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COUNCIL

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Integrated water resources management for food security and climate resilience

Executive Summary

Water is central to agriculture and the entire sustainable development agenda. Sustainable agriculture depends on integrated water resources management (IWRM) and innovative solutions, addressing climate change risks and poor water governance. There is a need for more effective and consistent actions, coupled with strong political will, in recognizing, valuing and managing water in a holistic and integrated manner to achieve all the Sustainable Development Goals (SDGs).

The year 2022 has witnessed the greatest water challenges due to climate change and ineffective water governance. The floods in Australia, Madagascar, Pakistan and South Africa, as well as the long-lasting unprecedented droughts in China, the United States of America, East Africa and Europe took thousands of lives, destroyed villages and towns and other infrastructures, massively affecting agriculture and livelihoods.

The annual amount of freshwater resources available per person declined by more than 20 percent in the past two decades. This trend is projected to continue. There is urgency to support farmers to efficiently produce food and increase production of high-value and nutritious food, with optimal water use. Integrated solutions and policies at all levels are needed to improve food security, nutrition and resilience.

The 133rd Session of the Programme Committee welcomed the Evaluation of FAO's contribution to availability and sustainable management of water and sanitation for all (SDG6) and Management's Response; underlined the fundamental importance of sustainable management of water resources to FAO's core mandate and the need for the Organization to articulate a strategic and coherent approach to water-related activities; and stressed the urgent need to address the links between agriculture and water quality and pollution, within FAO's mandate, in collaboration with relevant UN agencies.

The Committee on Agriculture (COAG), at its 28th Session, recommended FAO to step up the work of the Global Framework on Water Scarcity in Agriculture (WASAG), to support Members, upon request, in building and developing capacities to produce data on available and actual use of water resources for agriculture; and, in close collaboration with relevant UN agencies, to initiate a Global Dialogue on Water Tenure.

Recognizing the urgencies and following the guidance provided by the 133rd Session of the Programme Committee, the 28th Session of COAG and the 170th Session of the Council, this

document provides an overview of the ongoing FAO's actions in support of integrated water resources management and presents the planned programmatic water-related initiatives to address the challenges and support the transformation of agrifood systems and the achievement of the sustainable development goals.

These programmatic initiatives include strengthening FAO's work on integrated water resources management, supporting the development of national water roadmaps through country-led dialogues and participatory processes, organizing a Rome Water Dialogue to catalyse innovation and mobilize political will towards integrated water resources management for food security and climate resilience.

Suggested action by the Joint Meeting of the Programme and Finance Committees and the Council

The Joint Meeting is invited to:

1. reiterate the importance of water resources management for food security and climate resilience;
2. welcome the initiative to develop and implement climate actions for effective agricultural water management, addressing the impacts of water scarcity, drought and floods on agrifood systems, as guided by the FAO Strategy on Climate Change 2022-2031;
3. further welcome the initiative to support Members to conduct national water dialogues and develop their national water roadmaps towards Sustainable Development Goals, as appropriate; and
4. support water resources management to be considered as the topic for the general debate of the 43rd Session of the Conference and as the biennial theme for Governing Body sessions in 2024-2025, and recommend the Council to endorse this proposal for approval by the 43rd Session of the Conference.

The Council is invited to endorse water resources management as the topic for the general debate of the 43rd Session of the Conference and as the biennial theme for Governing Body sessions in 2024-2025.

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I. Introduction

1. Water is central to agriculture, which accounts for 72 percent of global freshwater withdrawals, and to the entire sustainable development agenda. Current and future agriculture depends on sustainable management of water resources and innovative solutions, addressing climate change and improving water governance. There is a need for more effective and consistent actions, coupled with strong political will, in recognizing, valuing and managing water in a holistic and integrated manner as well as enhanced financing, to achieve all the Sustainable Development Goals (SDGs)[1].

2. Yet, the water crisis is in the top five crises to impact the world in the next decade[2]. With a rapidly growing population and increasing demand of water for economies and environment, freshwater resources are becoming increasingly scarce. Currently, 2.3 billion people live in water-stressed countries, of which more than 733 million - approximately 10 percent of the global population - live in countries with high and critical water stress[3].

3. The year 2022 has witnessed the greatest water challenges. The floods in Australia, Madagascar, Pakistan and South Africa took thousands of lives, destroyed agriculture, villages and towns and other infrastructures, and the long-lasting unprecedented droughts in China, the United States of America, East Africa and Europe massively affected agriculture and livelihoods.

