CODEX ALIMENTARIUS COMMISSION

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Food and Agriculture Organization of the United Nations

World Health Organization

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Agenda Item 3 **CX/RVDF 23/26/3**

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JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON RESIDUES OF VETERINARY DRUGS IN FOODS

26th Session

13-17 February 2023

Portland, Oregon, United States of America

MATTERS OF INTEREST ARISING FROM FAO/WHO INCLUDING JECFA

Information from the 94th Meeting of Joint FAO/WHO Committee on Food Additives (JECFA)

1. Since the last session of CCRVDF (2021), five meetings of JECFA (i.e. JECFA 91st, 92nd, 93rd, 94th and 95th) have been convened. These meetings addressed food additives (i.e. JECFA 92nd and 95th), veterinary drug residues (i.e. JECFA 94th) and contaminants in food (i.e. JECFA 91st and 93rd). The reports and detailed monographs from these meetings are available at the relevant FAO[1] and WHO[2] web sites.

2. JECFA94 was held virtually from 16 to 27 May 2022, to evaluate residues of certain veterinary drugs in food. The full report of the meeting is published in the WHO Technical Report Series (TRS 1041)[3].Toxicological monographs summarising the data that were considered by JECFA94 will be published in *WHO Food Additives Series No.85*[4]; residue monographs summarising the data that were considered by JECFA94 are published in *FAO JECFA Monographs No.28*.

3. JECFA94 recommended maximum residue limits (MRLs) for the following veterinary drugs: Ivermectin (sheep, pigs and coats – fat, kidney, liver and muscle); Nicarbazin (chicken – skin with fat, kidney, liver and muscle). These MRL proposals will be discussed under Agenda Item 6.2.

4. Furthermore, JECFA94 evaluated other compounds for which the assessment could not be finalized (due to incomplete data) and also provided some general considerations on issues related to the work of the committee, as summarized in this paper.

Imidacloprid

5. In view of the absence of a study to assess the impact of imidacloprid on representative human intestinal microbiota, it was not possible to determine a microbiological ADI (mADI) and a microbiological ArfD (mARfD), thus JECFA94 was unable to establish an Acceptable Daily Intake (ADI) and an Acure Reference Dose (ArfD) for imidacloprid. Therefore, an MRL could not be recommended for imidacloprid.

6. Further information on disruption of the colonisation barrier and on the selection for, and emergence of, resistance in the microbiota in the gastrointestinal tract would assist in the further evaluation of the compound

Selamectin

7. JECFA94 evaluated Selamectin as part of a pilot program in which it conducts a parallel review of the information at the same time as the sponsor pursues approval in the proposed species with national authorities, as discussed at CCRVDF24[5].

8. JECFA94 withdrew the previous ADI and established an ADI of 0–0.05 mg/kg bw; however, specific MRLs could not be recommended for selamectin at this time due to a lack of established good veterinary practice (GVP).

9. Full registration in a Member State, including GVP, is required to complete the residue assessment.

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1 http://www.fao.org/food-safety/resources/publications/en/

2 https://www.who.int/groups/joint-fao-who-expert-committee-on-food-additives-(jecfa)/publications

3 https://www.who.int/publications/i/item/9789240057586

4 https://www.who.int/groups/joint-fao-who-expert-committee-on-food-additives-(jecfa)/publications/toxicological-monographs

5 REP18/RVDF24, paras. 98-103
http://www.fao.org/fao-who-codexalimentarius/meetings/detail/en/?meeting=CCRVDF&session=24

General Considerations

10. Some of the general considerations from JECFA94 are summarized and reported here below. The full considerations are available and published in TRS 1041.

JECFA's comments on the parallel review process

11. As previously noted by JECFA88 (2019), the Committee remains supportive of the parallel review process. Based on the experience gained through the evaluations of selamectin at the 88th and 94th meetings, JECFA concluded that the process and requirements for this parallel review approach should be essentially the same as those for a compound that has already received registration in a Member State. This includes providing all necessary information required to establish an HBGV and recommend MRLs in the tissue(s) of interest, as is the mandate of JECFA.

