but contains few to no details on funding sources.

53. While the new plan lends weight to the One Health approach and to extending AMR activities to cover food safety, crops, soil and water, it maintains the focus on animal health. With most antimicrobials used in livestock and aquaculture (especially antibiotics), the focus seems appropriate. However, the challenge is to boost AMR efforts in other sub-sectors by improving understanding of AMU in those sectors and recognizing the different levels of effort needed to counter AMR compared with animal health. This requires surveillance efforts to be extended to AMR and to antimicrobial residue testing in plants and crops intended for human consumption and the environment (soils and water) where possible. In plants and crops, the use of antimicrobials other than pesticides for disease prevention and control also needs to be monitored.
54. As in the case of its predecessor, FAO-AP2 has limited clarity on FAO's approach at the national and regional levels, its role vis-à-vis its national partners and its internal global coordination structure to deliver on AMR. Currently, its approach is driven by project priorities and associated resources. It remains very much grounded in developing tools and guidelines that are substantially similar outputs to those of the FAO-AP. While this is understandable, given the need to cover more countries and maintain capacity-building efforts, there is still no long-term strategy for the use of these tools and guidelines and how they could be used to generate the required data on AMR. These aspects are assessed further in Section 3.3 and 3.6.

3.2 Coherence

3.2.1 Compatibility of FAO's AMR work with other interventions in the field

Finding 6. The GAP is a strong, unifying blueprint for Tripartite delivery. Other AMR actors, such as donor agencies and research institutions, have aligned with it. A 2019 report by the ad hoc IACG on AMR flagged some concerns over and knowledge gaps in the overall delivery of AMR work (IACG, 2019). However, the Tripartite's recent drive for common management of its AMR work, with environmental contributions from UNEP, should strengthen the coordination of FAO's AMR work with that of other actors.

55. The evidence gathered from reports and interviews indicates that the three Tripartite organizations know their respective roles and responsibilities and implement projects and programmes that are aligned and do not overlap. Risks of duplication exist in the livestock sector, especially in animal health, where FAO and OIE have what appear to be closely aligned remits. However, evidence suggests that the two organizations are largely delivering complementary activities and outputs, with FAO working with the relevant authorities at country and farm level, and OIE providing inputs to maintain and raise the standards of veterinary services, including on the use of antimicrobials. There is also an understanding that FAO will focus on collecting AMR data, while OIE will focus on AMU data collected through national statistics.
56. The Tripartite has recently developed essential mechanisms to coordinate its work on AMR. Its workplan on AMR, with associated M&E framework and performance indicators, should reinforce the structure for ensuring coherence in their programmes of work (FAO, 2020b). The Tripartite Secretariat also facilitates communication and management between the

- organizations, fostering better understanding and the alignment of work. The AMR MPTF mechanism should boost coordination between the Tripartite organizations and UNEP.¹⁹
57. The role of the Tripartite and, hence, FAO has been fully supported in the IACG's final report (IACG, 2019). Endorsing the three main agencies and their work on AMR to date, the report stressed the need to accelerate the global drive against AMR and step up the implementation of NAPs and activities. It cited gaps in the scientific knowledge on AMR and in the required implementation funding, both of which must be addressed if progress is to be made. In addition, the collective effort against AMR needs to be broadened to engage with the private sector and to fully connect into all other human, animal and environmental health programmes of work. The IACG report and its recommendations are an important advocacy tool for FAO's work on AMR and provide direction for future priorities.
 58. At the regional level, the Tripartite organizations have aligned their AMR work with the Africa Centres for Disease Control and Prevention and the African Union to strengthen their work. The risk of duplication at the national level is being mitigated through ministerial-level coordination platforms involving Tripartite members and AMR stakeholders from key sectors. In Zimbabwe and Ukraine, for instance, such platforms have been set up to collate information on AMR activities. Such platforms are particularly important in countries where there is limited coordination between national ministries. They have also helped to strengthen political commitment. In Viet Nam, though FAO does not have joint AMR activities with International Livestock Research Institute (ILRI), the two organizations have long been in regular contact and share information, also coordinating through the national One Health and Food Safety committees.
 59. Other key organizations in the AMR architecture include donor agencies, universities, research centres, international organizations, development institutions and non-profit organizations. As FAO is not primarily a research organization, its knowledge generation and synthesis work are built on collaborations with universities and research centres. FAO can draw on research conducted by organizations such as CGIAR to implement the FAO-AP (especially focus areas 1 and 4). Among the other UN agencies, UNEP has a direct association with AMR and has recently started focusing on it. FAO is working on specific areas to do with the environment and has begun to coordinate with UNEP on specific areas. The World Bank and OECD are also engaged in AMR, but focus largely on its economic implications. FAO's work in key areas, such as raising global awareness of AMR, supporting NAPs and building evidence on AMR in the food and agriculture sectors, is complementary and was welcomed by all actors contacted by the evaluation team.
 60. The international development agencies and non-profit organizations that work on AMR are generally funded through key donor agencies such as the Fleming Fund, NORAD and USAID. These agencies have carefully aligned themselves with the GAP, enabling their partners to do the same. For the pharmaceutical alliances and other private-sector actors the evaluation team was unable to find significant relevant information at global level. See section 3.4 on Partnerships for more details on FAO's collaboration with key actors.

¹⁹ More details on the MPTF in the Partnerships section.

3.2.2 Links between FAO and the AMR scientific community

Finding 7. FAO has good ties with the AMR scientific community to ensure that its work is aligned with the rapidly evolving science, especially in animal health and food safety. However, much of its engagement with the scientific community has been through informal mechanisms. There has been a conscious effort to formalize and systematize this engagement. FAO has also collaborated with the AMR scientific community to include research based on its work, some of which has been published in peer-reviewed journals.

61. The Tripartite arrangement provides opportunities for discussion, collaboration and the introduction of new science, ideas and techniques. The GAP was prepared after more than ten years of scientific consultation on AMR and is widely considered to be scientifically appropriate and sound. FAO's own work, especially the FAO-AP, closely follows the GAP, so has the same level of scientific credibility. The GAP, FAO-AP and NAPs are cross-cutting plans based not just on AMR science, but also incorporating social, economic and governance components. Similarly, Codex is regularly involved in updating and revising its scientifically based guidelines, standards and codes of practice on AMR, with substantial involvement of external AMR experts.
62. Within FAO, several permanent and seconded personnel in NSA, the Food Systems and Food Safety Division and the Joint FAO/WHO Centre (Codex) are AMR specialists with strong scientific backgrounds and a network of personal contacts throughout the AMR scientific community. This personal networking has often led to projects and working relationships with external centres of AMR expertise, such as the proposed collaboration on AMR between the Land and Water Division, the Joint FAO/IAEA Centre (Nuclear Techniques in Food and Agriculture) and the University of Munich. In addition, the ad hoc AMR-WG, which meets weekly and comprises experts from key FAO departments and divisions (including national and regional personnel) working on AMR, has furnished opportunities to keep up with scientific advancements on the subject. This is down to the regular sharing of updates and discussions on the AMR activities being implemented by FAO, both at headquarters and in the Regional Offices.
63. FAO is not a research organization as such, but makes extensive use of scientific evidence and the technical expertise of its personnel and external experts in setting policy and guidelines. These experts also contribute to FAO's technical reports on AMR at global, regional and national level (FAO, 2018b). External funding has allowed the Regional Offices to actively support research to generate evidence for interventions to tackle AMR. A key example is the involvement of FAO in a mixed-method ethnographic research project funded by the Fleming Fund in five African countries, which took a bottom-up approach to exploring practices used, knowledge on and attitudes towards AMU and AMR in livestock production systems (Caudell et al., 2020). Such research allows the development of more targeted and efficacious interventions, as it considers the socioeconomic, cultural and historical factors associated with AMU and AMR in livestock production systems at national level. Other examples include socioeconomic research in the field and the development of new surveillance techniques (Coyne et al., 2020; FAO and IAEA, 2019). Such studies have contributed to the wider literature on combating AMR. Similarly, the joint FAO/WHO scientific advice programme works with experts to review and assess scientific information to underpin the standard-setting work of Codex on AMR. There are also specific networks at country level involving scientific institutes and universities, such as the Indian Network for Fisheries and Animal AMR. The evaluation team considers such work and the ensuing publications to be a positive aspect of FAO's scientific leadership in the field of AMR.

64. The recent establishment of FAO Reference Centres for AMR has significant potential to enable the formation of research networks and the conduct of research for Members. In the last two years, FAO has recognized five Reference Centres for collaboration and the provision of scientific expertise on AMR: three in Europe, one in North America and one in Asia, while applications from others are currently being considered. These offer a wide range of scientific skills and knowledge that are particularly important to FAO-AP focus area 2 on surveillance, including diagnostics, sampling practices, surveillance methods, genotyping and phenotypic characterization, as well as appropriate analytical techniques. For example, FAO collaborates with Thailand's Chulalongkorn University Veterinary AMR Cluster at the regional level to help strengthen laboratory capacity in selected countries, to harmonize laboratory protocols for AMR testing and to conduct regional laboratory training on AMR diagnosis (FAO, 2020c).
65. While FAO's ties with the AMR scientific community are a positive sign, such linkages are very recent and still a work in progress. The AMR Reference Centres do not receive any payment for their activities or for the provision of expertise on behalf of FAO. They value FAO as a global AMR partner with international standing, as well as for the opportunities it provides for research collaboration and networking with FAO Members. For example, in Zimbabwe, FAO is exploring potential AMR synergies with academia and research institutions to identify how project data can be better organized with other national results. Harnessing the potential power of the Reference Centres and of other partnerships with universities and research institutions will be important to FAO's work on AMR.
66. Closer collaboration and better communication between FAO and its network of Reference Centres, other research and development institutions and FAO Members should also help accelerate research into a number of scientific knowledge gaps on AMR. Crucial in this regard is to understand the extent and purpose of various forms of AMU in crop agriculture and forestry, so that these can be given due attention in FAO's future work. In addition, more research needs to be done on practices suitable for small- and medium-scale farmers. This includes using new and improved vaccines and alternatives to antibiotics to enhance productivity. In view of the human dimension of the behavioural change required to combat AMR, more research into the socioeconomics and governance elements of AMU in the value chain is vital to develop more effective and sustainable measures. With limited resources, it will be important that activities and outputs can focus on high-risk situations identified through scientifically sound risk analysis and assessment. FAO can be a strong catalyst in promoting such research and using its outputs to inform policymaking.

3.2.3 Alignment of FAO's AMR activities within the Organization

Finding 8. Although the FAO-AP for AMR aimed to operate "within the parameters of the FAO Strategic Objectives", the evaluation team found no evidence that this was effectively achieved. It did prove a positive stimulus for closer interdepartmental coordination, especially the ad hoc interdepartmental AMR-WG. However, research for the evaluation suggests that all relevant divisions and departments still need to be fully aligned through greater internal coordination and awareness of AMR.

67. The FAO-AP's links to the FAO Strategic Programme, Strategic Framework and Strategic Objectives have changed over time, though with limited clarity. For instance, the FAO-AP states that it will "ensure that all relevant parts of the Organization, at headquarters, regional and country levels, are actively engaged and coordinated in promoting work on combating AMR, within the parameters of the FAO Strategic Objectives". However, the document does not confirm into which specific SOs AMR should be embedded. Over time,

there has been some indication in FAO Programme of Work and Budget documents, linking AMR to SO4 and SO5 in 2015 and to all five Soss in 2019 (FAO, 2015d; FAO, 2019c). The September 2016 update to COAG on FAO's Work on AMR states that "strategically, [AMR] has been fully embedded into the 2016–2017 workplans of FAO's Strategic Programmes with clear milestones and expected results at global and country levels commensurate to the available resource" (COAG, 2016). However, FAO's Reviewed Strategic Framework and Outline of the Medium-Term Plan 2018–21, presented to the 155th session of the Council in December 2016, mentions AMR only very briefly in the context of SO2 (FAO, 2016b).

68. FAO personnel in various divisions and departments made clear in interviews that FAO's AMR work is generally seen as not being fully embedded in the Organization's Strategic Framework. This was considered a sign of limited commitment and a serious disadvantage when it came to allocating regular budget funding to the area of work. With the FAO-AP and the Revised Strategic Framework being developed almost simultaneously in 2016, FAO's work on AMR could and should have been more embedded in the Framework. As mentioned,, these linkages are not very clear either in FAO-AP2.
69. The FAO-AP and other high-level documents acknowledge AMR as a cross-cutting issue requiring a multidisciplinary solution and a One Health approach, but application has proved slow, with FAO yet to achieve full multidisciplinary participation. The 2011 Strategic Action Plan for One Health was very animal health focused and failed to mention AMR as one of the most important and best-suited candidates for this approach (FAO, 2011). Admittedly, the Strategic Action Plan was prepared some years before the rise to prominence of AMR and the FAO-AP, but with hindsight, it was an opportunity missed.
70. FAO has been addressing other crucial cross-cutting issues, such as climate change and ocean management, through specific multisectoral programmes, but has not yet been able to approach AMR in the same way. The FAO-AP has proved a positive stimulus for encouraging closer interdepartmental collaboration, especially the AMR-WG, based on a review of the group's meeting minutes. Similarly, in selected Regional and Country Offices, there is evidence of interdepartmental collaboration between ECTAD, Food Systems and Food Safety, and Fisheries on issues such as antimicrobial residues and guideline development. Nevertheless, interviews and project reports suggest that a full One Health approach on AMR, including plant health, forestry, soil and water, is still nascent and that FAO needs to make greater effort, including better coordination and increased internal awareness of AMR and the threat it poses.

3.3 Effectiveness

3.3.1 Results to date

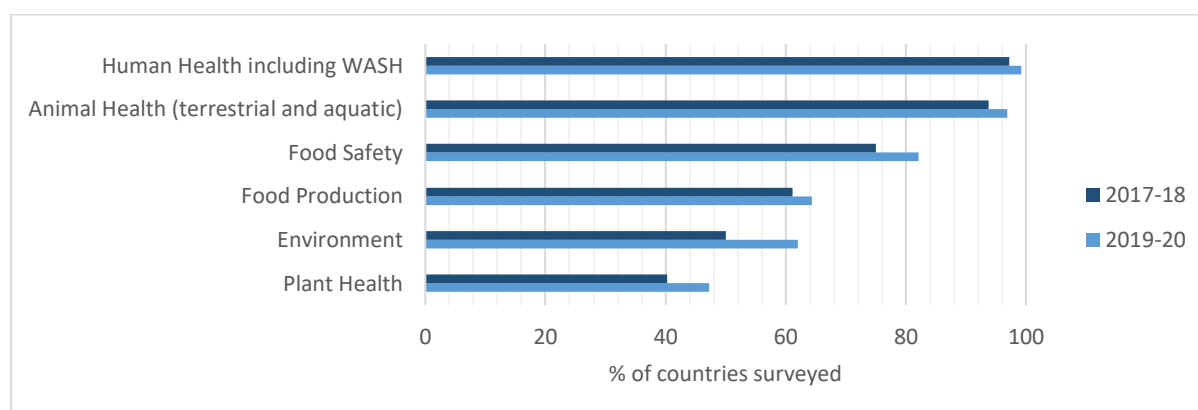
Finding 9. FAO, along with OIE and WHO, has played a major role in developing and implementing AMR NAPs, helping to set in motion or strengthen work on AMR at national level. However, overall NAP implementation and multisectoral collaboration on AMR remain a challenge. FAO has, therefore, developed useful tools and supported national One Health coordination units. There has been an increase in multisectoral coordination on AMR, but the tools are recent introductions and it is too early to assess their effectiveness.

71. FAO has supported the development and implementation of cross-sectoral NAPs on AMR, together with WHO and OIE. The aim of the NAPs is to combat AMR through nationally coordinated efforts in different sectors. They can be traced to the sixty-eighth World Health

Assembly of 2015.²⁰ FAO support has included a manual (with WHO and OIE) for NAP development (FAO, OIE and WHO, 2016) and the provision of technical assistance to ministries at national level, primarily in the food and agriculture sectors. TrACSS, jointly administered by the three organizations, has been central to monitoring. A measure of the Tripartite's work has been a significant increase in the number of NAPs over the FAO-AP period of 2016–2020, from 79 countries in 2016/17 to 120 countries in 2019/20 (FAO, OIE and WHO, 2018b). The increase cannot solely be attributed to Tripartite support, as some were developed independently. Nevertheless, all stakeholder groups interviewed by the evaluation team consider these plans to be an important first step in combating AMR and to form a strong basis for future work at national level (WHO, 2015; IACG, 2019).

72. Even though there are 120 countries with an NAP, according to data for 2019/20, only 23 percent of those NAPs have “funding sources identified, are being implemented, and have relevant sectors involved with a defined M&E process in place” (FAO, OIE and WHO, 2018b; Orubu et al., 2020). The evaluation team identified similar implementation challenges in the case-study countries. The lack of resources was a recurrent issue hampering the implementation of NAPs (Peru, Armenia and Ukraine). In Zimbabwe, interlocutors flagged limited or insufficient ministerial expertise on AMR, including within the national intersectoral group on AMR. Similarly, in Peru, the perception was that the AMR NAP had not been fully implemented due to a lack of financial resources on the animal health side.
73. Many countries have also faced challenges in achieving multisectoral collaboration for the implementation of NAPs. Figure 3 shows the involvement of different sectors in developing NAPs, based on data collected from TrACSS. On average, only 50 percent of the NAPs engaged the food production, environment and plant health sectors. Their exclusion in AMR activities was also evident in the results of the global survey for this evaluation, with only 53 percent of respondents saying their ministry of environment was involved in AMR work and only 32 percent saying their ministry of education was involved. Moreover, in some countries, the various sectors worked in silos, with limited coordination.

Figure 3: Sectors actively involved in developing and implementing AMR National Adaptation Plans (NAPs)



Source: Created by the evaluation team based on data from TrACSS.

* Note: Countries that had developed NAPs or were in the process of developing them are included in the figure.

74. In addition to project activities, FAO has helped to address collaboration issues by supporting the setup and strengthening of One Health platforms, such as in Armenia and

²⁰ The country AMR NAPs are available through a FAO repository, the FAOLEX online database.

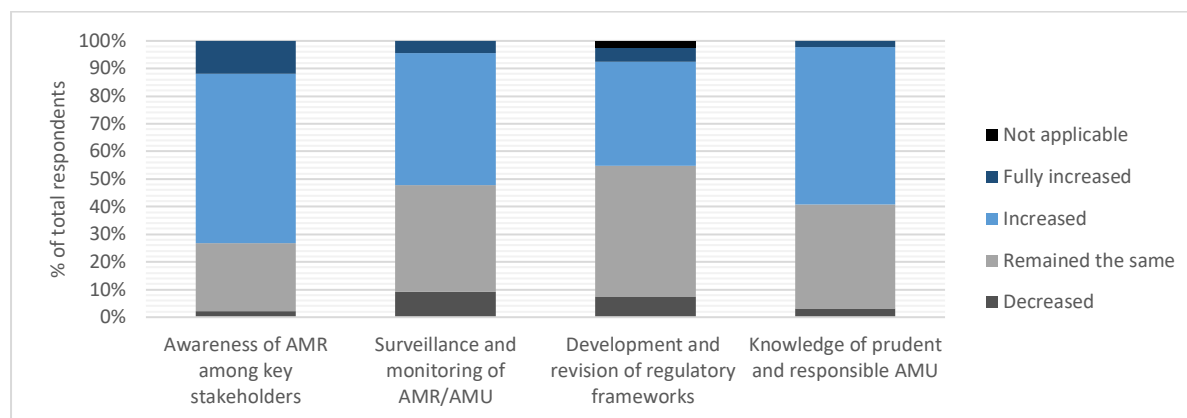
Bangladesh. These platforms have met regularly to discuss and share information and coordinate on specific NAP areas, such as surveillance. Along with Tripartite coordination, the platforms have enhanced the sharing of information between different ministries. Other FAO projects, such as Africa Sustainable Livestock 2050 (ASL2050),²¹ have also brought together representatives from ministries of agriculture, environment and health to coordinate greater collaboration. However, their institutionalization, functionality and operational capacity vary from country to country, as we discuss in Section 3.7.2.

