CODEX ALIMENTARIUS COMMISSION E

Food and Agriculture Organization of the United Nations

World Health Organization

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Agenda Item 3 **CX/CF 21/14/3**

March 2021

JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON CONTAMINANTS IN FOODS

14th Session
(virtual)
3-7 and 13 May 2021

MATTERS OF INTEREST ARISING FROM FAO AND WHO INCLUDING JECFA

(Prepared by the Joint FAO/WHO JECFA Secretariats)

1. This document provides information on FAO and WHO activities in the area of provision of scientific advice to Codex, other UN agencies and FAO and WHO Member countries which are of interest to the Codex Committee on Contaminants in Foods (CCCF).

2. This document supersedes working documents CX/CF 20/14/3 and CF/CF 20/14/3-Add.1. Working documents issued during 2020, which has been revised or updated in 2021 for consideration by CCCF14, can be found on the Codex website[1].

3. This document should be read in conjunction with Agenda Item 20 (CX/CF 21/14/18).

Joint FAO/WHO Expert Committee on Food Additives

4. Since the last session of CCCF, three JECFA meetings (i.e. JECFA89[2], JECFA90[3] and JECFA91) have been convened in a virtual format. These meetings addressed food additives and contaminants. Of particular relevance to CCCF were the 90th and 91st meetings of JECFA. The agenda of JECFA90 included the evaluation of trichothecenes, and a group of substances (known as previous cargos) on request from the Codex Committee on Fats and Oils (CCFO). The agenda of JECFA91 included cadmium (exposure assessment from all food sources), ergot alkaloids, the remaining group of previous cargoes (i.e. solvents and reactants), and the revision of specifications for steviol glycosides. The summaries of these meetings are available; the full reports are in the process of being published and the detailed monographs are/will be available at the relevant FAO and WHO sites:

   - FAO: http://www.fao.org/food-safety/resources/publications/en/
   - WHO: www.who.int/foodsafety/publications/jecfa/en/

5. Future meetings:

   JECFA92 is scheduled for 7–18 June 2021, in a virtual format. The meeting is dedicated to the evaluation of a number of food additives and enzyme preparations.

   The call for data and draft agenda for JECFA92 are available on the respective FAO and WHO websites:

   - FAO: http://www.fao.org/3/cb0728en/cb0728en.pdf
   - WHO: https://www.who.int/docs/default-source/food-safety/jecfa-92-call-for-data.pdf?sfvrsn=676f55b_4

Ad-hoc FAO/WHO Expert Meeting on (–)-hyoscyamine, (+)-hyoscyamine and (–)-scopolamine

6. FAO and WHO convened a joint expert meeting on 30 March – 3 April 2020, to provide scientific advice in response to a request from the World Food Programme (WFP). The WFP is the leading humanitarian organization that delivers food assistance in emergencies and works with the most vulnerable people around the world. In 2019 several people died, and multiple people admitted to healthcare facilities after eating Super Cereal (flour-type product made of pre-cooked corn, soybean and micronutrients) provided as food aid by WFP in Uganda. High concentration of tropane alkaloids, specifically (-)-scopolamine and (±)-hyoscyamine, from the toxic weed *Datura stramonium*, was found to be the source of the intoxication.

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1 http://www.fao.org/fao-who-codexalimentarius/meetings/extra/cccf14-2020/en/

2 Joint FAO/WHO Expert Committee on Food Additives. 89th Meeting. Summary and conclusions. http://www.fao.org/3/ca9918en/ca9918en.pdf

3 Joint FAO/WHO Expert Committee on Food Additives. 90th Meeting. Summary and conclusions. http://www.fao.org/3/cb2379en/cb2379en.pdf

7. Moreover, a second contamination incident occurred later in 2019 in South Sudan where unprocessed sorghum was contaminated with *Datura stramonium* seeds WFP requested FAO and WHO for scientific advice on tropane alkaloids in both processed and unprocessed food, to allow the development of appropriate risk management options. The report of the expert meeting was published in 2020 and is available online[4].

8. In addition, based on the deliberations of the expert meeting a guidance document was developed to provide specific recommendations on the limits for physical toxic *Datura stramonium* seed contamination in cereals and grains, which makes the document beneficial for screening purposes at the field level. This document was also published in 2020 and is available online[5].