12. JECFA reiterates that specific MRLs cannot be recommended without established GVP for a product in at least one Member State. A range of preliminary proposed MRL values, which may be useful in informing risk management, were derived for selamectin based on the currently available data.

Estimation of dietary exposure to veterinary drug residues as performed by JECFA

13. The current JECFA approach is to derive estimates of acute and chronic dietary exposure for two population groups; the general population and children. In some respects there is a degree of double-counting in this approach, as children are part of the general population.

14. Under the global estimate of chronic dietary exposure (GECDE) the maximum mean consumption and maximum highest reliable percentile consumption values, across surveys, are used to estimate dietary exposure. Food consumption data are derived from the FAO/WHO Chronic Individual Food Consumption Database – summary statistics (CIFOCOss). Prior to JECFA88, CIFOCOss changed to using the FoodEx 2 food description system and at the time of JECFA88 food consumption data were only available expressed on a "g/day" basis. On this basis the highest food consumption levels for most foods will be by the adult population.

15. Since JECFA88, further work on CIFOCOss has resulted in food consumption data now being available on a "g/day" or a "g/kg body weight per day" basis. The latter presentation of the data has advantages, as no assumption need be made concerning the body weights of different populations. However, for food consumption expressed on this basis, in most cases the highest food consumption values will be for infants and toddlers. This has the potential to result in the GECDE estimates for children and the general population being identical, or very similar.

16. Food consumption data in CIFOCOss are available for a range of sub-populations. These sub-populations are assigned to one of four age classes; all (general population), adults and the elderly, children and adolescents, and infants and toddlers.

17. Use of the GECDE has been adopted for evaluations conducted by the Joint FAO/WHO Meetings on Pesticide Residues (JMPR) as a measure of high consumer dietary exposure. JMPR routinely estimates mean and GECDE dietary exposure estimates for: all (general population), all adults, adult females, children and adolescents, and infants and toddlers.

18. While further discussions are required to fully harmonize dietary exposure estimation methods between JECFA veterinary drugs and JMPR, it is proposed that a partial alignment of the sub-populations should be performed as an interim measure.

19. With the availability of food consumption information expressed on a body weight basis, it is recommended that these data be used preferentially to minimize the assumptions made in deriving the GECDE. It is further recommended that the population groups for which GECDE estimates are derived be amended to align with the age classes currently used in CIFOCOss: infants and toddlers (0–35 months), children and adolescents (3–14 years), and adults and the elderly (15 years and above). It is further recommended that JMPR and JECFA continue to take opportunities to harmonize procedures for dietary exposure assessment.

A risk-based decision tree approach for the safety evaluation of residues of veterinary drugs

20. JECFA is sometimes asked for advice on veterinary drugs for which the establishment of HBGVs and recommendation of MRLs is not appropriate, for example when they are genotoxic carcinogens. In other situations there may not be a full data package, such as for "old" drugs where there is still a use, drugs with no commercial sponsor, drugs no longer in use but which cause contamination of food due to environmental persistence, or the misuse or abuse of drugs. In the early 2000s, a number of activities were undertaken to discuss possible approaches to these situations, including a Joint FAO/WHO "Technical workshop on residues of veterinary drugs without ADI/MRL", convened in Bangkok in 2004, and an FAO/RIVM/WHO Workshop, "Updating the principles and methods of risk assessment: MRLs for pesticides and veterinary drugs", held in Bilthoven, The Netherlands in 2005. Subsequently this led to the publication of EHC 240, "Principles and methods for the risk assessment of chemicals in food", in 2009. CCRVDF16 (2005) considered a report of a working group on residues of veterinary drugs without ADI/MRL.

