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Antimicrobial resistance: the economic cost of action or inaction

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I. Introduction

1. Antimicrobial resistance (AMR) is a One Health challenge. FAO plays a key role in supporting governments, producers, traders and other stakeholders to move towards the responsible use of antimicrobials in agriculture, thus helping reduce AMR risk in agrifood systems. Combating AMR is anchored in the FAO Programme Priority Area on One Health.¹
2. At its 39th Session in June 2015, the FAO Conference adopted Resolution 4/2015 on AMR² which recognized that it poses an increasingly serious threat to public health and sustainable food production, and that an effective response should involve government and society.
3. To support the implementation of Resolution 4/2015, the FAO Action Plan on Antimicrobial Resistance 2021-2025 was developed.³ It aligns with the Global Action Plan on Antimicrobial

¹ FAO. 2021. *FAO's Strategic Framework 2022-31*. Rome. <https://openknowledge.fao.org/handle/20.500.14283/cb7099en>

² C 2015/REP, para 45 <https://openknowledge.fao.org/handle/20.500.14283/mo153e>

³ FAO. 2021. *The FAO Action Plan on Antimicrobial Resistance 2021-2025*. Rome. <https://openknowledge.fao.org/handle/20.500.14283/cb5545en>

Documents can be consulted at www.fao.org

Resistance,⁴ highlighting the necessity of adopting a One Health approach, with the involvement of public health and veterinary authorities, the food and agriculture sector, financial planners, environmental specialists and consumers. Through the end of 2023, FAO has supported more than 60 countries across the world to implement activities in line with the FAO Action Plan on Antimicrobial Resistance.⁵

4. Activities under output 5.2 of the FAO Action Plan on Antimicrobial Resistance include to “support the development of the economic case for protecting food systems from the impacts of AMR, including assessments or pilot studies on the cessation of AMU [antimicrobial use] for growth promotion” and “support the development of AMR economic data for sectors under the FAO remit including knowledge-based and economic solutions (e.g. cost-benefit analyses) to better support the adoption of good practices and the generation of AMU/AMR data.”⁶

5. Responding to the request in 2021 from the Global Leaders Group on Antimicrobial Resistance to build the economic case for AMR investment, the Quadripartite Joint Secretariat on AMR (consisting of FAO, the United Nations Environment Programme [UNEP], the World Health Organization [WHO] and the World Organisation for Animal Health [WOAH]) has been working to estimate the costs of AMR and the associated benefits of the AMR response across different sectors.⁷

6. Since 2023, FAO has been supporting the Quadripartite Joint Secretariat on AMR to estimate the economic burden that the misuse of antimicrobials can impose on global livestock production systems, emphasizing the urgency of implementing effective measures in the forthcoming years.

7. This document describes the economic assessment that is taking place to identify, calculate and compare the cost and benefits, together with the inherent trade-offs, of reducing the need for antimicrobials, including its use as growth promoters (AGPs) in livestock production.

II. The economic assessment

8. The development of this economic assessment encompasses four main components, including projecting the future trajectory of livestock biomass, estimating the anticipated quantity of AMU in livestock production, evaluating the impact of AGPs on livestock productivity and, finally, conducting a detailed analysis of the economic effects stemming from the reduction of AGP usage on overall livestock output. Details related to the four components are as follows.

9. The future of global livestock biomass: Assessing the economic effect of reducing the need for AMU in livestock production requires forecasting the future trajectories of livestock biomass. Livestock biomass represents the total weight of the livestock population, measured in metric units (tonnes). The intertwining relationship between AMU levels and livestock biomass underscores the critical importance of comprehending and predicting the evolving patterns in livestock biomass by 2040, considering variations in the distribution and structure of livestock biomass across geographical regions, subregions and distinct animal species.

10. Livestock AMU global perspectives: Anticipating the expected change in livestock AMU is considered crucial for monitoring and mitigating the risks associated with the misuse of antimicrobials. In this component, the expected change in AMU within livestock is projected by combining two unique

⁴ WHO. 2015. *Global action plan on antimicrobial resistance*. Geneva. <https://iris.who.int/handle/10665/193736>

⁵ COAG:LI/2024/INF/10, <https://www.fao.org/coag/sub-committee-on-livestock/second-session/information-documents/en/>

⁶ FAO. 2021. *The FAO Action Plan on Antimicrobial Resistance 2021–2025*. Rome. <https://openknowledge.fao.org/handle/20.500.14283/cb5545en>

⁷ Global Leaders Group on Antimicrobial Resistance. 2024. Towards specific commitments and action in the response to antimicrobial resistance: Recommendations for consideration by UN Member States in the outcome document of the High-level Meeting on AMR in September 2024. <https://www.amrleaders.org/resources/m/item/gleg-report>

global datasets on biomass and AMU in livestock from FAO and WOA, applying a refined method for calculating biomass, employing econometric time series models for long-term forecast analyses and constructing different potential scenarios for AMU in livestock.

11. **Impact of AGPs on livestock productivity:** The impact of AGPs on livestock productivity is examined through a systematic literature review, aiming to establish a comprehensive understanding of the multifaceted effects of antimicrobials on livestock productivity. The study expands previous research by exploring the effect across different geographical regions and by production system. Essential insights are provided by the results to inform the subsequent exercise of modelling the effect of reducing AGPs on livestock productivity.

12. **The economic cost of reducing AMU in livestock production:** To assess the impact of phasing out AGPs, the Aglink-Cosimo model will be employed. This is a supply-demand model developed by the Organisation for Economic Co-operation and Development (OECD) and FAO to generate medium-term agricultural market projections. By employing this model, the cumulative effect of reducing the use of AGPs on livestock productivity will be simulated as well as the consequent effect on total livestock output by 2040.

13. **FAO aims to finalize this work and publish the final assessment within the timeframe of 2024 to 2025.** Four background technical papers, one for each of the main components of the economic assessment, will be drafted between January and August 2024. Each technical paper will be scientifically peer-reviewed, and comments addressed between September and December 2024. The final assessment will be drafted between January and February and launched in March 2025.