FAO/WHO Expert Meeting on Ciguatera Fish Poisoning

9. The issue of Ciguatera poisoning (CP) was raised at CCCF11 (2017) and the Committee agreed to request scientific advice from FAO/WHO to enable the development of appropriate risk management options. Based on this request, FAO and WHO convened an expert meeting on 19-23 November 2018 in Rome. Although there were many gaps in the available information about CP, there are some issues that require urgent attention regarding both risk management and research. The main needs for risk management were the definition of clear protocols to avoid the risk of consuming toxic seafood, mainly by local people and tourists, but also consumers purchasing imported seafood from certain areas. This included a well-defined information and outreach programme, and a clear identification of the geographic distribution of fisheries resources and causative organisms, as well as CTXs presence and concentration in different tissues and anatomic parts of the affected fisheries resources. The main research needs referred to detection methods, and the need to have a stable supply programme of analytical standards. The FAO/WHO Report of the Expert Meeting on Ciguatera Poisoning is available online[6].

10. Building on the above-mentioned report, FAO in collaboration with IAEA and IOC-Unesco developed an e-learning course on Monitoring and preventing ciguatera poisoning that in now available online[7]. This e-learning course targets food safety and fishery authorities, policy-makers, doctors and health managers. The course is also meant for trainers and students interested in ciguatera poisoning, and for fishing and fish processing workers.

WHO work on dioxin and dioxin-like compounds

11. Since the early 1990's, WHO has organized expert meetings with the objective to harmonize the toxic equivalency factors (TEFs) for dioxin and dioxin-like compounds on the international level, thereby giving recommendations to national regulatory authorities. TEF expresses the toxicity of dioxins, furans and PCBs in terms of the most toxic form of dioxin, 2,3,7,8-TCDD. The latest WHO TEFs for dioxin and dioxin-like compounds where established by WHO through expert consultations in 2005. Since then new data including data on relative potencies (REPs) have been published and complied into REP databases. TEFs are determined using a database of REPs that meet WHO established criteria using different biological models or endpoints. The new data indicate a need to update the 2005 WHO TEFs and therefore WHO has established an advisory group of international experts. The experts will support WHO in setting-up the criteria for the REP database to be used.

12. To manage the technical handling of the REP database WHO will collaborate with the European Food Safety Authority (EFSA). When EFSA has complied the date from the refined REP database based on the criteria established by WHO the data will be used by WHO to re-evaluate the TEFs. It is expected that the refined REP database can be ready during the autumn of 2021 at which time WHO will organize expert consultations aiming at re-evaluating the TEFs for dioxin and dioxin-like compounds.

Requests for scientific advice

13. Both organizations continue to jointly prioritise the requests for scientific advice taking into consideration the criteria proposed by Codex as well as the requests for advice from Member Countries and the availability of resources.

14. In scheduling the JECFA meetings and developing the agenda, the Joint FAO/WHO Secretariat has to take into account the priorities requested by the Committees on Food Additives (CCFA), Contaminants in Foods (CCCF) and Residues of Veterinary Drugs in Foods (CCRVDF), and occasionally other committees (eg CCFO). Due to the increasing requests for scientific advice to JECFA, not all requests can be addressed in the subsequent meeting.

4 http://www.fao.org/3/cb1857en/CB1857EN.pdf
5 http://www.fao.org/3/cb2105en/CB2105EN.pdf
6 http://www.fao.org/documents/card/en/c/ca8817en/
7 https://elearning.fao.org/course/view.php?id=648

15. To facilitate provision of extra-budgetary resources for scientific advice activities, please contact Dr Markus Lipp, FAO Food Safety and Quality Unit (jecfa@fao.org) and Mr Kim Petersen, Department of Nutrient and Food Safety, WHO (jecfa@who.int).

Global Food Consumption Databases and ongoing activities to support countries to generate and to use data for risk analysis purposes

16. Reliable information on food consumption, collected at individual level, is needed to estimate dietary exposure to chemicals and biological agents in the general population and in vulnerable population groups. To address the issue of insufficient access to such data, FAO and WHO have continued the work on the two following tools (initiated in 2014), to develop global food consumption databases.