21. This issue was raised at JECFA66 (2006), together with a number of related activities. The Committee concluded that there was need for an overarching approach, and recommended that the JECFA Secretariat convene a working group to develop a decision tree for the evaluation of veterinary drugs. This led to the development of a "Decision tree approach for the safety evaluation of residues of veterinary drugs", which was discussed at JECFA70 (2008). The approach was endorsed by the Committee and a number of revisions suggested. The paper was revised accordingly and submitted as a "Risk-based decision tree approach for the safety evaluation of veterinary drugs" to CCRVDF18 (2009), as a work-in-progress. CCRVDF agreed with the proposed general principles and supported further work on the approach.

22. The scheme was discussed at JECFA75 (2011) and a number of follow-up actions were recommended. However, these were not taken up immediately, due to resource limitations. JECFA78 (2013) reiterated the recommendations, which included the establishment of an electronic working group to develop guidance for establishing ARfDs for residues of veterinary drugs. This was done, and guidance has been developed and adopted by JECFA (2017), including approaches for the establishment of a mARfD.

23. A number of other recommendations to further develop the decision tree were made by JECFA78, which included undertaking work on "preliminary risk assessment", and on the feasibility of using a TTC approach for residues of veterinary drugs. These were not followed up. A number of sections in the draft document noted that further extensive work was required. This included characterization of dietary exposure and management of risk. Since then, much work has been undertaken on dietary exposure assessment, but consideration has yet to be given to how this might be integrated into the decision tree. Guidance on some parts of the scheme was developed but has yet to be adopted by JECFA, such as on the identification of strengths and weaknesses in the risk assessment (uncertainties and sensitivity analysis).

24. The present Committee discussed the decision tree and concluded that there is a continuing need for such an approach. It was agreed that the approach should be finalized and published as guidance for JECFA. There was a need to develop some aspects further. There may be a need to include some additional aspects and there may be others that can be omitted. The Committee noted that the approach was essentially generic and would be applicable to additional committees that provide advice to the Codex Alimentarius on food safety, such as JMPR.

25. JECFA recommends that the Joint Secretariat, together with other secretariats as appropriate, convene an electronic working group comprising experts from the three committees under JECFA, JMPR, and in dietary exposure assessment, to further develop the decision tree approach, with a view to its finalization in 2023 or 2024.

General considerations for microbiological effects

26. The impact of drug residues on the human intestinal microbiome is evaluated through a decision tree approach adopted by JECFA66 (2006), which complies with VICH GL36(R). This entails answering three questions to determine the need for establishing an mADI. Determine first, if the drug residue, and/or its metabolites, are microbiologically active against representatives of the human intestinal microbiota. Secondly, determine if the drug residues enter the human colon, and thirdly, if the residues entering the human colon remain microbiologically active. If the answer to any of these questions is "no", then there is no need to calculate an mADI and the assessment does not need to be completed. However, if an mADI needs to be calculated, two end-points of concern for human health are considered for the assessment: disruption of the colonization of the human intestinal microbiome, and increases in populations of resistant bacteria in the human intestinal microbiome. More recently, this was extended to consider the possibility of acute effects and the need for an mARfD.

27. This guidance delineates a step-by-step approach and provides an explanation of test systems that sponsors can use to address the impact of animal drug residues on the human intestinal microbiome, as another toxicological target of concern.

28. When JECFA assesses the potential effects of residues of a veterinary drug on humans, the different toxicological targets of concern need to be addressed (reproductive, mutagenesis, carcinogenesis, and chronic toxicity, for example), either by information available in the public domain or by conducting a corresponding study. Because traditional toxicological studies have been done routinely for many years, it is readily understood that all these end-points need to be addressed. However, in the case of the effects of drug residues on the human intestinal microbiome, such a requirement is not so evident since it is only in the last few years that an understanding about the importance of the human intestinal microbiome to human health has become apparent. The human intestinal microbiome is now considered an additional target organ, in which changes in the composition and function of these intestinal microbes (microbiota dysbiosis) has been associated with diseases ranging from localized gastroenterologic disorders to neurologic, respiratory, metabolic, hepatic and cardiovascular illnesses.