75. FAO's role in strengthening national One Health platforms is further underpinned by the results of the global survey conducted for this evaluation, where 20 percent of government counterparts particularly listed FAO's work on One Health platforms as its most important contribution to tackling AMR. TrACSS results also show the increasing involvement of sectors such as environment, plant health and food safety. However, as seen in Figure 3, the gap between these sectors and human and animal health remains significant. Also, at national level, in countries such as Zimbabwe, FAO has collaborated with the Tripartite and other organizations²² to provide support for a situational analysis on developing the NAP.
76. As having a NAP is not sufficient in and of itself, FAO has provided additional support to put the plans into operation. To ensure their implementation, FAO has developed comprehensive tools, which are currently being tested and implemented. The FAO-PMP-AMR, for example, aims to help countries operationalize their NAPs by making step-by-step improvements towards the sustainable AMU and management of AMR (FAO, 2021c). The tool was first piloted in Ghana in March 2019 and is now being used by multiple countries. A similar approach has been specifically designed for aquaculture biosecurity (PMP-AB) (FAO, 2018c). Countries are also supported with guidance and capacity-building on the use of such tools to enhance the implementation of their NAPs. The evaluation team has assessed the utility of these tools based on discussions with numerous stakeholders and found them to be comprehensive. However, as they are a very recent development, it is too early to identify concrete results.
77. The FAO-AP and its four focus areas tie FAO's support for the development of the NAPs to FAO's country-level projects and headquarters work on AMR. The evaluation team mapped FAO's AMR work (Appendix 2), drawing on the FAO-AP and inputs from teams working on AMR. The following sections use this map to assess the results of FAO's work on AMR in the four focus areas. Figure 4 tabulates the survey responses of FAO personnel and government counterparts on changes observed in the focus area results. On average, around 40 percent of respondents reported no change over the five-year period. Most changes were observed in "awareness of AMR among key stakeholders", or focus area 1. The results were consistent across FAO regions.

²¹ ASL2050 investigates factors that will shape future African livestock, such as population growth, changing consumer preferences, technological acceleration, climate change, big data and greater global connectivity, to generate evidence on emerging livestock-related opportunities and challenges for society (FAO, 2021b).

²² In the case of Zimbabwe, these include the Centre for Disease Dynamics, Economics and Policy, the Global AMR Partnership, and Action on AMR.

Figure 4: Global AMR survey: Changes observed in results associated with the four FAO AP focus areas over the past five years



Source: Created based on results of the AMR survey conducted by the evaluation team.

* Note: There were 93 survey responses in total from 35 countries with FAO AMR projects.

Focus area 1: Improve awareness of AMR and related threats

Finding 10. FAO's activities have helped to improve awareness of AMR among national stakeholders. Its activities have been guided by baseline surveys to ensure their suitability. However, direct users of antimicrobials and those who consume products grown using them have not been targeted at scale. To optimize AMU, these groups must be systematically engaged. The FAO-AP2 includes activities focused on behavioural change and involving civil society, both of which are critical to achieving results in this focus area.

78. FAO has helped to improve awareness of AMR by supporting the development of awareness-raising components of NAPs or by working directly with key stakeholder groups, such as farmers, veterinarians and extension workers. As identified in the results chain (Appendix 2), the activities are expected to improve understanding of the threats posed by AMR and to change the practices of the stakeholders in question, eventually reducing the need for AMU. Key activities associated with this focus area include the development of training materials, technical publications, videos and guidelines for the design of awareness campaigns based on stakeholder assessment. FAO has also made significant contributions to global awareness campaigns along with WHO and OIE, such as WAAW, as well major national, intergovernmental and sectoral meetings.²³
79. In a number of countries FAO has supported the establishment of regional and national multisectoral One Health platforms that have been instrumental in raising awareness on AMR within government. These have also increased the coordination and sharing of information between ministries and other key stakeholders. Key examples are the Bangladesh AMR Response Alliance, which is actively involved in disseminating information on AMR risks, and the AMR coordination groups studied by the evaluation team in Kenya, Ukraine and Zimbabwe. Government counterparts in countries that were not among the case studies for this evaluation have noted similar FAO support on One Health platforms, for example, in Bolivia, Ethiopia and Sri Lanka. However, in some countries, technical inputs have not fully reflected the multisectoral nature of the One Health approach. For example, in Peru, the intersectoral committee is largely composed of members focused on human health, which affects information flow to and the participation of other sectors on AMR.

²³ The WAAW activities have been implemented by FAO in countries beyond the 45 covered by FAO's AMR projects through its existing capacities.

Furthermore, according to the evaluation of EPT-2, their institutionalization, functionality and operational capacities have varied (FAO, 2021d). In Kenya, for example, a joint One Health secretariat has made significant contributions to work on zoonotic diseases, a One Health approach to AMR will need to be taken on board at institutional level for operational links between sectors to be coordinated and effective.

80. FAO has also supported the development of national communication strategies for awareness-raising in selected countries.²⁴ These have followed a One Health approach and provided guidelines on the development of messages, the selection of channels and the targeting of priority audiences. FAO has conducted AMR risk communication training with government officials at regional level, facilitated by RAP and RLC in their respective regions. The evaluation team found the FAO AMR awareness-raising and risk communication materials shared with government counterparts to be of good quality. In Armenia, journalists have been brought into the campaigns to better communicate AMR risks to the general public. At the regional level, FAO has facilitated regular consultations with the AMR focal points of the Association of Southeast Asian Nations (ASEAN) Communication Group for Livestock, enabling countries in Southeast Asia to refine their AMR communication and advocacy strategies. A number of non-FAO interlocutors have provided positive feedback on the material, including the website and the AMR newsletter. Selected material was also assessed by the expert panel set up for this evaluation (more details on which can be found in Section 3.3.2).
81. Separately, FAO has targeted veterinary students and veterinarians for awareness-raising activities. The FAO Regional Office for Asia and the Pacific has collaborated with the Southeast Asian One Health University Network on AMR training for students. In Bangladesh and Zimbabwe, FAO's projects have included contributions to national veterinary curriculums to raise AMR awareness among students. In other countries in the SADC region, FAO is working to harmonize AMR-related aspects of veterinary degrees. In Viet Nam, FAO is working with the Veterinary Association and OIE to raise veterinary students' awareness of AMU and AMR and to share best practices for making livestock producers aware of the legal implications of misusing veterinary drugs. In Peru, FAO has trained lecturers at universities offering degrees in veterinary medicine to promote responsible AMU (Congreso de la República del Perú, 2018). It is also engaging directly with veterinarians on AMR through national veterinary associations. The evaluation team noted examples from Ghana and Malaysia from key informant interviews and the document review.
82. FAO's awareness-raising work also has been guided by good knowledge of stakeholders, which it gains from surveys and other baseline studies. It has conducted such surveys in West Africa and in REU countries to assess the extent of AMR knowledge and stakeholder preferences for guidance and targeted advocacy materials. Also, FAO's Knowledge, Attitudes and Practices (KAP) surveys have allowed it to tailor its awareness-raising activities. These surveys have been conducted in collaboration with local non-governmental organizations (NGOs) or universities in seven countries in Sub-Saharan Africa and three countries in Asia,²⁵ targeting a range of stakeholders from food producers and pharmaceutical sellers to veterinarians and para-veterinarians.

²⁴ National Communication Strategy on Prevention and Containment of Antimicrobial Resistance, launched in Kenya in November 2018.

²⁵ Cambodia, Ethiopia, Ghana, Kenya, the Lao People's Democratic Republic, Sudan, the United Republic of Tanzania, Viet Nam, Zambia and Zimbabwe (COAG, 2020).

83. However, even though FAO has been able to inform national government stakeholders and prepared appropriate materials, awareness levels remain low among stakeholders that use antimicrobials directly. Of the five case-study countries, only Viet Nam and Zimbabwe had engaged directly with farmers on AMR. Government interlocutors in Zimbabwe perceived small farmers' awareness levels to be low. In Viet Nam, though farmers that participated in FAO training said their awareness had been raised, they were receiving competing and non-compatible information from other channels, including drug suppliers. The overall result on sustainable AMU was found to be low. Additionally, farmers that were aware of AMR were not knowledgeable about the transmission of AMR between humans, animals and the environment. In Armenia and Ukraine, the FAO and national authorities had raised awareness of AMR among larger cooperatives of commercial producers, but had relatively little engagement with smaller farmers, which was seen as an important future activity.
84. Moreover, FAO has generally failed to engage consumers in its awareness-raising activities and the economics of the burden of AMR are largely lacking from its arguments. The evaluation team has only seen one example of FAO engaging with consumers of products grown using antimicrobials. In Viet Nam, FAO has worked with WHO to raise public awareness of AMR in livestock. The campaigns have included press conferences with journalists from television networks, radio and photo essays. In Armenia, awareness campaigns target farmers as AMU users and journalists to improve their understanding of AMR, so that they can communicate AMR risks to the general public more effectively. However, no major activities in the other case-study countries targeted consumers. Furthermore, a review of the awareness-raising material and project documents showed that information on the economic burden of AMR featured only rarely. There are sound economic arguments for changing farming practices, but these are insufficiently developed to be effective, possibly because of the limited research available on the subject. The need to make stronger economic arguments is envisaged in FAO-AP2.
85. A crucial link between the awareness-raising activities and the optimal use of antimicrobials is a change in farming practices. The KAP study in Viet Nam noted that farmers were aware of AMR, but that this had not translated into lower AMU, due to their reliance on antibiotics to ensure livestock productivity (Pham-Duc et al., 2019). FAO has been addressing this in communication activities that draw on behavioural insights. However, this work is still in its early stages and relies entirely on extrabudgetary funding. A few initiatives, such as the AMR Behaviour Change Community of Practice, were launched during WAAW 2020. FAO-AP2 also suggests a few specific activities focused on the use of behavioural insights to change practices. In Viet Nam, the FAO Country Office developed guidelines for animal health workers and collaborated with Oxford University Clinical Research Unit to develop educational videos and a roadshow for drug-shop owners and pharmacists to promote responsible AMU (FAO, 2020d). The latter also involved the local government, which acted as facilitator for the target audience. However, these activities were all conducted in 2020, so their impact has yet to be assessed.
86. Similarly, consumer pressure resulting from consumer awareness could be an important way of changing farmer practices. This would, of course, vary from country to country, and the KAP studies should help FAO to select and tailor its approach. There have been some changes in behaviour noted by the evaluation team, however, these have been driven solely by the demands of importing countries. For example, in Ukraine, assisted by FAO, larger poultry-farming cooperatives have begun to move to fewer or no antimicrobials to market their produce in the European Union. Similarly, in South America, seven countries are part

of a Tripartite project working to produce “safe meat” to be imported to the European Union. The project focuses strongly on a One Health approach.

Focus area 2: Develop capacity for the surveillance and monitoring of AMR and AMU in food and agriculture

Finding 11. FAO has developed and successfully rolled out its tool for assessing in-country AMR surveillance capacity and, where funding has allowed, worked to improve national capacity. Active AMR surveillance remains a challenge, however: in most countries, FAO’s work is not generating the quality data needed to build evidence. Also, while some pilot surveillance projects have been implemented across the One Health spectrum, including in fisheries, environment and food safety, most are focused on livestock and poultry. Scaling up support for a comprehensive One Health approach to surveillance systems that produce quality data on AMR at national level is an urgent challenge for FAO.

87. FAO’s work in this focus area is important, as it will help generate the data evidence needed to convince stakeholders of the risks of AMR and to change AMU practices.²⁶ It predominantly involves the collection of data on AMR through improvements in national laboratory capacity and support for integrated surveillance systems.
88. In this context, FAO has developed ATLASS to assess the strengths and weaknesses of national laboratory and surveillance capacity on AMR. The tool has been valuable in identifying gaps in national capacity and was greatly appreciated by government counterparts in the case study countries. In some countries, ATLASS has also been used to track national progress. As of September 2020, FAO had conducted baseline ATLASS missions²⁷ in 28 countries, covering more than 100 laboratories (see Figure 5), culminating an ATLASS report for each country. These form the basis for targeted training and the prioritization of activities to strengthen national laboratory and surveillance capacity. The ATLASS reports belong to the respective countries and are confidential, so their data could not be used for this evaluation. Still, the evaluation team reviewed a few reports made available to it and they were found to be comprehensive, with a clear focus on the technical issues associated with laboratory networks and surveillance systems, along with actionable short- and medium-term recommendations for each.
89. To scale up its ATLASS work and to ensure harmonized surveillance, FAO is also building a global community of assessors to serve as a technical resource for further assessments within countries and regions. Regional training sessions in Africa and Asia have reached out to 118 experts from 48 countries to date. The training events are designed to meet national needs and include the development of technical capacity on molecular techniques for AMR surveillance and assessment methodologies (COAG, 2020). The FAO Reference Centre for AMR in Chulalongkorn University, Thailand has started to use ATLASS, with members of the Reference Centre as assessors. Other Reference Centres are also being given training. FAO’s work on ATLASS has been conducted in close collaboration with national networks and organizations and coordinated with that of WHO and OIE to avoid duplication. It is supported by the Fleming Fund, the Russian Federation and USAID.

²⁶ Please see the results chain in Appendix 2 for more details.

²⁷ These are generally week-long missions conducted by external assessors, focused on collecting baseline information. It is recommended that these assessments be followed up by annual assessments conducted by national assessors to track progress. See FAO (n.d.c) for more details.

Figure 5: Map of countries with Assessment Tool for Laboratories and AMR Surveillance Systems (ATLASS) assessment missions



Source: FAO (n.d.c); Last updated 31 May 2020. Modified to comply with *UN. 2020. Map of the World.*

90. Stronger laboratory and surveillance capacity is a key focus of regional and country projects. In Zimbabwe, where FAO is implementing the country-level Fleming Fund project, AMR testing capacity has been strengthened in 14 government laboratories associated with different ministries. Similarly, the Regional Office is participating in online webinars on AMR surveillance in Peru on the application of molecular techniques and the use of medicated feed, through a regional project supported by the European Union. Through AMR projects in Asia, the Aquaculture unit at headquarters and the AMR team in RAP have played a prominent role in promoting AMR surveillance in aquaculture. In Viet Nam, FAO's work has led to the initiation of AMR surveillance in aquaculture in two provinces through the global Fleming Fund project. FAO has further bolstered national capacity by supplying equipment and resources for AMR testing and surveillance. For example, in Armenia, through the regional project funded by the Russian Federation, FAO is providing laboratory equipment and reagents. In Zimbabwe, FAO has done the same through the Fleming Fund project.
91. FAO is developing a platform for the management and use of AMR data collected through in-country surveillance, building on RAP's successful adaptation of WHO software WHONET.²⁸ This data platform uses WHONET as a template to ensure the harmonization of data collection through integrated surveillance. In Armenia, a database has been created to collate AMR data with REU support. A major constraint on the development of these databases is the sensitivity surrounding access to national AMR data. FAO and non-FAO interlocutors observed that countries might be reluctant to share AMR data because of the potential significant implications for trade, particularly if they are major food exporters or are looking at international trade opportunities. An alternative being explored is to allow countries to report national surveillance data in a confidential manner to the AMR platform and to report the same data publicly in combined regional reports to protect their anonymity.
92. Even though FAO has made progress on strengthening laboratories through its ATASS missions and capacity-building initiatives, active AMR surveillance is still in the preliminary stages in most countries. More needs to be done on routine testing and reporting to be

²⁸ Within the Tripartite to avoid overlap, FAO is focusing on AMR data collected through multiple surveillance systems, whereas the OIE is focusing on the AMU data collected mainly through national statistics.

able to generate the evidence needed. Globally, an increase in the levels of data collection and sharing on AMR is not yet evident. Apart from the few countries where FAO has supported the implementation of pilot AMR surveillance projects, there is a lack of AMR surveillance in the food chain and limited laboratory capacity. This was noted in the global survey conducted for this evaluation. As seen in Figure 4, only 52 percent of respondents from 35 countries reported improvements in AMR surveillance and monitoring, while only 4 percent reported a full increase in capacity. The 4 percent were in countries that participated in major activities implemented through the Fleming Fund and USAID-supported projects. Field interviews conducted by the evaluation team and key informant interviews at global level confirmed that countries were far from having consistent surveillance and testing, mainly due to resource constraints.

93. Moreover, much of FAO's support for AMR monitoring and surveillance has focused on terrestrial animals and some countries have struggled to use standardized approaches in different sectors. AMR crop and environmental surveillance was found to be very limited in four of the five case-study countries. Zimbabwe was the exception, where environmental surveillance work was conducted in collaboration with WHO through the 'Tricycle' project. 'Tricycle' aims to develop harmonized surveillance capacity at country level, so that outputs can be compared within and among countries (WHO, 2016). Similarly, a review of Tripartite documents showed integrated surveillance activities with WHO and OIE in Indonesia. However, surveillance across the One Health spectrum still needs to be harmonized.

Focus area 3: Strengthen governance related to AMU and AMR in food and agriculture

Finding 12. FAO has provided substantial governance support to countries involved in its work on AMR, for example, through legal assessments and assistance to policymakers, following a multisectoral and One Health approach. However, for FAO to contribute to optimal AMU, the assessments need to spur changes in legislation. Greater support for regulatory enforcement is also required. Nonetheless, the evaluation team deems this work a key preparatory step in reducing AMR at country level.

94. Focus area 3 is associated with analysis and support for better integration of AMR into national policies, institutional and legal frameworks. Within this focus area, FAO has provided significant inputs to assist in the development and improvement of appropriate national legislation to strengthen the governance of AMU. This has come in the form of a specific methodology for assessing AMR-related gaps in national legislation and the provision of advice and assistance to address them by FAO's Development Law Branch (LEGN). Part of this work has been carried out in close collaboration with OIE and is considered a good example of collaboration between the two Tripartite members. Furthermore, it is linked to other work carried out by FAO on setting international reference standards and good practices, in particular, its support for the standard-setting work of the Codex Alimentarius Commission and the International Plant Protection Convention (IPPC), which are benchmark standards for food safety and plant health under the World Trade Organization Agreement on the Application of Sanitary and Phytosanitary Measures, and the development of the International Code of Conduct on Pesticide Management with WHO.
95. Countries perceive LEGN's assessments of their AMR legal frameworks (together with national law consultants) to be highly valuable in detecting gaps in their legislation. They have also made a direct contribution to the governance components of AMR NAPs. Preliminary assessments of national legislation have, for the most part, led to FAO and OIE collaborating with the host countries to develop new legislation. In Viet Nam, where the plan

is to ban prophylactic mass use of antibiotics in livestock by 2025, FAO has supported the enforcement of the ban on antibiotics as a growth promoter by providing technical inputs to a legal circular for drug companies and stores. This should help boost legislative enforcement. In Armenia and Ukraine, with widespread over-the-counter sales of antimicrobials, LEGN's assessments pinpointed gaps in regulation on their sale. In Ukraine, LEGN's work also helped to define AMR for use in national legislation; the Government of Ukraine is working to align its legislation with that of the European Union for trade purposes. The evaluation team also reviewed selected LEGN assessment reports and the methodology used. They include an analysis of the full antimicrobial lifecycle from manufacture and advertisement to sale, use and disposal. The assessments acknowledge key sectors involved in the antimicrobial lifecycle and contribute to greater One Health collaboration by covering environment, soil and waste, water quality and pesticides in addition to animal health.