- The FAO/WHO Global Individual Food Consumption Data Tool (FAO/WHO GIFT) is currently sharing 22 datasets (including 6 nationwide datasets) and aims to share another 50 by the end of 2022. The database provides not only access to all microdata but also provides food-based indicators in the field of food consumption, nutrition and food safety. FAO/WHO GIFT utilizes FoodEx2 as categorization tool, which has been upgraded for use at global level as the result of a collaboration between FAO, WHO and the European Food Safety Authority (EFSA). FAO/WHO GIFT also provides an up-to-date global inventory of individual quantitative food consumption surveys conducted, planned and ongoing, with detailed information on over 260 identified studies. The platform is available online[8].
- CIFOCOss (FAO/WHO Chronic Individual Food Consumption Data summary statistics) has been further implemented with data from 37 countries and corresponding summary statistics.
- The GEMS/Food programme continues to actively support the work of CCCF by supporting several electronic working groups (EWGs) in the collection and analysis of global food contamination data to derive recommendations for maximum levels (MLs).
- Moreover this data on food consumption (CIFOCOss) and food contamination (GEMS/Food contaminants) are now available on the same platform[9] and using an harmonized food classification FoodEx2:

Risk Assessment Methods and Principles

Updated chapters of the Environmental Health Criteria 240[10] - Principles and methods for the risk assessment of chemicals in food

17. Since the publication of the EHC 240 in 2009 science has further evolved as well as risk assessment practices. FAO and WHO have recently finalized several projects to update (sub) chapters as follows:

- **Section 4.5 - Genotoxicity**[11]: The updated section 4.5 on genotoxicity published in November 2020 will be incorporated in the online version of the EHC 240 in the coming months.
- **Chapter 5 - Dose-Response Assessment and Derivation of Health-Based Guidance Values**[12]: The updated chapter 5 on dose-response assessment and derivation of health-based guidance published in December 2020 will be incorporated in the online version of the EHC 240 in the coming months.
- **Chapter 6: Dietary Exposure Assessment of Chemicals in Food**[13]: The updated chapter 6 on Dietary Exposure Assessment of Chemicals in Food published in November 2020 will be incorporated in the online version of the Environmental health criteria 240 in the coming months.
- **Section 9.1.4.2 Enzymes**[14]: The updated section 9.1.4.2 on enzymes published in November 2020 will be incorporated in the online version of the EHC 240 in the coming months.

8 http://www.fao.org/gift-individual-food-consumption/en/
9 http://apps.who.int/foscollab
10 https://www.who.int/publications/i/item/9789241572408
11 https://www.who.int/docs/default-source/food-safety/publications/section4-5-genotoxicity.pdf?sfvrsn=8ec3434_2
12 https://www.who.int/docs/default-source/food-safety/publications/chapter5-dose-response.pdf?sfvrsn=32edc2c6_5
13 https://www.who.int/docs/default-source/food-safety/publications/chapter6-dietary-exposure.pdf?sfvrsn=26d37b15_6
14 https://www.who.int/docs/default-source/food-safety/publications/section9-1-4-2-enzymes.pdf?sfvrsn=e238e86e_2

FAO's publication on Food Safety and Climate Change

18. Climate change is causing unprecedented damage to our ecosystems. Various climate change-related phenomenon like increasing temperatures, ocean warming and acidification, severe droughts, wildfires, altered precipitation patterns, melting glaciers, rising sea levels and amplification of extreme weather events have severe implications on our food systems. While the impacts of such environmental drivers on food security are well known, the effects on food safety receives less attention. In this regard, the FAO's publication "*Climate Change: Unpacking the Burden on Food Safety*" was written to identify and attempt to quantify some current and anticipated food safety issues that are associated with various climate change-related drivers. The food safety hazards that are considered in the publication are food-borne pathogens and parasites, harmful algal blooms, heavy metals with emphasis on methylmercury, pesticides and mycotoxins.

19. By raising awareness of the issues, it is hoped that the document will not only help in improving our understanding of the climate change implications on food safety but also aid in fostering stronger international cooperation in reducing the global burden of these concerns. The publication concludes with a focus on the benefits of combining forward-looking approaches such as foresight with scientific innovations, not only to anticipate future challenges but also to build resilient systems that can be continually updated as more knowledge is assimilated.

20. The document was published and is available online[15]. A webinar to disseminate the major findings of the publication was held in November, 2020. The recording can also be found online[16]. A short video on how Climate change is threatening the safety of our food is also available online[17].