29. Thus, as one more toxicological target of concern, sponsors of drugs submitted for evaluation will need to address the effects of residues on the human intestinal microbiome, for both end-points of concern; the disruption of the colonization barrier and an increase in bacterial resistance. A drug, or its metabolite, might not be an antimicrobial but could still produce disruption and/or increase the population of resistant bacteria, to the extent that an mADI and/or mARfD need to be calculated.

30. Therefore, sponsors need to fully address both of these concerns for potential impact of drug residues on the human intestinal microbiome, either using information available in the public domain or by running a corresponding study.

31. Furthermore, while current assessments consider only bacteria in the evaluation, it is now well established that the intestinal microbiome also includes bacteriophages and other viruses, archaea, fungi and protozoa, which play an important role in human health. JECFA will therefore consider how the impact of residues on some or all of the other components of the human intestinal microbiome might be addressed.

32. JECFA recommends that the Secretariat convene a microbiome expert working group to explore developments in this evolving area.

Activities on antimicrobial resistance

33. This section provides a summary update on activities on AMR that have been carried out since the last session of CCRVDF.

Quadripartite (FAO/UNEP/WHO/WOAH) work on Antimicrobial Resistance

34. At its annual executive meeting in March 2022, the Tripartite partnership for One Health, so the FAO, WHO and WOAH, formally became the Quadripartite as they signed a Memorandum of Understanding with UNEP. The four organizations have been working together for long time but in the recent years they have strongly supported the establishment of One Health AMR global governance structures through the implementation of a number of joint initiatives.

35. The Quadripartite Joint Secretariat on AMR (QJS), which was set up in 2019 and consolidates the joint work of FAO, UNEP, WHO and WOAH on AMR, published their *Strategic Framework for Collaboration on AMR* in April 2022. This Framework reflects the joint work of the four organizations to advance a One Health response to AMR at the global, regional and country level. It broadly supports the implementation of the five pillars of the Global Action Plan on AMR, as well as strengthening global AMR governance. The Framework is operationalized through a biennial workplan, initially for 2022-23.

Integrated surveillance

36. The QJS on AMR has established a technical group to support and coordinate integrated surveillance activities across the organizations (QTG-AIS). In June 2021, the QJS opened a call for experts to establish the Quadripartite Technical Group on Antimicrobial Resistance and Use Integrated Surveillance. Experts have been shortlisted for the QTG-AIS and will be invited to join the group to start their work in late 2022. The QTG-AIS will provide advice and guidance on the development of global and context-appropriate regional and country-level systems for integrated surveillance and the establishment of effective capacities. High-level advocacy and synergy with the Global Leaders' Group Action Plan is facilitated by the establishment of the GLG Task Force on Integrated Surveillance led by GLG member, Prof Lothar Wieler. One Health integrated surveillance of AMR and AMU is a critical area of focus in the upcoming 3rd Global High-Level Ministerial Conference on AMR in Muscat, Oman (November 2022). Action points derived from focused discussions by expert panelists in a featured session will inform bold and specific commitments for the 2024 United Nations General Assembly High Level Meeting (UNGA HLM) on AMR.

Global Human and Veterinary Medicines Regulatory Authorities Summit and Forum

37. One the priorities of the QJS on AMR's workplan for 2022-2023 includes developing and updating standards and technical advice on global practices. This work comprises providing support to human and animal medicines regulatory authorities by convening a global regulatory summit and producing a workplan to support countries in using regulations, enforcement and smart solutions to preserve efficacy of antimicrobials. The preparations for the Summit are currently underway with the Summit taking place as a hybrid event in Geneva from 22-23 March 2023. The objectives of the summit will be (1) to enhance regulation for promoting appropriate and prudent use of antibiotics by phasing out over-the-counter sale of antibiotics in human and animal health sectors; (2) to discuss mechanism to enforce the phasing out of sales of antibiotics without prescription; and (3) to develop and share alternative smart solutions to discourage over-the-counter sale of antibiotics. After the Summit, a forum will be created to foster on-going communication and collaboration among human and animal medicines regulatory authorities to address AMR using regulations, enforcement and smart solutions until the next Summit will take place in two years. In addition, the Quadripartite will select the technical support needs expressed by human and animal medicines regulatory authorities to develop a workplan for technical capacity building, particularly for low middle-income countries.