96. The legal framework assessments have added value by increasing policymaker interest in the significance of AMR issues and boosted their confidence to strengthen associated legislation. Interviewees noted that in Peru, the review of AMR legislation conducted by FAO contributed to the final agreement of new legislation to ban the use of colistin (polymyxin E) in animals. Similarly, in Ukraine, new laws, developed with FAO's support, are going through parliament and are deemed to be an essential first step in the country's campaign to combat AMR. In Armenia, the need for legislation banning AMU for growth promotion has been identified, while Viet Nam plans to ban preventive mass use of antibiotics in livestock by 2025. Through the workshops and discussions held for these assessments, FAO helped to raise awareness of AMR among national stakeholders. For example, the workshop held to validate the Ghana AMR legislative report was attended by 35 external participants, including the heads of four key ministries, their legal advisors and representatives of the Ghana AMR platform, OIE and WHO.
97. Even though stakeholders view FAO's work in this focus area as an essential step towards future AMR reduction, awareness and enforcement levels of new regulations need to be improved for the work to effectively contribute to sustainable AMU. These observations are based on the evaluation team's analysis of data from interviews with farmers, veterinarians and extension workers in Viet Nam and Zimbabwe. Further, FAO has only provided enforcement support for regulation in one of the five case-study countries. It is, therefore, not yet feasible to properly assess the impact of FAO's work on legislation.

Focus area 4: Promote good practices in food and agriculture systems and the prudent use of antimicrobials

Finding 13. FAO has developed important AMU guidelines and conducted AMR outreach activities for farmers, supported by other FAO projects promoting biosecurity and good farming practices. In two countries analysed, FAO's activities were successful in fostering a better understanding of AMR, though there was limited evidence of their effectiveness in reducing AMU. Moreover, as the work on raising awareness and generating evidence is still in the early stages and the work on governance requires enforcement support, there is limited momentum for changes in farming practices and AMU. Building economic arguments for AMR reduction and finding alternatives to AMU are deemed critical to achieving future results in this focus area.

98. Focus area 4 is closely linked to the first three focus areas, all of which are designed to provide the impetus for producers to engage in better farming practices and support the prudent use of antimicrobials. FAO's activities in this focus area have consisted of support for the research and development of AMU guidelines and farmer outreach activities.

99. FAO has adopted approaches that are tailored to the context of and socioeconomic factors associated with antimicrobial use. It has conducted or commissioned studies into how farmers perceive AMR and what they consider important for changes in AMU (Caudell et al., 2020; Pham-Duc et al., 2019). A major component of this work is FAO's KAP reports,²⁹ also used for awareness-raising work in focus area 1. The reports have been compiled in close collaboration with relevant stakeholders, such as the International Centre of Research in Agronomy for Development (CIRAD) in Cambodia and the College of Veterinary Medicine and Agriculture of Addis Ababa University in Ethiopia. The Ethiopian KAP report, for instance, was used to provide training on mastitis management in dairy cattle and to minimize inappropriate AMU. The Zimbabwean KAP study on the poultry value chain revealed a lack of AMR knowledge at farmer level. To bridge this gap, FAO is using its farmer field school (FFS) model to provide training on responsible AMU and biosecurity. Similar FFS activities are being trialled in Viet Nam and considered in Armenia (implementation in Armenia has been delayed by the COVID-19 pandemic). Because of the limited sample of farmers interviewed in Zimbabwe, it was not possible to ascertain the effectiveness of FFS AMR activities in these communities. Still, the few farmers interviewed said the training had raised their awareness of AMR issues, good farming practices and responsible AMU. Follow-up work is needed, however, to assess the FFS impact on AMU.
100. FAO has supported the development of AMU guidelines and production practices and provided associated training. In Viet Nam, FAO has completed technical guidelines for pig and poultry production and delivered corresponding training courses on biosecurity and prudent AMU (FAO, 2020d). In Bangladesh, FAO is collaborating with OIE to develop AMU guidelines for aquaculture. A workplan on the topic was developed at a workshop organized by WorldFish in early 2019. Guidelines on prescribing antimicrobials and/or good husbandry practices are at various stages of development in Cambodia, Ethiopia, Ghana, Kenya, the Lao People's Democratic Republic, Sudan and Viet Nam. FAO has also been encouraging the uptake of these practices and AMU guidelines through its FFS model and direct farmer training. In Bangladesh, FAO and Spectrum Mobile Health Incorporated have launched the BARA Manush (human) and Murgi (poultry) smartphone applications, providing clinical guidelines and antimicrobial and pathogen information for prescribers.
101. Moreover, FAO's other projects to promote prevention and control, biosecurity and good farming practices have reinforced its work in this focus area. In Ukraine, the good farming practices promoted by FAO to tackle African swine fever have contributed to a reduction in AMU across the country (FAO, 2018d). Similarly, FAO's EPT-2 programme activities promote biosecurity, sanitary standards and vaccination campaigns to prevent avian influenza in 36 countries in Africa and Asia. The extent to which these activities have also had an impact on AMU remains to be seen.
102. The results in focus area 4 will depend on the uptake of AMU guidelines and farming practices, which should translate into changes in levels of AMU. All farmers interviewed by the evaluation team in Viet Nam and Zimbabwe that had taken part in FAO training courses had applied biosecurity measures and reported a decrease in clinical diseases in their enterprises, reducing the need for therapeutic AMU. However, in both countries, farmers have continued to use antimicrobials for preventive use. In most cases, this could be down to the unavailability or high cost of suitable vaccines compared with antimicrobials. The evaluation team found only limited evidence that FAO had engaged with vaccine producers to increase vaccine availability and affordability for small and medium-sized farmers in its

²⁹ These surveys were conducted in seven countries in Sub-Saharan Africa and three countries in Asia.

target countries with a view to reducing AMU. As part of the Fleming Fund country grant for Zimbabwe, to be implemented by a FAO-led consortium, there are plans to increase production of a vaccine for East Coast Fever (caused by *Theileria* spp.) in cattle, thereby also reducing the widespread reliance on antibiotics (especially tetracyclines) to control the disease. Moreover, the numbers of farmers engaged in FAO AMR activities is relatively small compared with the total farmer population. For greater uptake of AMU guidelines and farming practices, more stakeholders need to be engaged.

103. Among the farmers interviewed in Viet Nam and Zimbabwe, there were mixed views on the potential for antimicrobial-free farming, with concerns over risks associated with limited antimicrobial use. In Zimbabwe, although farmers appreciated benefits that improved biosecurity and good farming practices brought to their poultry production units, they were concerned about the potential costs associated with lower levels of AMU. Furthermore, biosecurity was less applicable to their cattle rearing, which involves sharing communal grazing lands with other farmers' herds. Still, the Zimbabwean farmers said they were now more aware of AMR and that their compliance with recommended withdrawal periods for meat and milk after using antimicrobials had improved.
104. Information analysed by the evaluation team indicates that switching livestock production systems from a high dependency on antimicrobials to prudent AMU can involve significant initial costs depending on the practices adopted. For example, in Ukraine, it took large commercial farmers about two years to adapt to antimicrobial-free farming practices and return to profitability. A review of external literature suggests that these high costs make it even more difficult for smaller producers to change practices (Carminati, 2020; Osbjør, 2020). FAO's KAP studies in Asia and Africa confirm that most farmers are reluctant to try new techniques without a guarantee of economic viability (Caudell et al., 2020; Pham-Duc et al., 2019). Currently, antimicrobial-free foods, are more expensive to produce and to purchase than their non-organic counterparts and still part of a niche market in many countries. Hopefully, an increase in demand for healthier foods and AMR awareness among consumers will lead to changes in behaviour and practices. An economic justification for reducing AMU and/or the engagement of consumers are, therefore, factors that could contribute to FAO's effectiveness in this focus area. FAO has recently started to engage in such issues through the FAO AMR Behaviour Change Community of Practice.

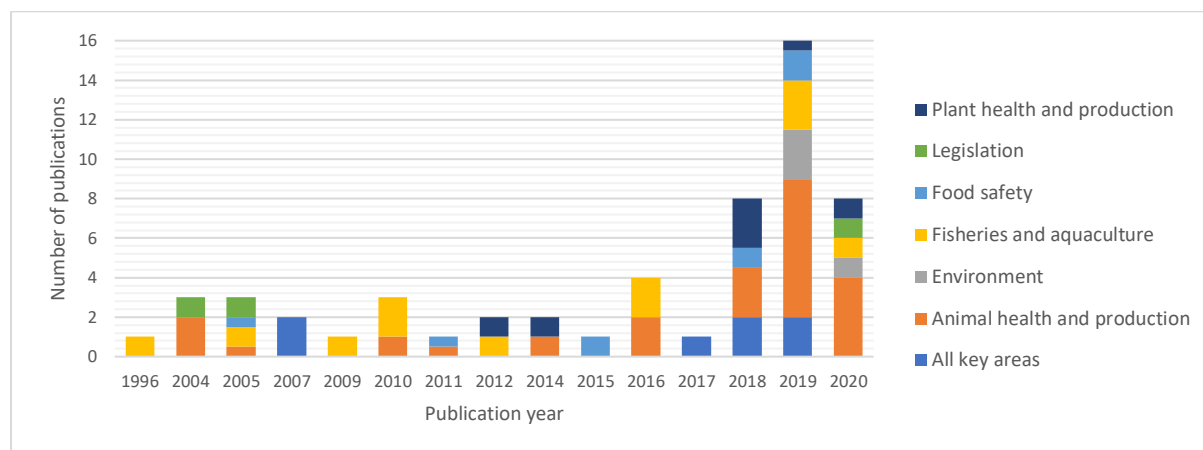
3.3.2 Quality of FAO's AMR publications

Finding 14. FAO's publications on AMR are an important output of its work. These provide a scientific basis for FAO's AMR activities and technical advice for stakeholders. The expert panel believes the Organization's publications to be relevant and of good quality, especially those by the Regional and Country Offices. Still, given the evolving nature of the AMR threat, FAO needs to continue to engage with its partners across the One Health spectrum on scientific and technical work and to regularly update its publications.

105. One of FAO's significant outputs on AMR is its provision of technical advice in the form of guidelines, manuals and good practices at the global, regional and national level, based on appropriate research where necessary. The evaluation team assembled a list of 56 FAO publications on AMR that were available online or easily accessible (last updated in September 2020). A rapid appraisal of the documents shows FAO's growing collaboration with the Tripartite organizations, universities and research centres to strengthen its scientific base on AMR. A significant proportion of them (around 25 percent) have been published with WHO and OIE and the total number of publications on AMR has increased significantly since 2015, coinciding with the development of the FAO-AP. However, the

increase is mostly down to publications on AMR in animal health and production. There have been consistent publications on AMR in the context of aquaculture and food safety over the years. Those on AMR in the environment and plants are more recent, with the exception of two sets of guidelines on AMR in plants in 2012 and 2014.

Figure 6: FAO AMR publications by year



Source: Evaluation team's analysis of FAO publications.

106. From the 56 publications, the external expert panel reviewed a sample of 18 published since 2016 to assess their relevance, overall quality (including methodological rigour, comprehensiveness of the narrative, referencing and collaboration) and innovativeness. It also reviewed the FAO-AP. More details on the process and methodology, along with the assessments made, can be found in Annex 3. The assessment showed that FAO's publications on AMR were relevant in their respective subject areas and of good overall quality. The scores were well balanced between global, regional and country-level publications, though some of the highest scores went to regional publications from RLC and RAP, which is in line with the evaluation team's own assessment. These publications were also highly inclusive of national experience.
107. Nearly 90 percent of the publications assessed received high scores for relevance and were aligned with the outcomes of the FAO-AP. Publications were appreciated for having the potential to inform policymakers and laying the foundation for future AMR activities. Publications based on the KAP surveys and those that characterized the structure of livestock/aquaculture production systems at country level were considered important for gaining a better understanding of antimicrobial use and associated AMR. The experts also cited the relevance of issues covered in recent publications focused on AMR in the environment. However, they noted that some publications required a broader approach that took into account the pharmaceutical industry, animal production industry, citizens associations and future scenarios involving changes in global food production systems. Similarly, in some publications, the socioeconomic and the national contexts needed to be given greater consideration for a more holistic view on AMR issues. Greater coordination between headquarters, Regional and Country Offices in developing these publications could improve their relevance. Moreover, because of the constantly evolving aspect of the topic, FAO needed to emphasize the importance of updating online repositories.
108. Most publications were cited for their high technical quality, with strong evidence-based narratives and recommendations. Certain publication approaches were also deemed to be of high quality, for example, the AMR susceptibility testing proposed for the aquaculture sector. The country-level publications were supported by solid data and context-specific

examples. All publications were observed to have a clear and concise format. However, a few publications scored lower on quality indicators. These lacked references to support findings and had vague recommendations with limited detail on how they were to be implemented. Other issues noted were a lack of standardized terminology across publications and the absence of clear implementation pathways. Some of the publications also required better identification of target audiences to ensure best use of their recommendations and guidelines. External validity of the findings was missing for some publications, which was considered important given the scope of FAO's work.

109. Scores for innovativeness³⁰ were lower than for other aspects of the assessment. This was understandable, as a substantial proportion of documents were guidelines and good practices and, for some publications, the experts confirmed this was not required. Still, a few recent publications on AMR in the environment and in foods of plant origin were considered innovative, as was the incorporation of economic aspects into the KAP surveys. AMR in the environment and plants are also areas where knowledge on AMR is limited, so the publications were appreciated for their effort to bridge important knowledge gaps. Publications that referred to the economic aspects of AMR were considered particularly important, as the issue is often overlooked in work on AMR.

3.4 Partnerships

Finding 15. Because of the need for a One Health approach to AMR, strong partnerships are pivotal to its success. FAO has increasingly engaged with partners on AMR and plans to do more, such as strengthening its Tripartite collaboration through the Joint Secretariat and MPTF mechanism, its work with UNEP and the FAO Reference Centres for AMR. However, these are all relatively new or still being formalized. Within the Tripartite, thanks to its broad mandate, there are opportunities for FAO to play a greater role in food and agriculture. Outside the Tripartite, there are actors across the antimicrobial lifecycle and in the food value chains with which FAO should systematically engage to enhance its work on AMR.

3.4.1 FAO within the Tripartite

110. FAO's key partnership on AMR at global level has been with the Tripartite organizations. All three organizations have their own agendas, but they work together towards common goals on AMR that are aligned with the GAP. Since well before the creation of the Tripartite, FAO and WHO have been collaborating on food safety, particularly through Codex.³¹ The recent establishment of a joint FAO/WHO Centre to coordinate AMR work promises stronger collaboration (FAO, 2020e). There are other long-standing collaborations between FAO and OIE, both of which have animal health in their remit. OIE is responsible for the setting of standards for animal health, including the performance of veterinary services at global and regional level, while FAO has a broader responsibility that includes plant health, soil, water and work at the national level, in addition to technical assistance, capacity-building, emergency support and other livestock-sector outputs, including animal health.
111. Aside from the regular coordination and joint technical meetings,³² there are numerous examples of FAO's collaboration on AMR. It cooperates with OIE by providing data on livestock, which have been used to calculate AMU adjusted by livestock biomass for the OIE's global AMU surveillance programme since 2016 (OIE, 2020). The Tripartite recently

³⁰ Innovativeness was described as the originality of the publication in its aims and objectives.

³¹ The Codex Alimentarius Commission was set up jointly by FAO and WHO between 1961 and 1963.

³² See Appendix 4 for more details on the list of meetings and joint work.

published a technical report, with information on international tools (including legislation frameworks and guidelines) for the production, marketing authorization, supply and use of antimicrobials across human, animal and plant sectors (FAO, OIE and WHO, 2020). It is a welcome development that will enable the Tripartite organizations to identify gaps in current guidance and regulations along the antimicrobial value chain using a One Health approach. Because of FAO's mandate and the gaps noted in the report, it also presents opportunities for FAO to take on a greater role on AMR in the plant, animal and environmental areas.

112. As mentioned in Section 3.3.1, the Tripartite has lent support to countries to conduct situational analyses and to develop and implement their AMR NAPs. The organizations have participated in intersectoral groups and committees on AMR in several countries, including Armenia, Peru, Ukraine and Zimbabwe. These have facilitated interactions and the sharing of information between ministries and stakeholder organizations at the national level and have re-enforced the One Health approach at country level. In Zimbabwe, there have also been efforts to develop online platforms to share One Health data stemming from Tripartite activities in the country. This would allow the sharing of AMR data between sectors and increase the capacity for reporting AMR in the country. In Viet Nam, the Tripartite works closely with other organizations, including donors, universities and research centres through the One Health network, which also addresses AMR. The One Health network is involved in developing training activities to improve One Health collaborations between sectors.
113. At regional level, through the Regional One Health Tripartite mechanisms in Africa and Asia, there are examples of regional AMR programming and coordination to harmonize approaches and delivery. For example, the Tripartite organized WAAW³³ in Africa in 2018 and 2019 and in Asia in 2020. This typically involves a range of awareness-raising activities for various stakeholders, such as farmers, veterinarians, the livestock sector, the general public, healthcare providers and, critically, senior policymakers. In Asia, UNEP is collaborating with the Tripartite on AMR awareness-raising activities at regional level, including annual WAAWs. The evaluation noted the close working relationship between the Tripartite organizations at most regional and sub-regional levels in Asia and Africa, particularly where substantial projects were facilitating significant work on AMR. A good example is Southern Africa, where the Tripartite is significantly involved in combating AMR in Zimbabwe and in developing a new strategic framework on AMR for SADC (FAO, 2019d). FAO and OIE are also working to develop guidance on the use of veterinary products for SADC. RAP, together with OIE, has been engaged in developing regional guidelines on AMU monitoring at farm level and in establishing the FAO-OIE coordination group on AMR. WHO personnel have been based in FAO's Regional Office in Bangkok for closer collaboration. Similarly, RLC was recently involved in establishing a Tripartite project on AMR, supported by the European Union.
114. More recently, the AMR MPTF has presented funding opportunities for joint Tripartite proposals.³⁴ It aims to strengthen collaboration between the Tripartite organizations, per the recommendations of the IACG report. FAO's approved budget as of December 2020 was USD 1.7 million (around 30 percent of available funding). The MPTF has approved a concept note for a joint OIE/FAO project on AMR legislation, which is expected to start in

³³ WAAW has been endorsed by the World Health Assembly and has been held annually since 2015.

³⁴ Launched in 2019 with the support of the governments of the Netherlands, Sweden and the United Kingdom of Great Britain and Northern Ireland (MPTF, 2020).