Other issues of potential interest to the Committee

FAO's work on food safety aspects of edible insects

21. Insects have been traditionally consumed in various countries over generations. Recently growing concerns about the environmental effects of food production has led to an interest in the possibility of using insects as a viable nutrient source in both human diets and animal feed. The is due to the low carbon, water and ecological footprints associated with insect farming. In addition, edible insects can be a good source of protein, fatty acids, vitamins and minerals.

22. Along with the benefits, insect production and consumption bring with it several challenges, for instance any food safety hazards that could pose potential threats to consumers. The primary objective of a publication under preparation is to provide an overview of the potential food safety issues that should be considered, including biological agents (bacterial, viral, fungal, parasitic) as well as chemical contaminants (pesticides, toxic metals, flame retardants). Determination of food safety hazards will help to establish appropriate hygiene and manufacturing practices in this sector.

23. In addition to the food safety aspects, other challenges facing this emerging sector are briefly discussed. These include general absence of insect-specific regulations governing the production and trade of insects as food and feed, issues related to upscaling the production of insects, among others.

24. The publication is being developed by FAO and reviewed by a number of academicians, insect producer organizations and food safety authorities from around the world. The document is currently being finalized and should be published in the second quarter of 2021.

FAO's work on bivalve mollusc monitoring

25. International trade has been the main driving factor for the rapid growth of the bivalve mollusc production industry during the last six decades, growing from nearly one million tonnes in 1950 to 17.3 million tonnes in 2018. According to FAO statistics, the export value of bivalve mollusc trade reached USD 4.26 billion in 2018. However, there are a very limited number of countries with consistent monitoring programmes for bivalve mollusc.

15 http://www.fao.org/3/ca8185en/CA8185EN.pdf
16 https://www.youtube.com/watch?app=desktop&v=Zipp0l012D8&feature=youtu.be
17 https://www.youtube.com/watch?v=oEgqEtnMems&t=1s

26. The need for developing international guidance for implementation of bivalve mollusc sanitation programme within the framework of the Section 7 of the Code of Practice for Fish and Fishery Products (CXC 52-2003) was identified by the representatives of 15 major bivalve producing and trading countries participating in the 2nd International Workshop on Molluscan Shellfish Sanitation: Application of Sanitary Surveys, held 24–28 September, 2012, in Newport, USA. The Codex Committee on Fish and Fishery Products (CCFFP) and the FAO Committee on Fisheries Sub-Committee on International Trade supported the development of international guidance by FAO/WHO.

27. The Joint FAO-WHO Technical guidance for the development of the growing area aspects of Bivalve Mollusc Sanitation Programmes[18] was developed by a team of International experts representing different geographical regions and different bivalve mollusc production practices and was piloted in a number of countries.

28. The guidance served as the basis for the development of a Joint FAO-Cefas e-learning Course on Bivalve Sanitation and consists of three modules. The first module titled *growing area risk profile*[19] and the second titled *growing area assessment and review*[20] are available online. The last module is under development. The target audience of the course are policy makers, development practitioners and programme managers, sectoral specialists and researchers, bivalve farmers, trainers and extension agents.

29. Over the last two years, FAO in collaboration with its Reference Centre for Bivalve Mollusc Sanitation, the Centre for Environment, Fisheries, and Aquaculture Science (Cefas)[21], has delivered a number of capacity building activities for the provision of guidance on relevant laboratory protocols, accreditation and use of methods for bivalve mollusc testing.

Early warning systems for harmful algal blooms

30. Harmful algal blooms (HABs) have significant impacts on food safety and security, through contamination, or mass mortalities of aquatic organisms. Indeed, if not properly controlled, aquatic products contaminated with HAB biotoxins are responsible for potentially deadly foodborne diseases. Rapidly growing HABs can lead to consequences like reduced dissolved oxygen in the ocean, dead zones and mass mortalities of aquatic organisms. Improving forecasting for HABs could be an opportunity to develop early warning systems for HAB events such as food contamination, mass mortalities or foodborne diseases.

31. Surveillance systems have been developed to monitor HABs in many countries; however, the lead-time or the type of data (i.e. identification at species level, determination of toxicity) may not be sufficient to take effective action for food safety management measures or others such as transfer of aquaculture products to other areas. Having adapted forecasting or early warning systems could help to mitigate the impact of HABs and reduce the occurrence of HAB events. In this regard, FAO is taking the lead in the development of a Joint FAO-IAEA-IOC Technical Guidance for the Implementation of Early Warning Systems for HABs. The document will guide competent authorities and relevant institutions involved in consumer protection or environmental monitoring to implement early warning systems for HABs that are present in their areas (marine and brackish waters), specifically for those affecting food safety or food security (benthic HABs, fish killing HABs, pelagic toxic HABs and cyanobacteria HABs).