Economic case for AMR

38. To respond to recurrent inadequate financial support for implementing AMR National Action Plans, the Quadripartite prioritized building an investment case for AMR in their 2022-23 workplan. The main objective is determining the global cost of inaction, the global resource needs for the AMR response and the return on investment of a package of integrated interventions across different sectors. This will help to inform global, regional and country prioritization and resource mobilization. A model toolbox will be developed, including an integrated interventions prioritization guide, costing and impact estimation tools, and exemplars of country investment case and resource mobilization strategy and training module. This will help countries to plan and mobilize domestic and external resources. This work has been recommended by the G7 and the GLG. Initial activities have already been started, including selecting experts to constitute the Advisory Group to provide independent strategic advice and inputs on this work.

Global Leaders' Group on AMR

39. The GLG on AMR was formed following the recommendation of the Interagency Coordination Group on AMR. (ICGA). The GLG is composed of heads of state, serving or former ministers and/or senior government officials acting in their individual capacities, together with senior representatives of foundations, civil society organizations and the private sector. It also includes principals of the Quadripartite (FAO, UNEP, WHO and WOAH) as ex-officio members. The GLG is co-chaired by Their Excellencies Sheikh Hasina, Prime Minister of Bangladesh and Mia Amor Mottley, Prime Minister of Barbados. Its mission is to advise on and advocate for political action for the mitigation of drug-resistant infections through responsible and sustainable access to and use of antimicrobials and its functions are guided by an action plan and key performance indicators. Since July 2021, the GLG has published its action plan, three information notes on surveillance, financing and the climate crisis and released two calls to action on discharges to environment and on reducing the use of antimicrobials in food systems. The GLG also released a statement contributing to the adoption of the new Codex *Guidelines on Integrated Monitoring and Surveillance of Foodborne AMR* (CXG 94-2021) and the revised Codex *Code of Practice to Minimize and Contain Foodborne AMR* (CXC 61-2005). The GLG held two high-level political side events on antimicrobial resistance in 2022, at the Commonwealth Heads of Government Meeting in Kigali, Rwanda, and at the United Nations General Assembly in New York, United States of America (USA). The GLG was called upon by the UN General Assembly in its resolution to support the UNGA HLM Meeting on AMR in 2024. Other priority areas of ongoing work include advocacy for defined key asks related to AMR for G7 and G20, advocating for inclusion of AMR in the Intergovernmental Negotiating Body Instrument, and advocating for integrated One Health surveillance of antimicrobial resistance and use with emphasis on high level political advocacy, including collaboration with the QTG-AIS.

40. As a joint Quadripartite effort, FAO is contributing to develop the One Health priority research agenda on AMR. More specifically the project aims to identify research questions on AMR at the interface of the One Health sectors (human, animal, plant and the environment) to better prevent, control, and respond to AMR, and it focuses on five pillars: 1) transmission; 2) integrated surveillance; 3) interventions; 4) behavioral insights and change; and 5) policy and economics.

41. A tool to assess the implementation of Infection Prevention and Control (Agri-IPC), including water, hygiene, sanitation, and wastewater management (Agri-WASH), was developed.

42. The World Antimicrobial Awareness Week (WAAW) is now taking place annually from 18 - 24 November. During WAAW 2021, the FAO Action Plan on AMR 2021-2025 was launched.