2021. National and headquarters-based Tripartite personnel involved in developing a MPTF project proposal for Zimbabwe said in interviews that the mechanism had helped to fill gaps in coordination and avoid duplication in the design of new initiatives. The Zimbabwe proposal, for example, covers Tripartite work to develop East Coast Fever vaccination capacity for livestock, aimed at increasing the effectiveness of vaccination to reduce the use of tetracyclines in treating the disease.
115. However, even though there are strong examples of effective collaboration on the delivery of the GAP, in some cases, Tripartite activities have had a disproportionate focus on human health. This can be seen in the agendas of Tripartite meetings, the design of MPTF proposals and joint reports. This is down to the high visibility of AMR work through the human health interface and the substantial resources committed by WHO to AMR, both in terms of budget and personnel, compared with FAO. FAO's noticeably limited representation at Tripartite meetings has also led to the more prominent focus on human health. In addition, until recently, FAO's role had focused almost entirely on animal health, so was not fully representative of FAO's broad, multisectoral mandate.
116. With AMR now embedded in OIE's Performance of Veterinary Services (PVS) system, WHO carrying out Joint Evaluation Exercises (JEEs) and FAO conducting ATLASS assessments and applying the PMP-AMR, there are opportunities for closer Tripartite collaboration to optimize resources, share information and avoid duplication. Through its Legal Office, FAO has formed a partnership with OIE to evaluate country-level legislative frameworks, which is closely related to OIE's PVS work. FAO and OIE have conducted joint missions under the Veterinary Legislation Support Programme and FAO personnel are often invited to participate in JEE missions. A formal arrangement on sharing information about AMR might enhance the Tripartite's work and avoid duplication. Such an arrangement might allow FAO to use the outputs of the PVS and JEE mission reports to identify gaps in laboratory and technical capacity and to improve the delivery and targeting of capacity-building activities. Currently, many of these reports are confidential and belong to the countries in question.
117. Similarly, closer Tripartite collaboration could help FAO deliver the FAO-AP, for instance, on AMU and AMR data. The OIE is building a system to report AMU in livestock, based mainly on the submission of data by countries, but with less information on AMU at local and farm level. There is scope for FAO to become more involved in AMU data collection at farm level through its network of Country Offices, while ensuring alignment with OIE requirements for AMU surveillance. Similarly, OIE, with its role and influence in the international movement of livestock, could prove a useful partner for FAO in compiling AMR surveillance data in light of the sensitivities surrounding its potential impact on international trade.
118. In line with the Tripartite Workplan on AMR 2019–2020,³⁵ closer collaboration between FAO and OIE on AMU and AMR would lead to greater effectiveness. Another area for enhanced Tripartite collaboration would be for FAO to work more closely on food safety with WHO, in particular, on activities associated with raising consumer awareness of AMR at national and regional level. Overall, the Tripartite's harmonious working relationship illustrates the type of collaboration on AMR that regional organizations and countries need to manage the flow of antimicrobials between nations, to share information and to build trust in their ability to reduce the risk of AMR.

³⁵ The output 3.2 National cross-sectoral data on AMR and AMU of the work plan.

3.4.2 FAO partners at global, regional and national level

119. FAO's other key partnerships at global level on AMR include UNEP, donor agencies, universities and research organizations. FAO is beginning to collaborate with UNEP on AMR issues through its Land and Water Division and UNEP recently attended an AMR-WG meeting. A concept note on a joint Tripartite and UNEP project on AMR in the environment has been approved by the MPTF and the initiative is expected to start in 2021.
120. Collaborations with resource partners have proved vital to FAO in coordinating with other actors and networks at national level and in monitoring its AMR work. Both the Fleming Fund and USAID have organized their AMR work with a large network of global and national partners. This has provided opportunities for FAO to coordinate directly and indirectly with other implementing partners. In the case of the Fleming Fund, these include Mott McDonald, the organization managing Fleming Fund country grants. There are similar examples of coordination with USAID partners on EPT-2 and GHSA projects in Africa and Asia (FAO, 2021d), including national universities, research centres and networks. However, the extent of these partnerships depends on agency arrangements. For example, in the case of NORAD, FAO's engagement has been focused on a project results framework and annual reporting mechanisms. All donors interviewed for this evaluation consider FAO a reliable partner.
121. FAO has also collaborated with universities and research institutions to gain scientific backing for its AMR work and to support further research on AMR. In Viet Nam, FAO has sought to improve AMU practices in aquaculture and poultry production with the Oxford University Clinical Research Unit. The new FAO Reference Centres for AMR provide further opportunities for FAO to expand its network, not only to local and international research institutions and academia, but also to NGOs and other relevant stakeholders (including the pharmaceutical and food industries) in countries and regions where the Centres are well established. For example, at least one of the Reference Centres mentioned interaction with large private companies in the food industry that have integrated livestock systems and control the chain, owning the entire process from feed to retail in the region. Important partnerships with universities and research organizations are covered in Section 2.2.
122. In response to the survey conducted for this evaluation, FAO personnel unsurprisingly listed ministries of agriculture, their departments and equivalents as the Organization's most important partners, followed by ministries of health, WHO/Pan American Health Organization (PAHO) and universities and research centres. In turn, government officials surveyed repeatedly cited FAO as a strong partner. The Organization is valued for its technical support and capacity-building on AMR, together with its coordination work. FAO is also seen as a neutral and trusted partner, facilitating multisectoral collaboration.
123. FAO is working to strengthen its collaboration with the private sector. For FAO's work on AMR, this means actors in the antimicrobial value chain, from production to disposal, as well as in the food supply chain, especially large commercial livestock producers and producers' associations. At regional and national level, FAO is beginning to engage with the private sector by enabling public-private partnerships to combat AMR and by building on existing collaborations, particularly with those involved in food production. In Peru, the Organization has collaborated with aquaculture, poultry and pig producer associations through workshops on national AMR risks. These associations expressed interest in continuing to work closely with FAO to tackle AMR, as they understood the potential positive implications for international trade. In Zimbabwe, poultry producers have been involved in FAO training work from the outset. In Ukraine, FAO has assisted large-scale poultry producers in adapting their

husbandry systems to AMU-free practices and in creating a national accreditation system for their products. Using the same model, it is now engaging with the national association of pork producers.

124. However, other key opportunities to work with private stakeholders are being missed. Private laboratories, for example, are not being used to collect AMR data. In Peru, large commercial poultry producers conduct regular culture and antimicrobial susceptibility testing on their flocks to inform treatment plans. Similarly, in Armenia and Ukraine, AMR and residue testing is conducted through private laboratories for trade purposes, but FAO has not grasped the opportunity to use these labs to enhance national surveillance. In both cases, the data could be used by national governments and FAO for enhanced AMR monitoring and evidence building. In Ukraine, a private laboratory with significant AMR technical capacity is not being used by the public sector because of authorization issues. Reducing the threat of AMR will require the help of all these potential resources.
125. Around 40 percent of FAO respondents identified a number of key actors with which FAO should partner (or increase engagement) to enhance the effectiveness of its work. These included the ministries of environment of countries covered by RAP and REU, the private sector, including poultry producers, pharmaceuticals and feed manufacturers, in RAP and farmers (livestock, fish, crops), consumers, veterinary medicine sellers and private veterinary professionals in Africa. Interviewees also cited national and state governments, veterinary associations, NGOs, UNEP and regulatory authorities as missing from the partnership list in their countries. Other potential partners identified by the evaluation team included international financial institutions, such as the World Bank, with a view to working on the economics of AMR in the food and agriculture sectors, and regional organizations, such as the Andean Community,³⁶ to help strengthen regional coordination (World Bank, 2020). Systematically engaging all stakeholders associated with the antimicrobial and food supply chains would enhance the effectiveness of FAO's work on AMR.

3.5 FAO's institutional arrangements and operational capacity

Finding 16. The implementation of the FAO-AP has been hampered by the lack of full-time AMR management, which has left gaps in coordination, planning and communication and led to limited visibility of FAO's work on AMR globally. Also, a significant number of key AMR personnel are temporary consultants. The evaluation team believes the underlying reasons to be FAO's lack of strategic planning on AMR, including its failure to properly integrate AMR into the Strategic Framework, and its allocation of only limited resources from the core budget. This approach is detrimental to the long-term continuity of FAO's work on AMR and puts at risk the Organization's ability to fulfil its AMR commitments and remain a relevant partner in the Tripartite.

126. FAO is addressing a broad remit that spans all areas of food and agriculture, including animal health and production, food safety, plant health and the environment. Because of the cross-cutting nature of the issue, multiple FAO technical departments and divisions are strongly linked to its work on AMR.³⁷ However, there is no clear overarching structure for managing and coordinating FAO's work on AMR. There has been an FAO AMR Coordinator (the Chief Veterinary Officer) and numerous focal points for AMR in various divisions, but no central management structure. Over the course of the evaluation, a new Joint FAO/WHO

³⁶ A regional trade organization comprising Bolivia, Colombia, Ecuador and Peru.

³⁷ Based on the current organizational chart, all 15 divisions in the three main streams have a role to play in AMR, as well as the three centres, the Legal Office and the Office of SDGs (FAO, 2021a).

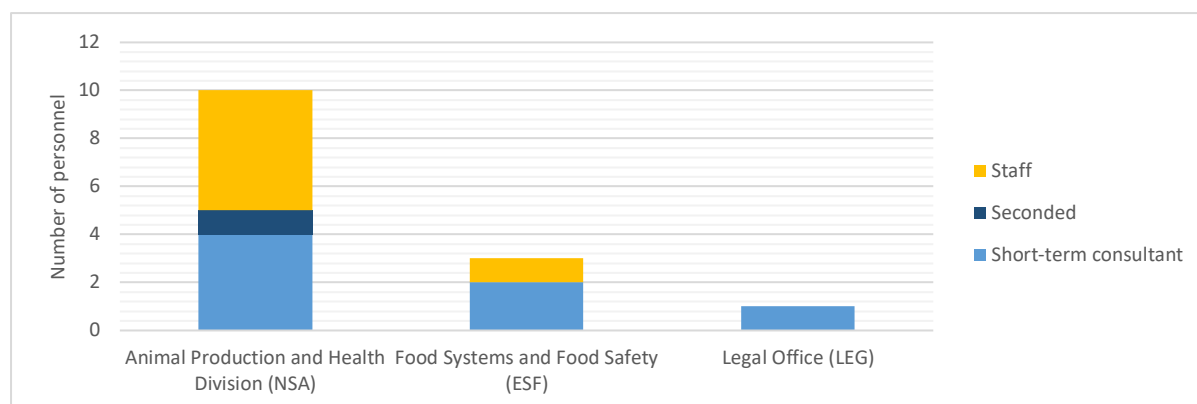
- Centre (Codex) was set up to include AMR. It is not yet clear how the Centre will coordinate with all divisions involved and adopt a One Health approach.
127. Based on cross-departmental products reviewed and data from key informant interviews, the evaluation team noted how the absence of a central management structure for AMR had affected FAO's ability to coordinate internally and manage its external visibility. Most interviewees outside FAO said the Organization should improve its coordination and communication. They cited issues such as identifying contact points on AMR within the Organization and slow response times to correspondence and collaboration on joint activities. Similarly, internal stakeholders raised concerns about internal communication and external collaboration. Key examples included limited information sharing between and within divisions and departments and a lack of awareness of AMR and One Health issues across crucial multidisciplinary technical resources. All of these limitations culminate in the fragmented delivery of FAO's AMR work.
128. There are also few aspects of FAO's work on AMR that bind it from a programmatic perspective. By way of illustration, the evaluation team found it difficult to assemble the history of FAO's work and its linkages to the Tripartite. The FAO website on AMR has recently been updated, which is a useful first step, however it lacks regional and national information. There is also a notable absence of records of FAO's work on AMR. The progress reports presented to the Programme Committee are a useful review, up to a point, but more detail should be available in a central repository.
129. The AMR-WG has compensated to a certain extent for the lack of central coordination structure and management. It was established in 2015 to support the AMR coordinator and advise on preparing the FAO-AP and has been active ever since.³⁸ Based on key informant interviews and a review of AMR-WG meeting minutes, the evaluation team considers the AMR-WG to be an effective mechanism for developing the FAO-AP and an essential source of technical know-how and interdisciplinary communication on AMR. It has been an important instrument in driving forward the FAO-AP.³⁹ At headquarters, it has contributed to information sharing between disciplines and provided FAO personnel with a platform to discuss normative matters, such as the Tripartite M&E framework and the FAO-AP2. However, even though the AMR-WG is a strong asset in sustaining FAO's work on AMR, attendance depends largely on voluntary commitments arising from technical interest and personal commitment. While the voluntary aspect of the Group may be part of its attraction, it is a forum where technical matters outweigh managerial matters, so is not a sustainable mechanism for coordinating and managing FAO's AMR work in the long term.
130. In terms of staffing, the delivery of AMR projects relies on a small number of regular, full-time personnel, supported by a significant number of short-term consultants. FAO's AMR capacity at headquarters has been strengthened by seconded Member personnel (Figure 7). The evaluation team acknowledges that FAO has managed to sustain its global commitments to the Tripartite, IACG and other bodies through extrabudgetary resources or limited and specific core funding. FAO interviewees widely perceive the lack of core funding to be challenging, with personnel often working on AMR outside their terms of reference and occasionally discouraged from doing so. In comparison, OIE and WHO, have dedicated departments, personnel and budgets to implement their work on AMR.

³⁸ As of March 2020, the AMR-WG had 48 members across FAO's divisions.

³⁹ The evaluation team was able to analyze the minutes of some AMR-WG meetings, along with information from interviews with AMR-WG members, to understand the group's workings and contribution.

Significant personnel turnover was also cited as a problem for maintaining the impetus on AMR work and contributing to a lack of institutional memory.

Figure 7: Distribution of personnel allocating more than 70 percent of their time to AMR by division and contract type



Source: Created based on data from the AMR-WG survey, March 2020.

* Note: The survey was not compulsory and the figure may not include all personnel allocating more than 70 percent of their time to AMR.

131. The absence of a strategy on AMR and FAO's failure to integrate AMR into its Strategic Framework have been detrimental to the delivery of the Organization's work on AMR. One concrete implication has been the limited or lack of core resources allocated to the work on AMR. Programmes of Work and Budget (PWB) make scant mention of FAO's work on AMR. Apart from the USD 1.7 million allocated for work on AMR and One Health, specifically for one post (P2) in animal health and one (P3) in food safety, there is no direct budgetary allocation for FAO's work on AMR. In some instances, AMR is linked to certain Strategic Objectives. However, there is no information available on budgetary allocation to AMR or AMR-related activities. Table 1 shows the 2019 linkages between AMR work and the SOs. These can be viewed against the backdrop of allocations of USD 226 million, USD 656 million, USD 156 million, USD 244 million and USD 709 million to SPs 1, 2, 3, 4 and 5, respectively, for 2018/19, but the exact percentages allocated to AMR are unavailable. There are also five TCP projects on AMR, funded through FAO's core budget, amounting to around USD 1.8 million over 2015 to 2020 (Appendix 1). There are a few other ways in which core funds are channelled to AMR work. Uncommitted funds from divisional or project budget lines are sometimes used for important AMR activities, such as WAAW, or for side events at larger meetings. Often, however, there are no clear allocations.

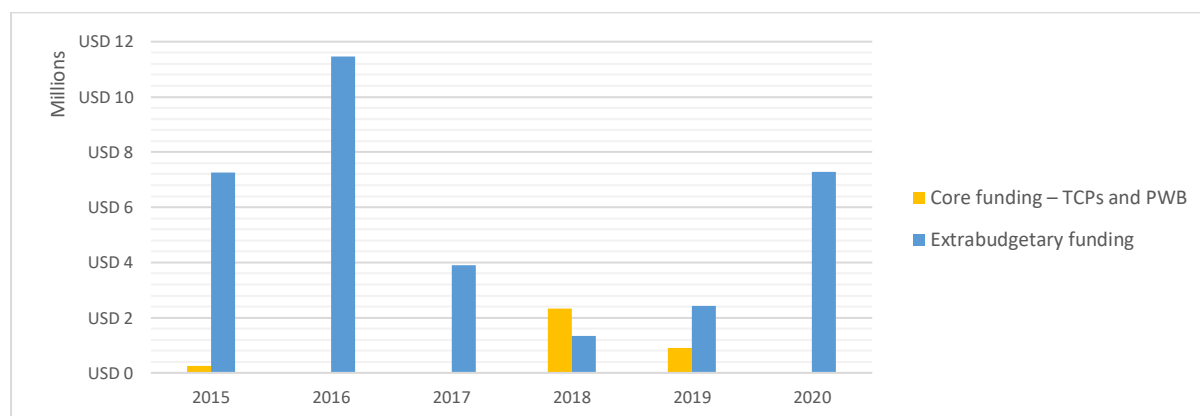
Table 1: Linkages between corporate outputs and AMR-related results

Strategic Programme	End 2021 Target (AMR-related)	Corporate Outputs	AMR Action Plan Outputs
1	3	1.1.1, 1.1.2, 1.3.1	1.2, 3.2
2	10	2.1.1, 2.1.2, 2.2.1, 2.3.1	1.1, 3.1, 3.2, 4.2
3	1	3.1.2	4.1
4	23	4.1.1, 4.2.1, 4.3.1, 4.4.1	1.2, 2.1, 4.1, 4.3
5	12	5.1.1, 5.2.1, 5.3.1, 5.3.2, 5.4.1	2.3, 3.1, 4.1, 4.3
Total AMR target	49		

Source: FAO, 2019c.

132. For most of its operational outputs on AMR, FAO relies on short-term projects supported by extrabudgetary funds. Figure 8 shows the funding allocated to FAO's work on AMR between 2015 and 2020 through core and extrabudgetary mechanisms. The columns represent additional funds received each year.⁴⁰ The MPTF is unable to provide consistent programmatic support for FAO, as the funding is aimed at country operations and activities implemented jointly by the Tripartite organizations (WHO, FAO and OIE, 2019b). This has major implications for the coverage of FAO's work, both in terms of the scope of activities implemented and the number of countries covered.

Figure 8: FAO's AMR resources – core and extrabudgetary



Source: Created based on data from Field Programme Management Information System (FPMIS) project documents and PWB reports, March 2020.

* Note: This figure does not include funding from the USAID-backed GHSA project, as the specific allocation to AMR activities from total funding is unavailable.

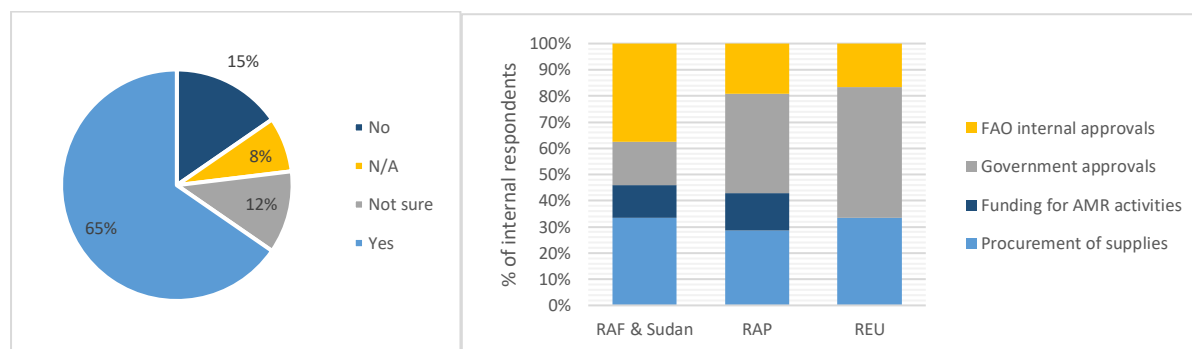
133. As FAO has not committed to a long-term strategic approach to its work on AMR, the timespan for its work is tied to FAO-AP, plus the outstanding portions of externally funded projects. New country and regional projects supported by extrabudgetary funds are in the pipeline, but the lack of a sustained strategic and programmatic approach inevitably means that FAO's AMR work runs the risk of discontinuity of funding and implementation. The evaluation team considered the amount of time that FAO might need to make a significant impact on reducing the risk of AMR in those countries and regions where it is active. All technical interlocutors suggested that FAO's AMR work needed to be folded into a long-term programme lasting at least a decade. This seems realistic, considering that it has taken northern Europe, for instance, 25–30 years to reach its current level of AMR awareness, surveillance and compliance (FAO and Danish Veterinary and Food Administration, 2019). If FAO wishes to maintain its global role and work on AMR, it must recognize that its responsibilities will persist over a similar time horizon. An overarching strategy that is integrated into FAO's Strategic Framework and supported by the core budget would greatly advance its effectiveness and sustainability.

Finding 17. At regional and country level, coordination and technical support arrangements on AMR projects have worked well. In countries not covered by extrabudgetary funding, FAO has supported the development of AMR NAPs and raised awareness through other initiatives and activities. However, a programmatic approach on AMR does not exist in all regions and the evaluation team noted issues with administrative procedures and procurement.

⁴⁰ The figure does not take into account personnel time allocated to AMR not linked to AMR projects.