Microplastics

Update from FAO

32. The Global Oceans Action Summit for Food Security and Blue Growth[22] requested that the FAO, The International Maritime Organization (IMO) and the United Nations Environment Programme (UNEP) work together with the Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) to improve the knowledge base on microplastics in the marine environment and provide policy advice on this topic. As a result, UNEP approached GESAMP, FAO and other partners with a proposal to contribute to the global assessment on sources, fate and impacts of microplastics on the marine environment and resources with funding provided by the Government of Norway.

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18 The Joint FAO/WHO Technical guidance for the development of the growing area aspects of Bivalve Mollusc Sanitation Programmes: http://www.fao.org/documents/card/es/c/ca1213en/

19 https://elearning.fao.org/course/view.php?id=481

20 https://elearning.fao.org/course/view.php?id=629

21 FAO Reference centre work programmes and annual reports: https://www.cefas.co.uk/icoe/seafood-safety/designations/fao-reference-centre-for-bivalve-mollusc-sanitation/fao-reference-centre-work-programmes-and-annual-reports/

22 http://www. globaloceansactionsummit.com/

33. FAO was requested to contribute specifically on fisheries and aquaculture. FAO worked closely with key partners and academia, which resulted in a report called ¨Microplastics in fisheries and aquaculture¨.[23] The document describes the status of knowledge on the occurrence of microplastics in the aquatic environment and the implications for aquatic organisms and food safety. It contains a set of recommendations and best practices to reduce the possible impact of microplastics on fish populations and stocks, as well as on food safety issues arising from seafood consumption. However, fisheries and aquaculture products are not the only contributor to the dietary exposure of microplastics and the Subcommittee on Fish Trade (COFI-FT) in its seventeenth session requested FAO to work jointly with WHO to carry out an exposure assessment including other relevant food commodities.

34. In this regard, FAO is developing a background document that compiles information on the occurrence of microplastics in all commodities, microplastics contamination along food value chains, and plastic migration from food contact materials and packaging. It also includes a review of the existing literature on the toxicity of the most common plastic monomers, polymers, and additives (plasticisers, flame retardants, pigments and dyes, stabilizers, etc.). This process will set up the basis to evaluate if a risk assessment exercise is viable and the information can be used for the provision of risk management options.

Update from WHO

35. Microplastic in the environment is an emerging contaminant that has generated intense public concern, questions to WHO from Member States and recurring queries from the media. Questions have been asked about the human health impacts of the exposure to microplastic particles, from the polymers themselves, to the monomers as well as additives used to make the plastic material, adsorbed chemical contaminants and associated biofilms.

36. Recognizing this, WHO has reviewed the state of evidence on microplastic in drinking-water and published a report assessing the risks to human health in August 2019[24]. To continue WHO's effort to assess the potential health risks associated with exposure to microplastic, a currently ongoing project widens the scope of the assessment from a drinking-water focus to the environment, including exposure via food, water and air. Working with a group of international experts WHO aims to assess human health risks arising from exposure to microplastic particles from the environment, identify research needs and define the scope of the future work of WHO on microplastic particles. The report is expected to be published in summer 2020.

Seaweed and chemical safety

37. The world production of marine macroalgae, or seaweed, has more than tripled, up from 10.6 million tonnes in 2000 to 32.4 million tonnes in 2018. Increased cultivation and utilization of seaweed are expected to be important pillars of sustainable food security and a robust blue economy in the near future. Many factors can affect the presence of hazards in marine macroalgae and seaweed, including seaweed type, physiology, season, production waters, harvesting methods and processing. Several hazards, among them heavy metals and marine biotoxins have been reported to be (potentially) associated with seaweed. However, legislation and guidance documents on seaweed production and utilization are generally still lacking. In this regard, FAO is developing a background document that identifies food safety hazards (chemicals, pathogens and toxins) linked to the consumption of seaweed and aquatic plants. This will set up the basis for undertaking further work in this area. The report will be ready by May 2021. FAO considers that there might be value in developing relevant Codex guidance on this subject and is presenting this issue for consideration by the Committee.