43. The Codex Task Force on AMR has completed its work that resulted in the publication of the new *Guidelines on Integrated Monitoring and Surveillance of Foodborne AMR* (CXG 94-2021) and the update of the *Code of Practice to Minimize and Contain Foodborne AMR* (CXC 61-2005).

44. FAO is leading the implementation of these two documents, in six countries (Bolivia, Cambodia, Colombia, Mongolia, Nepal and Pakistan) via the ACT (Antimicrobial Codex Texts) project. This project is funded by the Republic of Korea (ROK), during a time span of five years (2021-2026) with an overall budget of 10 million dollars.

45. The AMR-Multi-Partner Trust Fund is a strategic, inter-sectoral, multi-stakeholder initiative inviting partnership and financing to leverage the Quadripartite convening and coordinating power as well as mandates and technical expertise to mitigate the risk of AMR by supporting the implementation of One Health AMR NAPs. It is financially supported by Germany, Netherlands, Sweden, the United Kingdom and the European Commission (DG Sante), in a total of over 26 million USD. The Fund currently support projects in ten countries (Morocco, Kenya, Zimbabwe, Senegal, Ghana, Cambodia, Indonesia, Ethiopia, Peru and Tajikistan) and six countries have been developing new proposals throughout 2022.

    In addition, four global projects are being implemented with the financial support of the AMR MPTF:

    1. TISSA: a global web-based repository on AMR & AMU data across humans, animals, food and agriculturesectors

    2. Monitoring & Evaluation: Global-level monitoring and aggregation of indicator data at sectoral level

    3. Legal framework: Development of a One Health assessment tool for AMR-relevant legislation

    4. Environment: Strategic global-level governance advocacy initiatives on AMR in the environment

46. FAO is developing the International FAO AMR Monitoring system (InFARM). This database/platform is primarily envisioned to be a hosting data platform and support Members for collecting, collating, analyzing and reporting AMR/AMU data for the food and agriculture sectors at National level. It aims to be the data source for the Global Action Plan on AMR framework Monitor & Evaluation outcome indicators, providing aggregated data into the Tripartite Integrated System for Surveillance of AMR/AMU (TISSA) to offer Members and international community information on global integrated AMR/AMU surveillance. By October 2022, about 20 Members have submitted data to pilot the InFARM development.

47. WHO established in October 2021, the Advisory Group on Critically Important Antimicrobial for Human Medicine (AGCIA). This advisory group is working and developing the 7th Revision of the WHO CIA List in 2023.

48. WHO is in the final stages of developing the WHO Essential Medicines List Antibiotic Book, which provides guidance on the choice of antibiotic, dose, route of administration and duration of treatment for common infectious syndromes in alignment with the recommendations for antibiotics included on the WHO Model List of Essential Medicines and the WHO AWaRe (Access-Watch-Reserve) classification of antibiotics55.FAO is implementing its Action plan on AMR 2021-2025 (https://www.fao.org/3/cb5545en/cb5545en.pdf), through various projects at global, regional and country level. FAO is also leading the project ACT, funded by the Republic of Korea, that focuses on the practical implementation of the Codex *Guidelines on integrated monitoring and surveillance of foodborne antimicrobial resistance* (CXG 94-2021) and the Codex *Code of Practice to Minimize and Contain Foodborne Antimicrobial Resistance* (CXC 61-2005), at global level and focusing on in six countries as a proof of concept (Bolivia, Cambodia, Colombia, Mongolia, Nepal and Pakistan).

49. In March 2022, the first session of the FAO COAG''s Sub-Committee on Livestock recommended, among others, to request FAO to: 1) collect scientific evidence on alternative feeding practices to replace the use of medically important antimicrobials used as growth promoters (AGPs), their effectiveness and safety, and to conduct, through a collaborative effort, an inventory of these alternative feeding practices and disseminate related knowledge; 2) share successful experiences and good practices, including traditional knowledge, to support Members to reduce the need.