134. FAO's Regional and Country Offices have been at the forefront of delivering the Organization's work on AMR. Ninety percent of internal survey respondents working on AMR projects at national level believe that coordination and technical support between headquarters, Regional and Country Offices is effective or fully effective. Some 85 percent viewed the AMR-WG as an effective support structure. However, 25 percent observed that there were technical gaps in FAO's capacity that prevented it from meeting AMR-related needs in their countries. These were mainly associated with crops, environment, the social sciences and legal/policy aspects of FAO's work on AMR and nearly all related to financial and human resource constraints on these topics. Countries with limited resources for AMR, such as Armenia, Peru and Ukraine, have benefited from the support of Regional Offices. This has been vital to supplementing AMR expertise at country level and coordinating between countries in the region. For example, RLC has conducted online webinars on AMR surveillance in Peru, while RAP has designed questionnaires to understand better AMU, taking into account differences in national production systems.
135. The survey results are only from countries with AMR projects, however (extrabudgetary or TCPs). In countries that do not have specific projects on AMR, such as those covered by RNE (excluding Sudan), certain AMR activities have been implemented to support NAPs through Regional Initiatives and existing structures. The coordination and level of involvement varies depending on the resources available. Nevertheless, across regions, including those with project funding, there is a lack of clarity on the involvement and coordination of personnel from the food and agriculture sub-sectors (for example, food safety, crops and livestock). RAP has made efforts to develop a programmatic approach to AMR, according to its documentation on regional planning and its regional AMR-WG. However, in other regions, there are no mechanisms to facilitate the harmonized, coordinated delivery of AMR work.
136. A few issues linked to administrative procedures and procurement have also affected the efficiency of FAO's work on AMR. Over the past two years, FAO has signed Letters of Agreement recognizing five AMR Reference Centres, aimed at providing the Organization with technical and scientific know-how. All Reference Centre interviewees were disappointed by the bureaucracy of the accreditation process. Similarly, at least one resource partner highlighted FAO's slow response time in preparing and signing contracts for the delivery of various aspects of projects in the field. FAO's limited ability to form functional partnerships involving the financial management and disbursement of funds at national level has also compromised its competitiveness when applying for national grants.
137. These operational issues were also noted at regional and country level, where 65 percent of internal respondents confirmed some delays in project delivery (Figure 9a). For the countries covered by RAF and Sudan, this was mainly down to delays in internal approvals and procurement of supplies, whereas in those countries covered by RAP and REU, it was generally down to slow government approval processes, though procurement delays were also an issue.

Figure 9: Internal survey: (a) delays in delivering AMR projects and (b) key reasons for delays by region



Source: Created based on results of the AMR survey conducted by the evaluation team.

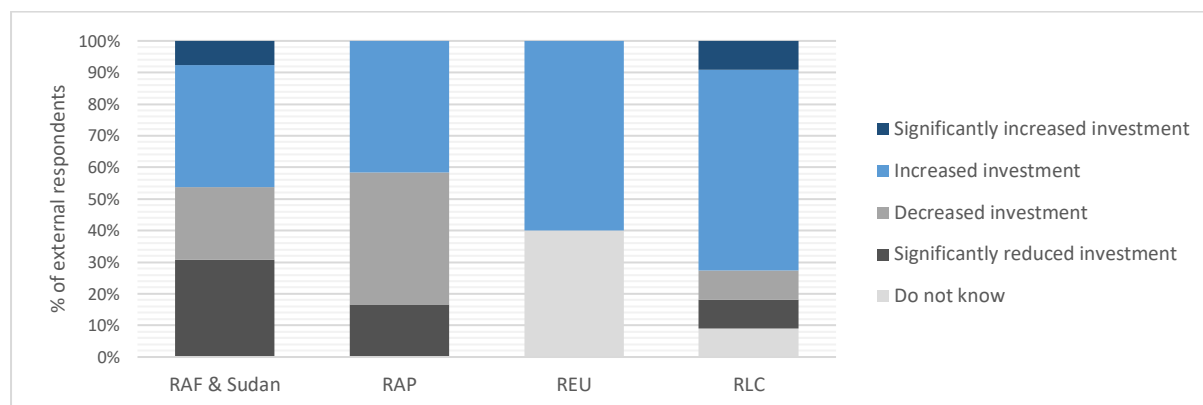
3.6 Sustainability

3.6.1 Sustainability of FAO's AMR results

Finding 18. FAO's country-level AMR activities have facilitated the creation of intersectoral One Health platforms, raised awareness and developed capacity, creating a strong basis for future collaboration and work on AMR. However, there is still limited buy-in from national governments, as evidenced by their limited investment in AMR and capacity to continue without FAO support. For FAO's AMR results to be sustainable, national stakeholders must recognize the significance of AMR, commit resources to tackling it and enforce associated legislation. Greater support for a systematic approach to AMR that attempts to address resource constraints at national level could boost the sustainability of FAO's AMR results.

138. Institutional strengthening, capacity development and ownership are instrumental to ensuring the sustainability of results in countries where FAO has worked. As AMR is invisible and there is a delay in its observable consequences, political commitment is lacking at national level, deterring the prioritization and allocation of resources. Around 80 percent of government counterparts surveyed had participated in the design of AMR projects, and FAO's AMR activities were widely endorsed by regional and national stakeholders. This was confirmed in interviews with ministries in the five case-study countries and by their participation in national One Health intersectoral groups. However, this widespread endorsement has not yet resulted in significant changes in national resource allocation. This is illustrated in Figure 10, which tabulates the views of government counterparts on changes in their national resource allocation in the four focus areas of the FAO-AP. Furthermore, the continuity of FAO's AMR work at country level has been challenged by competing public health risks and limited national resources, all of which have been exacerbated by the COVID-19 pandemic.

Figure 10: External survey: Distribution of responses on changes in government resource allocation

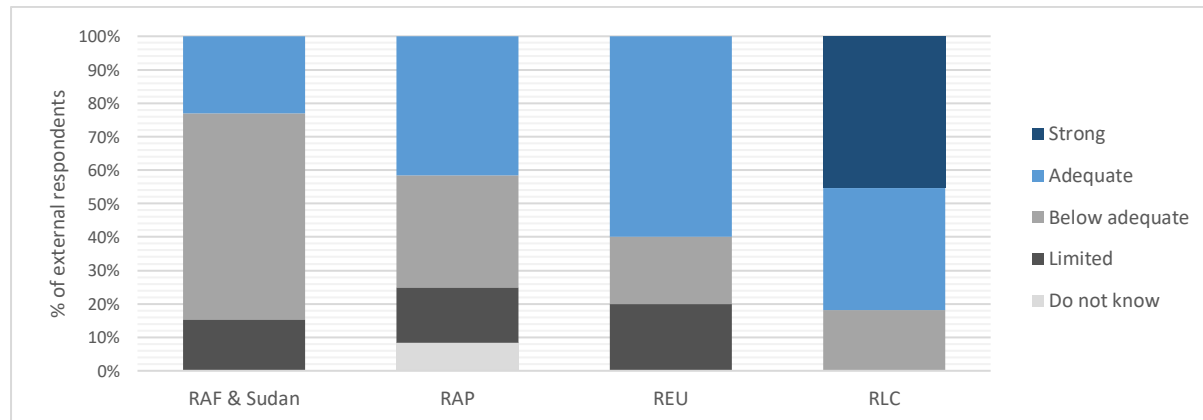


Source: Created based on results of the AMR survey conducted by the evaluation team.

* Note: While the sample size was 42, only a few responses were received for REU and RLC.

139. On average, more than 60 percent of external respondents in RAP, RAF and Sudan reported inadequate or limited national capacity to work on AMR. This, together with the other capacity constraints mentioned previously, suggest that many countries' capacity to implement their AMR NAPs depends on their sourcing external funding to conduct AMR activities. Consequently, even though FAO has done substantial work on AMR in the countries in question, the results are not yet sustainable without external funding.

Figure 11: External survey: Distribution of responses on government capacity to continue AMR work without FAO support



Source: Created based on results of the AMR survey conducted by the evaluation team.

140. Notes from key informant interviews in the five case-study countries underpin this view. Some countries, such as Peru, appreciated the role FAO played in identifying funding opportunities and the support provided in grant application processes. However, activities such as the monitoring of AMR testing, research funding and increasing laboratory capacity are expensive and need regular funding. Similarly, awareness-raising campaigns can be expensive to scale up and FAO needs to incorporate approaches that ensure sustainability at country level. This is likely to require further consultations with government and non-government partners to agree the roles and responsibilities of all AMR actors at country level (including milestones for assessing progress) and stronger global advocacy.

141. In Ukraine and Viet Nam, interviews with stakeholders revealed that policy changes to ensure adequate funding of AMR-related activities, especially surveillance, are unlikely

without substantially more convincing evidence on AMR. This is an issue where FAO should play a greater role. In Peru, Viet Nam and Zimbabwe, FAO-supported pilot AMR surveillance projects have been essential in generating much-needed evidence for risk-analysis purposes and to inform policy, but require more follow-up. Greater awareness of the urgency of AMR is needed at the highest decision-making levels in many countries.

142. Another possible complication that surfaced in the internal and external surveys concerns the inclusion of AMR in existing One Health groups for the control of zoonotic diseases. Within these national groups, as in FAO itself, this means AMR is often addressed together with zoonotic diseases, solely as an animal health or food safety concern. This neglects the much broader One Health characteristics of AMR compared with most zoonoses. As a result, the importance of AMU in plant health, forestry, soil and water tends to be undermined in favour of equally important, but more well-worn topics, such as AMU for growth promotion in animals.

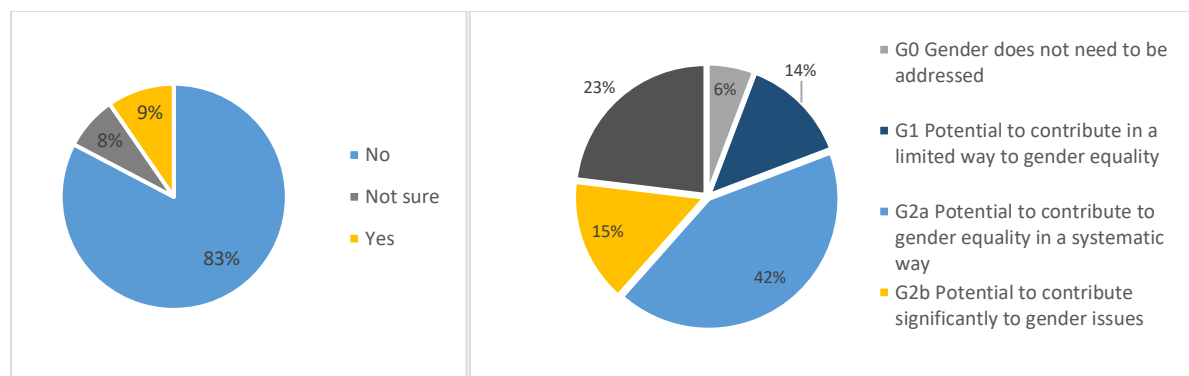
3.7 Cross-cutting issues

3.7.1 Gender

Finding 19. AMR projects have the potential to contribute to gender mainstreaming, gender equality and women's empowerment. However, the FAO-AP and the proposed FAO-AP2 do not specifically address gender issues and there has been no structured effort to integrate them into FAO's work on AMR. Where possible, women have participated in AMR activities across FAO's projects and gender-disaggregated data are being collected at country level. Systematic reviews and analyses will be necessary, however, to assess the standing of gender issues in FAO's work on AMR and to contribute to FAO's gender goals.

143. Evaluation fieldwork⁴¹ shows that women play a greater role in certain aspects of livestock management, particularly poultry, but have poor access to information, training, services and markets. FAO has engaged women in workshops and training initiatives on AMR and has collected sex-disaggregated data on its activities. However, targeting women is not the same as gender mainstreaming, nor does it make a project gender inclusive. It is important to explain the rationale behind the focus on women, how the interventions will help improve gender relations and create greater access and benefits for both women and men. The importance of gender issues will also vary depending on a country's gender norms. The evaluation team did not see any analysis of gender issues in relation to AMR at global or country level. Only nine percent of survey respondents in countries where FAO works on AMR said systematic gender reviews were conducted to inform AMR work (Figure 12a), however, no justification or report was provided to support these responses.
144. FAO's gender markers⁴² suggest that its work on AMR includes some projects with high potential to address gender issues. This was confirmed by survey respondents, per Figure 12b. The gender markers and survey results indicate a need for FAO's work on AMR to be informed by gender reviews or analyses at both the global and country levels.

Figure 12: Internal survey: (a) whether systematic gender reviews were conducted to inform FAO's work on AMR (b) the perception of FAO's AMR work from a gender-focused approach



Source: Created based on results of the AMR survey conducted by the evaluation team.

⁴¹ For the EPT-2 programme evaluation and from field-data collected for Viet Nam.

⁴² Since July 2015, project formulators are required to assign Field Programme Management Information System (FPMIS) gender markers to their projects when submitting their Concept Note. The markers indicate whether the project aims to promote gender equality and women's empowerment and the extent to which it is designed to ensure that women and men benefit equally from the intervention (FAO, 2017a).

145. In the case-study countries, there are examples of women's inclusion based on their roles. For example, in Zimbabwe, women are being targeted for FFS activities because of their responsibility for poultry and small ruminants. However, such role-based targeting has not worked in all countries and, as no specific gender analysis is available, the targeting may or may not be contributing to FAO gender goals. For example, as learned from previous evaluations, interventions aimed at women's empowerment need to create a supportive environment, with greater autonomy, choices and effective participation in decision-making. They cannot just expand or add new roles that may create an additional burden (FAO, 2021d). Gender integration also needs to recognize the different roles, interests and priorities of all sections of society and its intersection with other, less privileged groups. A good starting point for understanding the differences between men and women when it comes to AMR risk exposure could be the FAO country gender assessments (FAO, 2018e).

3.7.2 The One Health approach

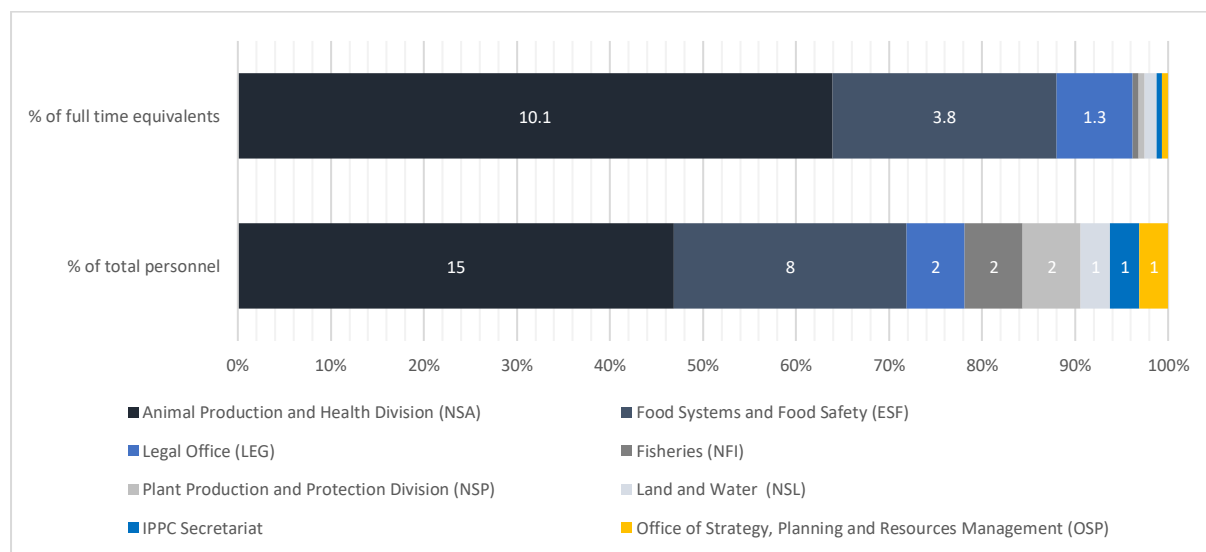
Finding 20. FAO has not been able to develop a complete One Health approach to AMR, despite promoting it in the FAO-AP, reports and project documents. It has been applied to projects with varying levels of success. While the livestock, aquaculture and food safety teams are significantly involved in AMR, the various plant, forestry, soil and water teams have had limited involvement. While this is understandable in view of the significant knowledge gaps in these fields, FAO, as part of the global AMR infrastructure, is committed to a holistic One Health vision and should take greater leadership in these areas.

146. When the Deputy Director General of FAO agreed to aligning the FAO-AP under the One Health concept,⁴³ this presented FAO with an ideal opportunity to use all the tools at its disposal, as well as a broad technical array of human resources specialized in food and agriculture. Unfortunately, this has not happened as yet and is undermining the Organization's comparative advantage (Finding 3). It will eventually affect the effectiveness of FAO's work on AMR (Finding 11). While the concept has been adopted by some key divisions, acceptance across all of the multisectoral disciplines available to FAO has taken time. This could have been avoided had the Organization shown more determined institutional and strategic commitment to One Health from the outset of the FAO-AP.
147. In 2015, quite understandably, AMR would not have been high on the list of many competing priorities in plant, forestry, soils and water in view of the important knowledge gaps in these technical areas. However, once committed to One Health, the Organization should have shown stronger leadership in delivering holistic One Health AMR messages. In several interviews, the evaluation team was told that for some divisions, AMR was a new topic, so there was limited awareness of linkages. This directly affected key divisions' degree of participation in AMR activities, including in the AMR-WG. However, in recent years, there has been progress towards the One Health approach. The Tripartite memorandum of understanding of 2018 confirmed the inclusion of AMR in each of the three organizations' working arrangements and could contribute to a fully multisectoral approach to AMR (FAO, OIE and WHO, 2018a). More recently, and encouragingly, the FAO Land and Water Division has collaborated with the Joint FAO/IAEA Division to produce new methods for tracking the movement of antimicrobials in the environment (FAO and IAEA, 2019).

⁴³ FAO defines One Health as "an integrated approach for preventing and mitigating health threats at the Animal-Human-Plant-Environment interfaces with the objective of achieving public health, food and nutrition security, sustainable ecosystems and fair trade facilitation" (FAO, 2021e).

148. Furthermore, as discussed in Section 3.5, the AMR-WG has been used as a coordination mechanism for FAO's work on AMR. As the group is framed under the One Health umbrella, its membership includes personnel from different FAO divisions, as shown in Figure 13. However, member participation depends on the senior managers of the technical divisions, who look at all other work priorities and the additional staffing costs involved in such contributions. Equally importantly, not all relevant divisions may have the necessary expertise to contribute to FAO's AMR work. This leads to disparate contributions from various FAO divisions and does not reflect well on FAO's commitment to a One Health approach to AMR.

Figure 13: Divisional membership of the AMR-WG at FAO headquarters



Source: Created based on data from the AMR-WG member survey, March 2020.

* Note: Full-time equivalents are calculated by summing the percentages of time allocated to AMR activities within a division or department. The categorizations are based on FAO's previous organogram.

149. At country level, FAO, WHO and OIE have played a strong role in promoting intersectoral coordination and collaboration in several countries through One Health intersectoral groups and committees, including in Armenia, Ukraine and Viet Nam.⁴⁴ However, institutionalization, functionality and operational capacities have varied from country to country, as we saw in Section 3.3. Moreover, although government counterparts in the five case-study countries greatly appreciated One Health as an approach, there was limited awareness of its importance by other stakeholders. In Viet Nam, the concept of One Health was new to interviewees at field level, including master trainers and farmers. Several of the farmers who were beneficiaries of FAO's awareness-raising on AMR also had limited understanding of it. They understood that AMR was a risk to their poultry and/or livestock, as well as its likely effects, but only a few understood that antimicrobial residues and resistant microbes might pose a threat to human health, either directly from live animals and their products or through the environment.