Marine biotoxins in water from desalinization plants

38. The majority of drinking water is supplied by ground or surface water from freshwater source. Desalination technologies may also be used to obtain drinking water and irrigation from non-conventional water resources such as brackish water, estuarine water or seawater. These technologies have been used for decades to provide drinking water in arid regions. In certain areas, they are the primary, if not the only, source of drinking water.[25] However, to overcome increasing drought conditions, the use of desalination is now expanding to semi-arid regions as an alternate solution.

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23 http://www.fao.org/3/a-i7677e.pdf

24 https://apps.who.int/iris/handle/10665/326499

25 WHO. 2010. "Safe Drinking-Water from Desalination." World Health Organization WHO/HSE/WS: 28. https://www.who.int/water_sanitation_health/publications/2011/desalination_guidance_en.pdf%0Ahttp://apps.who.int/iris/bitstream/10665/70621/1/WHO_HSE_WSH_11.03_eng.pdf%0Ahttp://apps.who.int/iris/bitstream/10665/70621/1/WHO_HSE_WSH_11.03_eng.pdf.

39. Desalination is also critical in Small Island States that are facing shortage of fresh water.[26] Five percent of the world's population, of whom half are in the Near East and North Africa are supplied with desalinated water. Today there are about 16 000 desalination plants that produces about 100 million m^3/day of drinking water. Since 2018, more than 400 new desalination projects have been contracted worldwide.[27] While some food safety hazards associated with water from desalinization plants are already well understood and handled, the risk of exposure to biotoxins associated with marine harmful algal blooms (HABs) via desalinated drinking water consumption has not yet been evaluated.

40. The 13th Session of the Intergovernmental Oceanographic Commission (IOC) Harmful Algal Bloom Programme (IPHAB) held at United Nations Educational, Scientific and Cultural Organization (UNESCO) Headquarters in 2017 expressed its interest to cooperate with FAO and WHO on a risk assessment of marine toxins in drinking water from desalination plants. FAO is developing a background document that will set up the basis to evaluate if a risk assessment exercise is viable and the information can be used for the provision of risk management options.

WHO Global Strategy for Food Safety

41. With the endorsement of the resolution, ''Strengthening Efforts on Food Safety'' by the World Health Assembly in late July, WHO is mandated by Member States to update the WHO Global Strategy for Food Safety (''the strategy''), in coordination with FAO and in consultation with Member States and OIE, eventually report back to WHA75 in 2022. This strategy is aiming to address current and emerging challenges, incorporate new technologies and include innovative approaches for strengthening food safety systems.

42. The WHO Director-General already approved the establishment of a new Technical Advisory Group (TAG) on Food Safety: safer food for better health and the nominated experts. This TAG is composed of 24 renowned international food safety experts encompassing different technical areas. One of the functions of this TAG is to advise WHO on the update of the strategy in the coming two years. Besides the establishment of the TAG,WHO is in close dialogue with FAO to brainstorm different essential components to be considered in the updated strategy and ensure the complementarity is well reflected in both food safety strategies that are under development. TAG meetings, Member States and other relevant stakeholders' consultations are also planned in 2021.

WHO Transformation

43. In March 2019, WHO announced reforms to strengthen the WHO's role as the world's leading authority on public health and to effectively support countries in achieving the "triple billion" targets. As part of this transformation of WHO, in January 2020, the Department of Nutrition and Food Safety (NFS) was created under the UHC/Healthier Populations Division, through bringing together the Department of Nutrition for Health and Development and the Department of Food Safety and Zoonoses, to address the burden of disease from physical, chemical and microbial hazards in food and unhealthy diets, maternal and child malnutrition, overweight and obesity.

44. The new Department aims to ensure universal access to safe, sufficient, nutritious food and effective nutrition actions, through setting science-based international food standards, promoting nutrition action in health systems, fostering sustainable food production and consumption, improving food environments and empowering consumers in all situations, monitoring nutrition status, and managing food safety events at the international level, closely working with Member States, UN partner agencies and non-State actors.

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26 Jones, E., Qadir, M., Van Vliet, M., Smakhtin, V. & Kang, S. 2019. The State of Desalination and Brine Production: A Global Outlook. *Science of the Total Environment* **657**: 1343–56. https://doi.org/10.1016/j.scitotenv.2018.12.076.

27 FAO. 2020. The State of Food and Agriculture. Rome. https://doi.org/10.4060/cb1447en.