50. In collaboration with FAO Reference Centre in the United Kingdom, FAO has developed an introductory module of AMR e-learning courses with five lessons.

51. FAO is working closely with the feed sector stakeholders (e.g.,the International Feed Iindustry Federation and regulators) to promote the animal nutrition practices that reduce AMU identified in the FAO *publication Animal nutrition strategies and options to reduce the use of antimicrobials in animal productions*. The matter will be addressed during the 16th International Feed Regulators Meeting which will take place on 23-24 January 2023 in Atlanta, USA.

52. FAO has developed several initiatives to promote the responsible use of antimicrobials at global and regional levels, including the following activities:

a. A set of surveys on the Knowledge, Attitude, and Practices (KAP) associated with AMU patterns was conducted in Africa, Asia and the Pacific, and Europe and Central Asia regions. The outputs of a KAP survey in the Lao People's Democratic Republic was published, resulting in a better understanding of drivers and motivations of using antibiotics in the country's livestock industry. Results also contributed to shaping the country's AMR communication and advocacy campaign.

b. A guideline on AMU monitoring at farm level in collaboration with WOAH is under development.

c. Surveys assessing the state of adherence of pig farms to recommended practices on prudent use of antimicrobials were conducted in Cambodia, Indonesia, and Viet Nam.

d. FAO, is working towards strengthened engagement from the animal feed industry in the fight against AMR in Latin America and the Caribbean through an AMR project funded by the European Union (EU). In July 2022, FAO is convening a roundtable discussion entitled "*Policy guidelines for the containment of AMR in the production and use of medicated feed - Moving towards decision-making",* between public and private sectors at the Regional FeedLatina Meeting, in Mexico City, Mexico.

e. Support is being provided to India, Indonesia, and Viet Nam in the mitigation of AMR risk associated with aquaculture, through improved understanding of related AMR/AMU problems.

f. FAO has launched a global initiative to reduce the need for antimicrobials in agrifood systems which aims to reduce the use of antimicrobials in agriculture by 30-50% in 10 years. Regional stakeholders' consultation has been organized in Asia and Africa.

Developing capacity in Latin American on food safety risk assessment of residues of veterinary drugs in food

53. FAO is implementing a project (funded by France) to develop capacity among officials in some countries in Latin America and the Caribbean on food safety risk assessment of residues of veterinary drugs in food. Although countries from this region are key producers and exporters of meat, there are few proposals from the region tabled at CCRVDF, and many of these proposals do not provide the comprehensive data package necessary for a full risk assessment by JECFA.

54. During the Covid-19 pandemic, a series of training webinars were carried out, covering an extensive technical programme divided in various modules to help participants gain knowledge and understanding of how residues of veterinary drugs are assessed by JECFA and how these assessments contribute to setting of MRLs for Codex standards and understand the critical data required to be submitted for assessment by JECFA. To conclude the project a final workshop (in English) is planned for 15-17 November 2022, in Santiago, Chile.

FAO's publication on Food Safety Foresight

55. The FAO publication, "Thinking about the future of food safety – A foresight report" outlines how major global drivers and trends will shape food safety in tomorrow's world.

56. All food needs to be safe for human consumption; thus, appropriate food safety measures must form the core of food production in our agrifood systems. As agrifood systems are transformed to meet the 2030 Agenda for Sustainable Development, there is need to develop and maintain a deep understanding of the future opportunities, threats, and challenges ahead of us.

57. The publication discusses some of the most important emerging issues in food and agriculture with a focus on food safety implications, including climate change, changing consumer behaviour and food consumption patterns, new food sources andj food production systems (namely edible insects, jellyfish, seaweed, plant-based alternatives, and cell-based food production), technological innovations and scientific advances, microbiome science, circular economy, and food fraud.