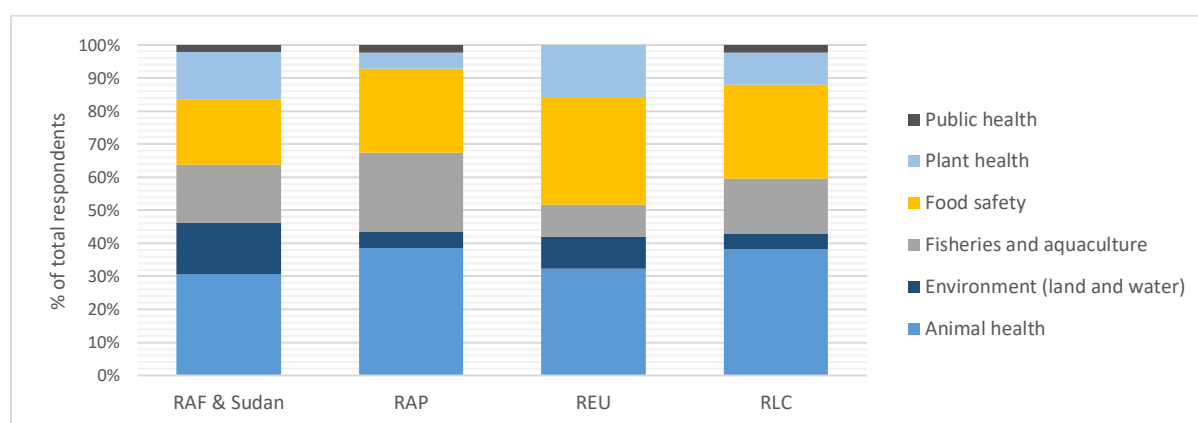
150. In Viet Nam, FAO and WHO are providing support in integrating its two AMR NAPs for human and animal health. Plant health and the environment are insufficiently addressed in

⁴⁴ One Health platforms and mechanisms were also reported in Bangladesh, Cambodia, Cameroon, Egypt, Ethiopia, Ghana, Indonesia, Kenya, the Lao People's Democratic Republic, Myanmar, the Philippines, Sierra Leone, Thailand, the United Republic of Tanzania and Viet Nam.

many national plans (Armenia, Indonesia, Pakistan, Peru, Ukraine and Zimbabwe), though they are considered in more depth in the NAPs of Ghana and Kenya. Zimbabwe has not incorporated crops and plants into grant proposals due to its prioritization of animal and public health components amid limited funding. A similar gap on the issue of antibiotic residues in watercourses was noted in Peru. Nonetheless, RLC has worked to address such gaps by conducting a systematic review of AMR in water to help better incorporate the environment into national AMR strategies. FAO's limited AMR work in these sub-sectors was also evident in the country surveys, though its work was somewhat more consistently distributed in those countries covered by RAF (Figure 14). FAO tried repeatedly to engage with actors in the environmental sector at country level with a view to AMR workshops and related activities, but its success was limited due to lack of awareness of the role played by the environment in spreading AMR.

151. The greater involvement of UNEP on AMR could enhance coordination with the environmental sector. On AMR in crops and environment, there are also opportunities for FAO to coordinate and collaborate with its network of AMR Reference Centres and with other organizations, such as the CGIAR AMR Hub and UK Research and Innovation, which are working on these issues at global and country level.

Figure 14: External survey: Distribution of FAO's work on AMR by sector



Source: Created based on results of the AMR survey conducted by the evaluation team.

152. Lastly, FAO's focus on selected areas is reflected to a certain extent in the expertise of the respondents surveyed for this evaluation.⁴⁵ Most FAO respondents (58 percent) had expertise in animal health and production and/or food safety, while only 8 percent had a background in environment and/or plant health. Even fewer had a background in aquaculture and fisheries. The distribution was similar for the government counterparts surveyed. Even though the evaluation team requested details of AMR focal points from ministries of environment, agriculture and health, or their equivalents, only one of the 42 counterparts surveyed had a background in AMR and the environment. The respondent also noted that in their country, the environment sector was only involved "at the tail end" of NAP development.

3.7.3 Monitoring and evaluation

Finding 21. There was no comprehensive M&E framework covering all of FAO's AMR work from 2016 to 2020. The FAO-AP2 includes a results chain with appropriate indicators. While

⁴⁵ Not all FAO personnel working on AMR were surveyed. There were up to three participants in each country, though, in a number of countries, that meant all personnel working on AMR were covered.

this is a positive development, it does not include outcome-level indicators or details of links between activities and targeted outcomes. The Tripartite M&E framework is widely recognized and gives FAO a strong basis for strengthening its M&E capacity. Both existing databases and those being developed for AMR present opportunities for FAO to complement its future M&E work.

153. The FAO-AP did not include an overarching M&E component. Monitoring of FAO's work during this period relied on progress reports⁴⁶ on the projects listed in Appendix 1 and on AMR updates submitted to the FAO Governing Bodies. There was no reporting on outcome-level indicators, such as success in reducing levels of AMU at national level or FAO's part in reducing the incidence of AMR. The FAO-AP2 also focuses on indicators such as number of training sessions and publications. These do not support a higher-level assessment of progress on tackling AMR.
154. More recently, as part of the Tripartite, FAO has participated in developing the M&E Framework for the GAP (WHO, FAO and OIE, 2019c). The framework was finalized in 2019 and the data generated should soon be available for monitoring purposes. It spans comprehensive monitoring of outputs and NAP implementation and includes outcome- and impact-level indicators on AMU and AMR. The framework is based on multiple databases, some of which were analysed by the evaluation team and are listed in Appendix 5. However, the framework is aimed at the general monitoring of GAP implementation and is not a replacement for monitoring FAO's work specific to the food and agriculture sectors. Still, the Tripartite work is a good opportunity for FAO to link its activities to outcome-level indicators within a well-defined theory of change and, thus, to approach the monitoring of its work in a systematic way.
155. There have also been a few positive improvements related to the M&E of FAO's work on AMR. The first is that the overarching indicators developed on GAP implementation are directed at NAP outcomes, rather than NAP delivery, so are a better measure of progress on reducing AMR risk. Moreover, FAO is currently preparing a performance indicator requested by the FAO Council that would help assess the Organization's delivery on AMR. Also, through the MPTF mechanism, FAO is developing a project proposal focused on strengthening AMR M&E across the Tripartite organizations. All of these initiatives should help FAO to strengthen the monitoring of its work.

⁴⁶ Based on project-level monitoring and evaluation frameworks.

4. Conclusions and recommendations

4.1 Conclusions

Conclusion 1. AMR is an undisputed global threat and minimizing it requires concerted collaborative action at all levels. FAO has a strong mandate to work on AMR in the food and agriculture sectors. It is well positioned to deliver on AMR and is moving in the right direction. The COVID-19 pandemic has made it more urgent that FAO prioritize its global role and work on AMR.

156. FAO's key role has been recognized by its Members, the United Nations General Assembly and partner organizations. It has strong comparative technical and organizational advantages in key food and agricultural sectors, including its global presence, close working relationships with national governments and its ability to influence policy change. FAO has made steady progress on all four focus areas of the FAO-AP, laying the foundation for delivering these outputs in the FAO-AP2. Its collaborations with the Tripartite organizations and other key AMR partners are strengthening over time and are critical to global and regional coordination and cooperation on AMR. FAO has also developed good linkages with the AMR scientific community, consolidating them into its network of Reference Centres.

Conclusion 2. Even though the Organization is well positioned to deliver on AMR, FAO lacks an AMR strategy that demonstrates its organizational commitment. This has hampered progress on the FAO-AP and does not reflect well on its global commitment to AMR. There is less than full acknowledgement of the work required across the antimicrobial and food value chains and in adopting a true One Health approach. It has further affected the emphasis placed on sectors associated with food and agriculture in the Tripartite's AMR work, as well as FAO's global influence and visibility on AMR.

157. The absence of an AMR strategy has resulted in limited alignment with FAO's Strategic Framework, which has translated into insufficient core resources for AMR. In addition, the roles, responsibilities and extent of involvement of the various FAO divisions and offices on AMR is not clear. The work is, therefore, heavily reliant on and guided by extrabudgetary funding, concentrated in certain divisions and geographic regions and mostly led by temporary personnel on specific projects. Again, these factors have affected FAO's role within the Tripartite, in some cases undermining its capacity to fully engage in meetings and to contribute as fully as the other partners that have allocated greater resources to AMR work. A cross-cutting strategy that sets out FAO's commitment on AMR, builds on its broad mandate and is fully embedded in the Strategic Results Framework, with an accompanying framework for monitoring, evaluation and learning, would create greater internal and global visibility and an evidence base to demonstrate the impact of its work.

158. Not having a comprehensive strategy has meant less than full acknowledgement of the role of all actors associated with AMR, their context and importance. For example, the role of consumers and the general public is missing from FAO's work and most consumers of food products remain unaware of AMR risks. They could be instrumental in generating greater demand for products free of antimicrobial residues and contributing to a change in farming practices. Similarly, even though farmers are the direct users of antimicrobials, there are no clear approaches for engaging them on AMR on a large scale that takes into account the socioeconomic context in which they operate. It is particularly important to understand the drivers of AMU and to explore cost-effective and sustainable alternatives to antimicrobials

while protecting farmers' livelihoods and food security. It is also necessary to engage large pharmaceutical companies and commercial farming enterprises in multi-stakeholder dialogue on AMU and AMR at country and global level to achieve impact at scale.

159. FAO's Action Plans have been important instruments in guiding its work on AMR, however, they do not provide sufficient detail on its approaches. FAO-AP2 recognizes the importance of developing good practices and an economic case for farmers, but it does not sufficiently set out how its activities will result in prudent AMU. It also does not specify FAO's role in relation to its government partners and other actors in achieving these results. What's more, it provides only for output indicators, such as the number of training courses delivered and the amount of guidance material produced, which yield limited measurable information on results. Moreover, there is no theory of change underpinning FAO's work on AMR that explains such linkages. It addresses the cross-cutting issue of the role of gender in AMR in a limited way. Greater clarity on FAO's approach to AMR through a long-term strategy would lead to more focused work and position it for better results.

Conclusion 3. There is no overarching AMR management team or structure coordinating the entirety of FAO's work on AMR. FAO has relied heavily on the dedication of voluntary members of the AMR-WG for internal coordination and knowledge sharing. This is not reflective of the ambitions of FAO's current plan and even less so of its role in tackling AMR and the seriousness of the issue. Over the course of the evaluation, the evaluation team observed FAO's growing commitment to tackling AMR, however, a multidisciplinary approach that sets out the role of all relevant divisions and offices at both headquarters and regional level is not yet evident.

160. Until the establishment of the Joint FAO/WHO Centre, FAO's work on AMR had been led by a few divisions. The Centre is a welcome development and could enhance internal coordination. However, FAO's work on AMR and the development of a strategy setting out roles still require considerable involvement from all relevant divisions and offices, including Fisheries, Food Systems and Food Safety, Forestry, Land and Water, the Legal Office, Plant Production and Protection, and Markets and Trade. Moreover, FAO's work on AMR is not classified as a programme with clear lines of responsibility and leadership at headquarters or regional level. While the evaluation team recognizes the key role played by the AMR-WGs on coordination and knowledge sharing across FAO, the contributions of its members should be systematized and formalized in their job descriptions. A clear allocation of roles and responsibilities and an overall coordination and management unit would directly benefit FAO-AP implementation.

Conclusion 4. FAO's work on AMR remains aligned with its Tripartite responsibilities and is guided by the GAP. There has been close normative cooperation between the three organizations and closer collaboration is evolving at implementation level by strengthening of the MPTF mechanism, the Tripartite AMR workplan and the Tripartite M&E framework. UNEP's collaboration with the Tripartite organizations on AMR is a positive sign and an important step towards a true One Health approach. However, there are further opportunities for FAO to strengthen its role in the food and agriculture sectors and for closer collaboration.

Conclusion 5. Beyond the Tripartite, FAO has played a strong role in coordinating and collaborating with a wide range of actors on AMR and is making good effort to broaden its partnering network. However, at all levels, greater systematic coordination with national, regional and global actors is required, together with the engagement of stakeholders along the food and antimicrobial value chains. Furthermore, for greater efficiency, there needs to be a clear understanding of all key stakeholders' roles when it comes to AMR.

161. Partnerships are key to addressing AMR because of its multidisciplinary and multisectoral aspects. FAO has formed strong partnerships at both global and country levels on AMR, however a more cohesive approach would contribute to greater effectiveness. The recent establishment of FAO Reference Centres for AMR is a positive step towards solid scientific collaboration on AMR. However, FAO has yet to make full use of their expertise and networks. Similarly, the inclusion of other value-chain actors, such the consumer, pharmaceutical and food industries, to gain their perspective and engage them in reducing the threat of AMR are an important part of the requisite holistic approach. There are also opportunities for stronger strategic partnerships with organizations such as the World Bank and the OECD, which have recently recognized the seriousness of AMR. However, this would require FAO to have greater clarity on its long-term vision and its role in different areas associated with AMR.
162. The evaluation team acknowledges that building and managing such partnerships requires substantial resources. Being able to systematically identify key actors and engage them is likely to increase the effectiveness and sustainability of AMR activities and provide greater opportunity to ensure long-lasting results.

Conclusion 6. FAO’s technical expertise is a key comparative advantage in its work on AMR. It is underpinned by a strong scientific basis, engendered in its AMR-WG personnel and supported by its collaboration with research centres, universities and the Tripartite organizations. FAO’s recent scientific publications on AMR were reviewed by a panel of AMR experts established for this evaluation and found to be of consistently high relevance and quality. FAO’s online repository has been a trustworthy source of information on AMR in food and agriculture. The model FAO uses to generate scientific knowledge for its work on AMR is strong and can be replicated in other areas of its work.

163. The scientific basis of FAO’s work on AMR is deemed to be strong on the whole, owing to its in-house expertise and scientific partnerships. However, it should take into consideration the ongoing evolution and diversity of production systems and the scenarios in which its work is implemented. The FAO-AP and most publications assessed by the expert panel were deemed highly relevant and of good quality, particularly those that incorporated the socioeconomic context for specific countries or regions. The experts recommended the inclusion of animal health economics in future KAP studies, along with details of target audiences and national/regional context.

Conclusion 7. Because of the multidisciplinary nature of AMR and the close connections between animal, environmental and human health, a One Health approach is necessary at all levels. Even though there are some promising examples of FAO advocating the approach in its work with government counterparts, it has not been able to demonstrate a true One Health approach internally or in its work with a wider array of stakeholders.

164. In view of its clear mandate in disciplines associated with the food and agriculture sector and in line with its global role on AMR, FAO has advocated a One Health approach through its AMR projects and documents. The establishment and composition of the AMR-WG attests to its intention to build this broad alliance. Nonetheless, there is limited clarity on the role of each division and how they are involved in combating AMR. For FAO to deliver a complete One Health approach, it needs to identify AMR knowledge gaps and implementation pathways for each discipline. This has affected its work in countries where there is limited awareness in its mandated areas, including AMR in plants, soil and water.
165. At country level, FAO has made good progress on encouraging national bodies to implement and coordinate AMR activities through One Health platforms. However, their

operational and functional capacity varies according to resourcing. Insufficient evidence on AMR in different areas (plants, water and soil) has led to a lack of awareness and prioritization of AMR activities.

Conclusion 8. Through the FAO-AP, FAO has delivered a substantive programme of work in the food and agriculture sectors, implementing AMR activities in 45 countries and providing far-reaching support on AMR NAPs. The four FAO-AP focus areas are interrelated and it was reasonable to address them in parallel. The activities and outputs of the focus areas are essential to building a strong foundation for future AMR work. Still, FAO's work to achieve optimal AMU has had limited results. A comprehensive strategic approach would increase the likelihood of strong results in combating AMR.

166. FAO's overall activities on AMR through its four focus areas have supported countries in developing and implementing their AMR NAPs. The focus areas are closely interlinked and complementary. FAO's implementation of AMR activities in its focus areas has produced key lessons to enhance the implementation of FAO-AP2.
167. There are too few details on the impact pathways of the four focus areas. For example, there is limited clarity on how legal assessments (under governance) will lead to optimal AMU. Similarly, FAO's work on guidelines and sharing good farming practices needs to take into account a country's socioeconomic factors and the drivers of AMU, which often supersede training and awareness-raising activities. FAO has recently taken steps to incorporate behavioural insights into its work, but clear linkages between its outputs and results still need to be defined.
168. The scale of FAO's work will be key to successfully contributing to a reduction in AMR. FAO must have a clear idea of how training a few farmer groups will translate into measurable changes in AMU at national level. Value-chain analysis should include a better understanding of antimicrobial governance and the stakeholders involved and identify areas where interventions would be most effective with broad coverage. Farmers should be involved in the analysis to gain a better understanding of the barriers to responsible AMU. In addition, awareness campaigns need to be conducted with consumer groups, so that they become acquainted with the risk of exposure to AMR in their food and their right to safe and nutritious food that is not cost-prohibitive.
169. Lastly, as with the NAPs and AMR surveillance, resource constraints have been a hindering factor, exacerbated by the COVID-19 pandemic. To ensure the sustainability of its results, FAO needs to acknowledge these constraints and help address them. Assisting countries in identifying grant opportunities and technical expertise to generate evidence on AMR, for example, could lead to an increase in resources for AMR. International trade could be used to drive greater surveillance: the certification of animal-derived products as safe and antimicrobial residue-free, for instance, could help reduce trade barriers and improve business reputations. Similar incentives could prompt the food industry to adopt best practices, commit to reducing AMU and take a proactive approach to controlling AMR in their sectors.

4.2 Recommendations

Recommendation 1. FAO should prioritize its work in a long-term strategy on AMR that recognizes the seriousness of the threat and is fully integrated into the Organization's Strategic Framework. The strategy should set out FAO's long-term role in combating AMR and that of its divisions and offices, as well as its approach at country and regional level. It should be based on analyses of FAO's comparative advantages and AMR risks along the relevant value chains, while identifying key partnerships and stakeholders at all levels. It further needs to be underpinned by a theory of change that clarifies the links between its activities and expected goals. The strategy should consider how FAO intends to engage on issues of One Health and gender, also based on appropriate analyses. The strategy should set targets and outcome-based indicators to measure progress and achievements.

170. The FAO Action Plans on AMR, their focus areas and results chain are important steps in defining FAO's AMR work, but do not sufficiently detail its approach or prioritize its activities and areas of work. Prioritization would make best use of FAO's resources and strengthen its position within the global AMR architecture. FAO should form its own sectoral justification for its AMR work, enabling better targeting of messages to convince national authorities of the threat of AMR.
171. For a complete One Health approach, FAO needs to deliver on all sectors associated with AMR under its mandate. It needs to consolidate up-to-date knowledge on AMR risks in the under-represented sectors within its mandate. If FAO believes it cannot implement a true One Health approach under its own auspices, it could consider developing new partnerships or allying with organizations and institutions to develop an AMR response for those sectors. This could be an opportunity to use the expertise and research networks of the AMR Reference Centres to address gaps in knowledge. Either way, the strategy needs to be developed through the joint efforts of relevant divisions, with an overarching AMR senior management team and coordination structure.

Recommendation 2. Reducing the global threat of AMR is a substantial task and FAO has the mandate for the food and agriculture sectors, which requires strong leadership and advocacy at all levels. To achieve this, FAO should consolidate its work on AMR into a strong programmatic approach with a central coordination and management structure that is supported by dedicated core funding over the next biennium, as well as by links with the Regional Offices. The multidisciplinary approach should be strengthened to take fully into account all of FAO's core technical areas and their connections to AMR. This would give FAO greater visibility on its AMR role and demonstrate its commitment to AMR risk reduction.

172. FAO needs to do more to ensure a cohesive and interdisciplinary programme on AMR that can tie in with all areas of its work. A programmatic approach does not mean a formal programme with a separate technical division on AMR, but a core management structure, possibly within an existing centre, to coordinate between technical divisions and thematic focus areas. To ensure broad collaboration, the evaluation team recommends that there be a clear allocation of resources from FAO's core budget and that it should not be guided solely by one division or office. A dedicated structure would allow more effective coordination and communication across all of FAO's work on AMR, including in Country and Regional Offices, ensuring its long-term sustainability.
173. The evaluation team acknowledges the effort made through the interdisciplinary AMR-WG and focal points for different areas and regions, but the overall coordination of activities and their management cannot be voluntary or ad hoc, as turnover of personnel could lead to AMR activities being discontinued. The evaluation team recommends formal recognition

of the contribution of AMR-WG members in the body's terms of reference. AMR is an important area of FAO's work and an urgent global threat that falls under FAO's mandate. Together with a long-term strategy, a programmatic approach supported by the core budget will indicate the seriousness of the issue and FAO's commitment to all Members, attract greater extrabudgetary funding and enable FAO to play its role in full within the Tripartite and the global AMR architecture.

Recommendation 3. FAO should sustain and strengthen its scientific approach to AMR at all levels, through greater engagement with the AMR-WGs, an enhanced role for the Reference Centres in supporting AMR work at all levels and broader scientific collaboration.

174. FAO's scientific base on AMR remains key to building commitment and confidence on AMR among stakeholders. Internally, greater collaboration to strengthen FAO's scientific approach must be encouraged among personnel at all levels. Channels for collaboration and knowledge sharing between Country Offices, Regional Offices and headquarters should be strengthened and linked through enhanced collaboration with the FAO Reference Centres for AMR. The continuity and appropriate use of the AMR-WG should be ensured, so that personnel can use it to engage on technical issues and cross-divisional learning. Its multidisciplinary aspect should be supported and used to better engage with the Reference Centres for AMR. Among other things, this will help to optimize the use of FAO's expertise to better support Regional and Country Offices.
175. Through partnerships, FAO should address areas where there is limited scientific evidence on AMR. An immediate starting point would be to boost engagement with the Reference Centres on AMR and expand their role to include support for planning and the development of FAO's AMR strategy, such as risk and value-chain analysis. Reference centres could also be set up for socioeconomic investigations, facilitating informed links between FAO's AMR activities and expected goals.

Recommendation 4. FAO should consider innovative approaches in order to make progress in focus areas where resource and socioeconomic constraints are hindering behavioural change across value chains and hampering commitment to combat the threat of AMR.

176. Because of the complex aspects and insidious nature of AMR and limited awareness of its consequences worldwide, resources for work on AMR will remain constrained at both global and country level. At the same time, in those sectors where resistance levels are less known due to a lack of evidence, it will be tough to convince stakeholders on the importance of AMR work and to put in place effective monitoring and control systems. FAO needs to position its work on AMR in such a way that it is able to work around such constraints and find novel entry points for its activities.
177. One way to change farming practices would be to raise consumer awareness of products that may contain antimicrobials, along with the public more broadly, to help generate demand for products free of antimicrobial residues and enhance incentives for prudent AMU by farmers. Furthermore, cost-effective alternatives to antimicrobials should be explored to protect animal health and farm productivity, thus protecting the livelihoods of farmers and their communities. Any such initiatives would need to be based on evidence from appropriate pilot studies. FAO could further collaborate with WHO on aspects involving food safety and consumers. In countries where AMR surveillance remains a challenge, FAO should support pilot studies to generate data. Shared with policymakers, this would help call attention to AMR issues and attract resources to enable the implementation of surveillance systems in key sectors where AMR has been identified as an issue.

Matrix of findings, conclusions and recommendations

EVALUATION DIMENSIONS

FAO's role in the global AMR architecture

1. FAO has a significant history of collaborating with key international organisations on AMR. The collaboration and FAO's work on AMR has increased since 2014, which aligns well with increasing AMR challenges.

2. FAO's mandate for its global work on AMR in the food and agriculture sectors is strong, as confirmed by the UNGA, FAO Members and partners.

3. FAO has comparative technical and organizational advantages for delivering a broad programme of work on AMR. However, the focus on selected countries and sub-sectors is not at par with the importance of AMR.

6. Key actors working on AMR have aligned themselves to the GAP and the recent drive for common Tripartite management should further strengthen AMR coordination.

15. Within the Tripartite, there are opportunities for FAO to play a greater role in the food and agriculture sectors and to strengthen its collaboration. Outside the Tripartite, actors across the antimicrobial lifecycle as well as the food value chains need to be systematically engage.

7. FAO has good linkages with the AMR scientific community. In the last two years there has been a conscious effort to formalise and systematise this engagement.

Organizational and institutional set-up of FAO's AMR work

4. FAO-AP's focus areas provide a strong basis for future AMR work that remain relevant. However, wider engagement in its development, a complete OH approach and implementation pathways were missing.

5. The FAO-AP2 addresses most key issues associated with FAO-AP. However, it still needs to be situated within a broader FAO AMR strategy.

8. Although the FAO-AP aimed to operate within the FAO Strategic Framework, there is no evidence that this was effectively achieved. Further a complete alignment with all relevant divisions and offices needs to be strengthened.

16. The implementation of FAO-AP has been hampered by the lack of full-time overarching AMR management leaving gaps in coordination and planning, as well as internal and external communication. This is detrimental to long-term continuity of FAO's work on AMR and puts at risk the Organization's ability to fulfil its commitments on AMR.

17. At the regional and country level, coordination and technical support arrangements have worked well to deliver AMR projects. However, a programmatic approach on AMR does not exist in all regions and a few issues linked to administrative procedures and procurement were noted.

FAO's effectiveness in achieving results on AMR

9. FAO has played a significant role in the development and implementation AMR NAPs but their implementation and multisectoral collaboration on AMR remains a challenge.

10. Under focus area 1, FAO has contributed to improved AMR awareness across national stakeholders. However, direct users of antimicrobials and those who consume products grown using them, have not been targeted at scale through its activities.

11. FAO has successfully rolled out its tool for assessing in-country AMR surveillance capacity. However, active surveillance for AMR remains a challenge in most countries.

12. FAO has provided substantial support on governance of AMR. Nevertheless, for FAO to contribute to optimal AMU, the work needs to bring about changes in legislation. Greater support on enforcement of AMR regulations is also needed.

13. FAO has developed important AMU guidelines and has conducted outreach activities for farmers on AMR. However, there is limited evidence on their effectiveness in reducing AMU and changing farming practices.

14. FAO's AMR publications provide a scientific basis for its activities and technical advice to stakeholder, notably publications from the regional and country offices. FAO needs to continue to engage on such work across the OH spectrum.

18. Activities implemented by FAO have been important initial steps on AMR across countries. However, there is limited buy-in from national governments. For sustainability of results it is important that all stakeholders recognise the significance of AMR and are able to commit resources for it.

19. AMR projects have the potential to contribute to gender mainstreaming, equality and women's empowerment. The FAO-AP and proposed FAO-AP2 do not address gender issues and there is no structured effort to integrate them.

20. FAO has not been able to develop a complete OH approach to AMR even though this is promoted in its Action Plans, reports and project documents.

21. Multiple results frameworks and databases are associated with FAO's work on AMR. However, there is no comprehensive framework covering the entire its entire work.

CONCLUSIONS

1. AMR is an undisputed global threat and minimizing it requires concerted collaborative actions at all levels. FAO has a strong mandate to work on AMR in the food and agriculture sectors and is well positioned to deliver on AMR.

4. FAO's work on AMR remains aligned with its responsibilities within the Tripartite agreement and is guided by the GAP. However, further opportunities to strengthen its role and for closer collaboration remain.

5. FAO has played a strong role in coordinating and collaborating with a range of actors on AMR. However, at all levels, greater systematic coordination along the food and antimicrobial value chains is required.

2. A FAO AMR strategy demonstrating organizational commitment is missing, which is associated with critical issues hampering its progress and global commitment to AMR.

3. There is no overarching AMR management team or structure coordinating the entire work of FAO on AMR. This does not reflect the ambitions of FAO's current plan and, even less, its role and the seriousness of the issue.

8. FAO has delivered a substantive programme of work on AMR that is essential in building a strong foundation for future. Nevertheless, there are limited results towards achieving optimal AMU.

6. FAO's technical expertise is one of its key comparative advantages for its work on AMR.

7. A OH approach is critical for tackling AMR. Even though there are a few promising examples of the approach being advocated, FAO has not been able to successfully demonstrate a complete OH approach.

RECOMMENDATIONS

1. FAO should prioritize its work in a long-term strategy on AMR, articulating its long-term role on AMR and its approach at the country level. It should be based on suitable analyses, while identifying key partnerships and stakeholders at all levels. It further needs to be underpinned by a theory of change and consider how FAO intends to engage on OH and gender.

2. FAO should consolidate its work on AMR into a strong programmatic approach with a central coordination and management structure that is supported by dedicated core funding and by links to the regional offices. A multidisciplinary approach should be further strengthened.

3. FAO should sustain and strengthen its scientific approach to AMR at all levels.

4. FAO should consider innovative approaches to advance its focus areas that acknowledge existing resource and socio-economic constraints across value chains.

Rating criteria	Conclusions: Assessment	Recommendations: Urgency level
	Not satisfactory	Immediate
	Medium	Medium term
	Satisfactory	Long term

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Appendix 1. List of FAO AMR projects covered in this evaluation

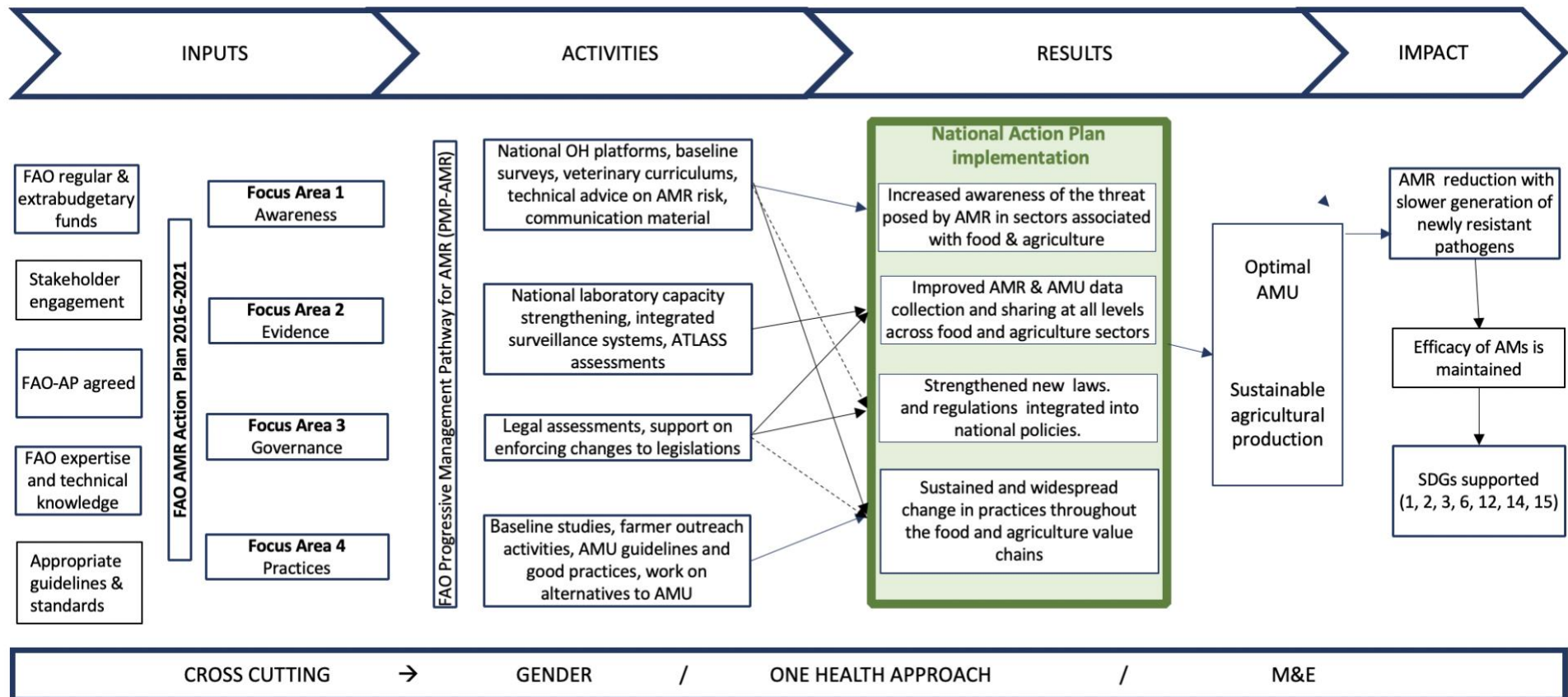
	Project symbol	Project name	Start date	End date	Budget [USD]	Region/country
1	GCP /GLO/710/UK	Engaging the food and agriculture sectors in Sub-Saharan Africa and South and South-east Asia in the global effort to combat antimicrobial resistance using a One Health approach	1 Sep 16	31 Mar 21	10 713 835	Africa and South-east Asia
2	OSRO/RAS/502/USA	Addressing antimicrobial usage in Asia's livestock production industry (evaluated through EPT-2 evaluation)	1 Oct 15	31 Dec 21	6 350 000	Asia
3	GCP /RER/057/RUS	Reducing the advance of antimicrobial resistance in food and agriculture	30 Mar 17	30 Nov 21	3 250 000	Armenia, Belarus, Kazakhstan, Kyrgyzstan and Tajikistan
4	UNJP/SLS/001/EC	Trabajando juntos para combatir la resistencia a los antimicrobianos	1 Feb 2020	31 Jan 2023	1 855 163	Latin America
5	OSRO/GLO/812/NOR	Risk analysis, risk communication and governance support for sustainable management of antimicrobial resistance in food production systems	1 Dec 18	30 Nov 20	1 346 818	Headquarters (86% funding), Latin America (14%)
6	OSRO/MYA/902/UK	Antimicrobial monitoring in poultry, Myanmar	1 Sep 2019	31 Aug 2021	1 377 850	Myanmar
7	FMM/RLA/215/MUL	Apoyo para el desarrollo de planes nacionales de resistencia a los antimicrobianos en América Latina	5 Dec 2016	31 May 2018	750 000	Latin America
8	FMM/RAS/298/MUL	Strengthening capacities, policies and National Action Plans on aquatic AMR	17 Jan 2017	31 May 2018	565 714	South-east Asia
9	TCP/RAS/3702	Support mitigation of antimicrobial resistance (AMR) risk associated with aquaculture in Asia	1 Feb 2019	31 Jul 2021	462 000	Asia
10	TCP/UKR/3702	Strengthening national capacities to address antimicrobial resistance (AMR) risks	1 Feb 2019	31 Jan 2021	253 000	Ukraine
11	TCP/MDV/3702	Supporting the veterinary and aquaculture sector in the implementation of the National Action Plan for containment of antimicrobial resistance	11 Jul 2019	30 Jun 2021	198 000	Maldives
12	TCP/RLA/3708	Contención de la resistencia a los antimicrobianos en los sistemas de producción de alimentos terrestres y acuáticos, bajo el enfoque Una Salud	1 Nov 2018	30 Oct 2020	145 000	Latin America

Appendix 1. List of FAO AMR project covered in this evaluation

	Project symbol	Project name	Start date	End date	Budget [USD]	Region/country
13	GCP/GLO/804/FR	Support to the organization of a specialist consultation meeting on FAO Progressive Management Pathway (PMP) on antimicrobial resistance (AMR)	1 May 2017	30 Apr 2019	91 273	Global
14	OSRO/GLO/507/USA	Supporting the Global Health Security Agenda (GHSA) to address zoonotic disease and animal health in Africa (AMR activities starting from 2020)	1 Oct 2015	31 Dec 2020	66 111 695	Global
15	OSRO/GLO/510/UK	Support to FAO for developing a national strategy to reduce the threat of AMR	24 Dec 2015	31 Oct 2016	896 933	Global
16	TCP/RAS/3620	Strengthening One Health approaches for countries in the Asia Pacific Region	1 Apr 2018	31 Dec 2019	490 000	Nepal, Papua New Guinea, Sri Lanka, Viet Nam
17	OSRO/LAO/902/OPS	Strengthening AMR/AMU surveillance in the animal health sector in the Lao People's Democratic Republic	5 Jun 2019	14 Apr 2021	1 053 231	Lao People's Democratic Republic
18	TCP/THA/3503	Enhancing national capacities for antimicrobial resistance risk management in animal food production in Thailand	12 Aug 2015	31 Dec 2017	242 000	Thailand
19	GCP/ZIM/031/UK	Addressing gaps in surveillance of antimicrobial-resistant bacteria in Zimbabwe	24 Mar 2020	23 Nov 2021	5 174 166	Zimbabwe

Appendix 2. Results chain for FAO's work on AMR

Note: The results chain is based on the FAO-AP and notes from interviews with the AMR project teams. It does not take into account the FAO-AP2. The sole purpose of the results chain is to present the linkages between the focus areas and to guide Section 3.3 of this evaluation on effectiveness.