58. The report is available at: https://www.fao.org/documents/card/en/c/cb8667en. The press release for its launch (7 March 2022) is available at: https://www.fao.org/newsroom/detail/fao-report-future-food-foresight/en

More information on the FAO Foresight programme can be found at:
https://www.fao.org/food-safety/scientific-advice/foresight/en/

FAO's reviews on the impact on the gut microbiome of substances of interest to food safety

59. As part of an organization-wide review of the impact of food systems on diet-related non communicable diseases, a literature review is conducted on the impact on the gut microbiome of substances of interest to food safety. Evidence of impact on human health, if any, will also be documented. As a first step, a methodology for systematic literature research and review has been established as well as a priority list of substances by categories (e.g. food additives, veterinary drugs residues, pesticides residues, micro plastics). Literature reviews focusing on the impact of pesticides residues, microplastics and veterinary drug on the gut microbiome have been submitted to peer review and are in publication process. The literature review on food additives is ongoing and will be submitted to peer review as soon as ready. While references and findings are compiled, a list of research and knowledge gaps is also being built to inform future potential discussions on challenges in research and how these can be addressed.

ACRONYMS USED IN THIS DOCUMENT

ADI	Acceptable Daily Intake
AGCIA	WHO Advisory Group on Critically Important Antimicrobials
AGPs	Growth promoters
AMR	Antimicrobial Resistance
AMR-MPTF	AMR-Multi-Partner Trust Fund
AMU	Antimicrobial Use
ARfD	Acute Reference Dose
CCPR	Codex Committee on Pesticide Residues
CCRVDF	Codex Committee on Residues of Veterinary Drugs in Foods
CIFOCOss	FAO/WHO Chronic Individual Food Consumption Database – summary statistics
CXG	Codex Guidelines
EHC	Environmental Health Criteria
EU	European Union
FAO	Food and Agriculture Organization
GAP	Global Action Plan for AMR
GECDE	Global Estimate of Chronic Dietary Exposure
GL	Guideline(s)
GLG	Global Leaders Group
GLP	Good Laboratory Practice
GVP	Good Veterinary Practice
HBGV	Health-Based Guidance Value
IACG	The United Nations Interagency Coordination Group on AMR
InFARM	International FAO AMR Monitoring system
JECFA	Joint FAO/WHO Expert Committee on Food Additives
JEMRA	Joint FAO/WHO Expert Meeting on Microbiological Risk Assessment
JMPR	Joint FAO/WHO Meeting on Pesticide Residues
KAP survey	Surveys on Knowledge, Attitude, and Practices associated with AMU patterns
LC	Liquid Chromatography
LOD	Limit of Detection
LOQ	Limit of Quantification
mADI	Microbiological ADI
mARfD	Microbiological ARfD
MR	Marker Residue
MRA	Microbiological Risk Assessment
MRL	Maximum Residue Limit
MS	Mass Spectrometry
NAP	National Action Plan for AMR
NOAEC	No-Observed-Adverse-Effect Concentration
NOAEL	No-Observed-Adverse-Effect Level
OECD	Organization for Economic Cooperation and Development
QJS	Quadripartite Joint Secretariat
QTG-AIS	Quadripartite Technical Group on Antimicrobial Resistance and Use Integrated Surveillance

RIVM	National Institute for Public Health and the Environment
SD	Standard Deviation
SDG	Sustainable Development Goals
TFAMR	Ad Hoc Codex Intergovernmental Task Force on Antimicrobial Resistance
TISSA	Tripartite Integrated Surveillance System
TJS	Tripartite Joint Secretariat
TR	Total Residue
TRR	Total Radioactive Residue
TRS	Technical Report Series
TTC	Threshold of Toxicological Concern
UN	United Nations
UNEP	United Nations Environment Program
UNGA HLM	United Nations General Assembly High Level Meeting
VICH	International Cooperation on Harmonization of Technical Requirements for Registration of Veterinary Medicinal Products
WAAW	World Antimicrobial Awareness Week
WHO	World Health Organization
WHO CIA List	WHO Critically Important Antimicrobials List
WOAH	World Organization for Animal Health (former OIE)