Source: Developed by the evaluation team based on the FAO-AP and key informant interviews

Appendix 3. People interviewed

First Name	Last Name	Position	Organization
Internal stakeholders			
Vitalii	Bashynskyi	AMR Focal Point, national consultant	FAO- Ukraine
Corallina	Basilli	Programme Officer	FAO- Headquarters
Daniela	Battaglia	Livestock Production Officer	FAO- Vienna
Berhanu	Bedane	Livestock Development Officer	FAO- Sub-regional Office for Southern Africa
Fenton	Beed	Senior Agriculture Officer	FAO- Headquarters
Zaruhi	Beglaryan	National Project Coordinator	FAO- Armenia
Daniel	Beltran Alcrudo	Animal Health Officer	FAO- Budapest
Catherine	Bessy	Food Safety and Quality Officer	FAO- Headquarters
Eric	Brum	ECTAD Team Leader Bangladesh	FAO- Bangladesh
Carmen	Bullon	Legal Officer	FAO- Headquarters
Sarah	Cahill	Food Safety Officer	FAO- Headquarters
Marisa	Caipo	Food Safety and Quality Officer	FAO- Santiago
Benjamin	Caldwell	Forestry Officer	FAO- Headquarters
Nadia	Chaudhary	National Technical Advisor (Law and Jurisprudence)	FAO- Bangladesh
Chris	Creese	Communications Expert	FAO- Headquarters
Irina	Curca	Programme Officer	FAO- Headquarters
María Alicia	De La Rosa B.	Área de Programa FAOPE y apoyo en proyectos RAM.	FAO- Peru
Katinka	DeBalogh	Senior Animal Production Health Officer	FAO- Bangkok
Leopoldo	DelBarrio	Coordinador en Resistencia a los Antimicrobianos y Una Salud	FAO- Santiago
Marlos	DeSouza	Senior Officer	FAO- Headquarters
Alejandro	Dorado Garcia	Animal Health Officer	FAO- Headquarters
Kululeko	Dube	Livestock Specialist	FAO- Zimbabwe
Suzanne	Eckford	Ex Fleming Fund project LTO	FAO- Headquarters
Ahmed	Elidrissi	Assistant to the Chief, AGAH, Infectious Diseases and Programming (EMPRES)	FAO- Headquarters
Mary Joy	Gordoncillo	Regional Project Coordinator	FAO- Bangkok
Alice	Green	Food Safety and Quality Officer	FAO- Headquarters
Ani	Grigoryan	National Communications Specialist	FAO- Armenia
Baogen	Gu	Senior Agriculture Officer	FAO- Headquarters
Armando	Hoet	Antimicrobial Resistance - Visiting Professor	FAO- Headquarters
Emmanuel	Kabali	AMR project coordination and technical support consultant	FAO- Headquarters
Stella	Kiambi	AMR National Coordinator and Deputy ECTAD Team Leader	FAO- Kenya
JieunChoi	Kim	Animal Health Officer	FAO- Headquarters

First Name	Last Name	Position	Organization
Tabitha	Kimani	Sub-regional AMR Coordinator (East Africa)	FAO- Kenya
Eva	Kohlschmid	Pesticide Management Expert	FAO- Headquarters
Hilde	Kruse	Senior Food Standards Officer	FAO- Headquarters
Francesca	Latronico	AMR Diagnostics specialist	FAO- Headquarters
Jeff	LeJeune	Food Safety Officer	FAO- Headquarters
Yingjing	Li	Legal Consultant	FAO- Headquarters
Markus	Lipp	Senior Food Safety Officer	FAO- Headquarters
Juan	Lubroth	Ex CVO	FAO- Headquarters
Daniela	Mangione	Field Programme Officer	FAO- Budapest
Friederike	Mayen	Senior Livestock Development Officer	FAO- Cairo
KiJung	Min	RAF AMR Communications Consultant	FAO- Accra
Koen	Mitiens	AMR Specialist / FMD Quantitative Risk Assessor	FAO- Headquarters
Béatrice	Mouillé	Deputy Laboratory Unit Coordinator	FAO- Headquarters
Scott	Newman	Regional Animal Health and Production officer RAF	FAO- Accra
Hang	NguyenThuy	National Communications Coordinator	FAO- Viet Nam
Divine	Njie	Nutrition and Food Systems Officer	FAO- Headquarters
Mark	Obonyo	AMR Coordinator	FAO Sub-Regional Office of Southern Africa
Henkrik Jan	Ormel	Senior Inter-Agency coordinator on One Health	FAO- Headquarters
IreneLabia	Ouoba	Regional Antimicrobial Resistance (AMR) Project Coordinator	FAO- Accra
Pawin	Padungtod	ECTAD Team Leader	FAO- Viet Nam
Kathiravan	Periasamy	Livestock Geneticist/Breeder	FAO- Vienna
Julio	Pinto	Animal Health Officer	FAO - Geneva
Cortney	Price	AMR Behavioural Change Expert	FAO- Headquarters
Eran	Raizman	Senior Animal Production Officer	FAO- Budapest
Melba	Reantaso	Aquaculture Officer	FAO- Headquarters
Enrique	Román	Asistente de Programa y Oficial a cargo de la Representación de FAO en Perú	FAO- Peru
Andry Vasylovych	Rozstalnyy	Animal Health Officer	FAO- Headquarters
James	Sasanya	Food Safety Specialist (Veterinary Drug Residues)	FAO- Vienna
Shiroma	Sathyapala	Forestry Officer	FAO- Headquarters
Beate	Scherf	Animal Production Officer	FAO- Headquarters
Bharani	Settypalli	Molecular Biologist	FAO- Vienna
Artur	Shamilov	Agriculture Officer	FAO- Headquarters
Junxia	Song	Senior Animal Health Officer	FAO- Headquarters

First Name	Last Name	Position	Organization
Keith	Sumption	CVO	FAO- Headquarters
Berhe Gebreegziabher	Tekola	Director, AGA	FAO- Headquarters
Kim-Anh	Tempelman	Project Officer	FAO- Headquarters
Antonio	Valcarce	Animal Health Expert (Antimicrobial Resistance)	FAO- Headquarters
Jing	Xu	Animal Health Officer	FAO- Headquarters
Lina	Yu	Associate Professional Officer	FAO- Headquarters
External stakeholders			
Niloy	Acharya	AMR policy and UK's FAO Reference Centre for AMR	UK Government- Department for Environment, Food and Rural Affairs (Defra)
Arturo	Aivar Guillén	Sub Director de Inocuidad Pesquera	Organismo Nacional de Sanidad Pesquera (SANIPES)
Camila	Alva Estabridis	Dirección de Calidad Ambiental	Ministerio del Ambiente
Jacqueline	Alvarez	Head, Knowledge and Risk Unit, Chemicals and Health Branch	UNEP- Economy Division
Ruth	Atkinson	Public Health Specialist	UK Government- Department of Health and Social Care
Manuel	Aybar	Gerente	Asociación Peruana de Avicultores
Mariel	Aybar Espinoza	Subunidad de Análisis de Riesgo	Servicio Nacional de Sanidad Agraria - SENASA
Anand	Balachandran	Unit Head, National Action Plans and Monitoring	WHO- Antimicrobial Resistance Division
Luis	Barcos	Representative for the Americas	Organización Internacional de Sanidad Animal - OIE
Eva Martinez	Bermudez	Directora General de Sanidad Animal, punto focal de OIE	Servicio Nacional de Sanidad Agraria - SENASA
Mario	Berrocal Perez	Gerente General	Asociación Peruana de Avicultores
Yevhenii	Boyko	Chief Veterinarian	MHP (Mironivsky Hliboproduct)
Luis Alberto	Bravo Barrientos	Director de Calidad Ambiental y Ecoeficiencia	Ministerio del Ambiente
Juan	Carrique-Mas	Research Fellow and Principal Investigator	Oxford University Clinical Research Unit, Ho Chi Minh City.
Francois	Caya	Chief of Staff	OIE Headquarters
Hanh	Chau Thi Tuyet	Technical official	D-FISH
Tuat	Chu Van	Senior Officer	Ministry of Agriculture and Rural Development, National Centre for Veterinary Hygiene Inspection
Rungtip	Chuanchuen	Academic Professor, Director for CUARM	Chulalongkorn University- Department of Veterinary Public Health
Carmen	Cruz Gamboa	Directora General	Dirección General de Sanidad Ambiental e Inocuidad Alimentaria- DIGESA
Ben	Davies	Charge de mission	OIE- Antimicrobial Resistance and Veterinary Products Department
César	De La Cruz	Director General de Sanidad Vegetal	Servicio Nacional de Sanidad Agraria - SENASA
Kinzang	Dukpa	Regional Project Coordinator, One Health	OIE Regional Representation for Asia and the Pacific, Tokyo Japan

First Name	Last Name	Position	Organization
Elisabeth	Erlacher-Vindel	Head of the Antimicrobial Resistance and Veterinary Products Department	OIE- Antimicrobial Resistance and Veterinary Products Department
Ubaldo	Flores Barrueta	Director de la Subdirección de Análisis de Riesgo y Vigilancia Epidemiológica	Servicio Nacional de Sanidad Agraria - SENASA
Neil	Fourie	Agriculture Attaché	UK Government- UK mission, Rome
Tatiana	Garcia	Delegación	Unión Europea
Tetiana	Garkavenko	Deputy Director	State Scientific and Research Institute of Laboratory Diagnostics and Veterinary and Sanitary Expertise
Ronnie	Gavilán	Especialista	Instituto Nacional de Salud del Ministerio de Salud.
Arman	Gevorkyan	Head of Laboratory	Veterinary-Sanitary and Phytosanitary Laboratory Services Center SNCO
Gayane	Ghukasyan	Country Programme Coordinator	WHO Armenia
Muriel	Gómez Sanchez	Especialista veterinario	Organismo Nacional de Sanidad Pesquera (SANIPES)
Delia	Grace	Program Leader	ILRI- Animal and Human Health
Kristina	Gyurjyan	AMR Focal Point, Head of Department, Secretary of the Inter-sectoral working group on AMR	Ministry of Healthcare
Hanh	Ha Thuy	Deputy Director General	Ministry of Agriculture and Rural Development, National Agricultural Extension Center
Karina	Harutyunyan	Consultant	Strategic Development Agency, NGO
Kitty	Healy	Head of Antimicrobial Resistance Policy and Surveillance Team	UK Government- Department for Environment, Food and Rural Affairs (Defra)
Rene	Hendriksen	Professor, Head of Research Group	Technical University of Denmark- National Food Institute
Tinashe	Hodobo	Veterinary Officer - One Health.	Ministry of Agriculture, Mechanization, Irrigation and Development (MAMID)
Minh	Huyen	Member of AMR National Steering Committee	National Institute of Veterinary Research, Hanoi
Holly	Jones	Fleming Fund Deputy Team Leader	UK Government- Department of Health and Social Care
Sergii	Karpenko	Director	Association "Union of Poultry Farmers of Ukraine"
Borys	Kobal	Chief State Veterinary Inspector of Ukraine	State Service of Ukraine on Food Safety and Consumer Protection:
Roman	Kolesnik	Specialist	Public Health Center of Ministry of Health: Antimicrobial resistance and Infection control Department
Yurii	Kosenko	Senior Officer and OIE Focal Point for AMR	State Research Control Institute of Veterinary Preparation and Food Additives

Appendix 3. People interviewed

First Name	Last Name	Position	Organization
Oleksandr	Kovalenko	Director	Sumy Regional State Laboratory of the State Service of Ukraine on Food Safety and Consumer Protection
Hue	Le Thi	AMR FP and member of national AMR committee	Ministry of Agriculture and Rural Development, Department of Animal Health
Ernesto	Liebana	Head	EFSA- Biocontaminants Unit
Susan	Luu	AMR Focal Point	WHO Viet Nam
Zivani	Makoni	Senior Medicines Assessor, Member of AMR OH Core Group and OIE Focal Point	Medicines Control Authority of Zimbabwe
Rubén	Mallaopma Soriano	Jefe de Sanidad	Asociación Peruana de Porcicultores
Portia	Manangazira	Director and Chair of AMR One Health Core Group.	Ministry of Health and Child Care
Johnny	Marchán Peña	Presidente Ejecutivo	Organismo Nacional de Sanidad Pesquera (SANIPES)
Olga	Martynenko	General Director	Biolights (Private diagnostic microbiology laboratory)
Tapfumanei	Mashe	Researcher	Ministry of Health and Child Care
Gift	Matope	Dean and Professor of Microbiology	Faculty of Veterinary Science, University of Zimbabwe
Oleksandr	Matskov	Head	Public Health Center of Ministry of Health: Antimicrobial resistance and Infection control Department
Rubén	Mayorga Sagastume	Representante en Perú	Organización Panamericana de la Salud – OPS, Perú
Dzovinar	Melkomian	Veterinary consultant	Strategic Development Agency, NGO
Diego	Mellado	Jefe de Delegación	Unión Europea
Tulio	Merino Regalado	Gerente General	Sociedad Peruana de Acuicultura
Stanley	Midzi	Health Systems Strengthening Advisor	WHO Zimbabwe
Elvira	Mirzoyan	AMR Focal Point, Advisor to the Head	State Service for food safety
Arshnee	Moodley	Team leader, Antimicrobial resistance	International Livestock Research Institute (ILRI)- CGIAR AMR Hub
Mykola	Moroz	Director	Ministry for Development of Economy, Trade and Agriculture of Ukraine: Food Safety and Quality Directorate
Patrick	Mubangizi	Regional Coordinator	Mott McDonald Regional Office for East and Southern Africa, Kampala.
Shungu	Munyati	Director General	Biomedical Research and Training Institute (BRTI)
Junior	Mutswangwa	Head of Laboratories	Biomedical Research and Training Institute (BRTI)
Lizz	Nasskau	First Secretary, Deputy Perm Rep to FAO	UK Government- UK mission, Rome
Joan	Neyra	Consultor RAM	Organización Panamericana de la Salud -OPS, Perú

First Name	Last Name	Position	Organization
Elizabeth	Ngadze	Plant Pathology Lecturer	Crop Science Department, University of Zimbabwe
Hung	Nguyen	One Health Specialist and ILRI Representative for South East Asia.	International Livestock Research Institute, Vietnam.
Huong	Nguyen	Technical consultant for AMR and Fleming Fund	National Institute of Veterinary Research, Hanoi
Thuy	Nguyen Bich	Senior Research Officer	National Institute for Veterinary Research
Josphat	Nyika	Director of Veterinary Services	Ministry of Lands, Agriculture and Rural Resettlement, Department of Livestock and Veterinary Services
Michael	O'Leary	Senior Infectious Diseases Advisor	USAID Viet Nam
Unesu Ushewokunze	Obatolu	Chair and former Director of Veterinary Services	Animal Health Industry Committee (AHIC)
Jorge	Pastor Miranda	Especialista Insumos e Inocuidad Alimentaria y Punto focal RAM	Servicio Nacional de Sanidad Agraria - SENASA
Oscar	Pineda Coronel	Director General de Insumos e Inocuidad Alimentaria (DGIIA)	Servicio Nacional de Sanidad Agraria - SENASA
Volodymyr	Polischuk	Associate Professor	Department of Epizootology and Veterinary Business Organization
Miguel	Quevedo Valle	Jefe Nacional	Servicio Nacional de Sanidad Agraria - SENASA
Pilar	Ramon-Pardo	Team leader, Antimicrobial Resistance	Pan American Health Organization (PAHO), Washington
Antonio	Rota	Lead Global Technical Specialist	IFAD- Livestock and Rangeland
Iryna	Rudenko	Senior Specialist	Ministry of Health of Ukraine: Public Health Directorate
Terri	Sarch	Ambassador, UK Perm Rep to FAO	UK Government- UK mission, Rome
Stefan	Schwarz	Professor	Freie Universität Berlin- Department of Veterinary Medicine
Olga	Shevchenko	Head (acting) and OIE delegate (now she is deputy head)	State Service of Ukraine on Food Safety and Consumer Protection:
Ashkhen	Shirvanyan	AMR Focal Point, Head of Department of Food Safety	Ministry of Agriculture of the Republic of Armenia
Ritu	Singh	Health Office Director	USAID Viet Nam
Artem	Skrypnyk	Consultant	WHO Ukraine
Yomsi	Sylvia	Environmental Laboratory Manager	Environmental Management Agency
Mc Allister	Tafur Garzón	Profesional internacional de Sanidad Animal, Productos Veterinarios e Inocuidad de los Alimentos	Comunidad Andina de Naciones
Elizabeth	Tayler	Technical Officer	WHO- Antimicrobial Resistance Division
Ana María	Trelles	Gerente	Asociación Peruana de Porcicultores
Valerii A.	Ushkalov	Director	Ukrainian Laboratory of Quality and Safety of Agricultural Products
Olafur	Valsson	Programme Officer	OIE sub-regional Office for Southern Africa, Gaborone, Botswana.

Appendix 3. People interviewed

First Name	Last Name	Position	Organization
Jannet	Vélez Rivas	Vice Decana	Colegio Médico Veterinario del Perú
Guillermo	Vidal	Presidente	Asociación Peruana de Porcicultores
Carla	Villena	Punto focal RAM de SANIPES	Organismo Nacional de Sanidad Pesquera (SANIPES)
Giang	Vo Ngan	Senior Technical Advisor	Family Health International 360
Thomas	Wittum	Professor, Department Chair	Ohio State University (OSU)- Infectious Diseases Institute
Martín	Yagui	Secretario Técnico	Comisión Nacional de Resistencia Antimicrobiana - Ministerio de Salud
Oksana	Yurchenko	Vice President	Association of Pig Producers of Ukraine
Raúl	Zegarra	Consultor veterinario	Asociación Peruana de Avicultores

Appendix 4. Resume of AMR meetings by Tripartite organizations

Note: The table shows FAO's involvement over more than two decades to the outputs of the Tripartite and to other global meetings culminating in (i) the Global Action Plan, and (ii) FAO's own Action Plan on AMR. The Tripartite continues to produce significant joint output on AMR, and FAO continues to contribute to major discussions on AMR. The associated publications were reviewed by the evaluation team. The Tripartite management and coordination meetings are not included in this list.

List of meetings/consultations associated with FAO's work on AMR

1997. WHO. "The Medical Impact of the Use of Antimicrobials in Food Animals": Report and Proceedings of a WHO Meeting, Berlin, Germany, 13-17 October 1997.
1999. WHO. "Use of Quinolones in Food Animals and Potential Impact on Human Health": Report and Proceedings of a WHO Meeting, Geneva, Switzerland, 2-5 June 1998.
2000. WHO Global Principles for the containment of antimicrobial resistance in animals intended for food. WHO Consultation with the participation of FAO and OIE, 5-9 June 2000, Geneva, Switzerland.
2001. Monitoring antimicrobial usage in food animals for the protection of human health: report of a WHO consultation, Oslo, Norway, 10-13 September 2001.
2003. First Joint FAO/OIE/WHO Expert Workshop on Non-Human Antimicrobial Usage and Antimicrobial Resistance: Scientific assessment, December 1 – 5. Geneva, WHO.
2004. Second Joint FAO/OIE/WHO Expert Workshop on Non-Human Antimicrobial Usage and Antimicrobial Resistance: Management options, 15-18 March Oslo, Norway.
2006. FAO/OIE/WHO. "Antimicrobial use in aquaculture and antimicrobial resistance". Joint FAO/OIE/WHO Expert consultation on antimicrobial use in aquaculture and antimicrobial resistance. Seoul, Republic of Korea, 13-16 June.
2007. Critically Important Antimicrobials. Report of the Joint FAO/WHO/OIE Expert Meeting, 26-30 November. FAO Headquarters, Rome. Rome, FAO
2010. FAO-OIE-WHO: Sharing responsibilities and coordinating global activities to address health risks at the animal-human-ecosystems interfaces – a tripartite concept note, 2010
2011. FAO-OIE-WHO. High-Level Technical Meeting to Address Health Risks at the Human-Animal Ecosystems Interfaces. Mexico City, Mexico 15-17 November 2011
2016. United Nations. Political Declaration of the High-level Meeting of the General Assembly on Antimicrobial Resistance, A/71/L.2. 22 September 2016.
2018. Joint FAO/WHO Expert Meeting in collaboration with OIE on Foodborne Antimicrobial Resistance: Role of the Environment, Crops and Biocides
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Appendix 5. List of M&E frameworks

	Name	Acronym	Type	Organization(s)	Sector
1	FAO Progressive Management Pathway for Antimicrobial Resistance	FAO-PMP-AMR	Self-assessment for countries	FAO	All
2	AMR Multi-Partner Trust Fund	AMR MPTF	Results chain	Tripartite	All
3	FAO Action Plan on AMR 2021-2025	FAO-AP2	Results chain	FAO	All
4	FAO AMR project progress reports	-	Output level reporting	FAO	Food and agriculture
5	Progress reports to FAO Governing Bodies	-	Output level reporting	FAO	Food and agriculture
6	Monitoring and evaluation framework of the Global Action Plan on AMR	GAP M&E	M&E framework	Tripartite (+UNEP)	All
7	Joint External Evaluation of International Health Regulations	JEE	External country assessment	WHO	Human health
8	evaluation of Performance of Veterinary Services	PVS	External country assessment	OIE	Animal Health
9	FAO Assessment Tool for Laboratories and AMR Surveillance Systems	FAO-ATLASS	External country assessment /self-assessment for countries	FAO	Food and agriculture
10	Tripartite AMR country self-assessment survey	TrACSS	Database	Tripartite	All
11	WHONET Software	WHONET	Data-collection software	WHO	All
12	Global AMR Surveillance System	GLASS	Database	WHO	Human health
13	OIE AMU data collection	-	Database	OIE	Animal Health
14	Tripartite Integrated Surveillance System on AMR/AMU	TISSA	Database	Tripartite	All
15	FAOSTAT, FAO FishStat Plus, FAOLEX-AMR, OIE-WAHIS and GLAAS	Other databases	Database	Tripartite	All

Sources: FAO, 2020f; FAO, n.d.b.; MPTF, 2020; WHO, FAO & OIE, 2019a;

Annexes

Annex 1. Terms of reference

<http://www.fao.org/3/cb3643en/cb3643en.pdf>

Annex 2. Results of the AMR surveys

<http://www.fao.org/3/cb3780en/cb3780en.pdf>

Annex 3. Report by the AMR expert panel

<http://www.fao.org/3/cb3781en/cb3781en.pdf>

Office of Evaluation
evaluation@fao.org
www.fao.org/evaluation

Food and Agriculture Organization of the United Nations
Rome, Italy