4. Addressing the water crisis and its major drivers, increasing and competing demands, impacts of climate change and ineffective water governance, is essential to the achievement of the 2030 Agenda for Sustainable Development and its SDGs including those focused on no poverty (SDG 1), achieving zero hunger (SDG 2), improving health and well-being (SDG 3), clean water and sanitation for all (SDG 6), affordable and clean energy (SDG 7), sustainable cities and communities (SDG 11), responsible consumption and production (SDG 12), contributing to climate ambitions (SDG 13), and safeguarding life below water (SDG 14) and on land (SGD 15).

5. The complexity of competing and increasing demands and stress on water resources requires integrated water resources management approaches including coordinated action on financing, policy and legal frameworks, transparent management of data and information, and multi-stakeholder planning across all sectors and at all levels.

6. The 133rd Session of the Programme Committee welcomed the Evaluation of FAO's contribution to availability and sustainable management of water and sanitation for all (SDG6) and Management's Response; underlined the fundamental importance of sustainable management of water resources to FAO's core mandate and the need for the Organization to articulate a strategic and coherent approach to water-related activities; and stressed the urgent need to address the links between agriculture and water quality and pollution, within FAO's mandate, in collaboration with relevant UN agencies.

7. As decided in the UN General Assembly resolution 75/212, the UN 2023 Water Conference will be convened on 22-24 March 2023 to review the progress made in the implementation of the UN Water Action Decade 2018-2028. Considering the increasing water-related challenges to agriculture production, food security and climate resilience, and the urgency to address them, it is crucial to seize the growing momentum ahead of the UN 2023 Water Conference, and to revisit the ways that water is managed in agrifood systems, maximizing social, economic and environmental benefits and FAO's work in this regard.

1 UN-Water's 2016 report - *Water and Sanitation Interlinkages across the 2030 Agenda for Sustainable Development*
2 World Economic Forum. 2020. *The Global Risks Report 2020*. Davos.
3 FAO and UN Water. 2021. *Progress on Level of Water Stress. Global status and acceleration needs for SDG Indicator 6.4.2, 2021*. Rome. https://doi.org/10.4060/cb6241en

II. FAO's actions on integrated water resources management in agrifood systems

8. The 133rd Session of the Programme Committee welcomed the Evaluation of FAO's contribution to availability and sustainable management of water and sanitation for all (SDG6) and Management's Response; underlined the fundamental importance of sustainable management of water resources to FAO's core mandate and the need for the Organization to articulate a strategic and coherent approach to water-related activities; stressed the urgent need to address the links between agriculture and water quality and pollution, within FAO's mandate, in collaboration with relevant UN agencies; and called for water issues to be considered with a cross-sectoral perspective within FAO's mandate, in particular by encouraging its discussion by relevant Governing Bodies.

A. FAO's actions and support in driving agriculture productivity and profitability through strengthened digital information, innovation and water management

9. Agricultural production critically depends on water access and availability and is among the most vulnerable sectors to climate-related water risks. Agriculture consumes approximately 72 percent of freshwater withdrawals globally. In many semi-arid countries, advanced rainfed agriculture or irrigation is not available to millions of smallholder farmers in relatively well water-endowed countries, reducing their production potential, livelihood, resilience to shocks and local food security.

10. Irrigation plays a critical role in the transition from subsistence to commercial farming, poverty alleviation and economic growth. Irrigated yields tend to be 30-100 percent higher compared to adjacent rainfed areas; in regions with a pronounced dry season, irrigation allows to extend the growing season; irrigation also supports the production of more nutrient-dense and/or more profitable food, fruits and vegetables, and stabilizes production under climate change; further, it can serve as a conduit of broader rural access to water resources. Combined with improved capacity and governance, rural markets and infrastructure, irrigation generates direct benefits (increased profitability, reduced risk of crop failure and stabilization of local food production, fairer access to water resources), as well as indirect benefits (employment, additional income, balanced conditions of food and supply markets).

11. Since 1961, irrigated area more than doubled. About 40 percent of global agriculture production comes from irrigated land, which is only about 20 percent of all agricultural land[4]. Almost all land in sub-Saharan Africa (93 percent), three-quarters of cropland in Latin America and the Caribbean, two-thirds of crop land in the Near East and North Africa, and more than half of cropland in Asia are rainfed. In rainfed systems, better agricultural water management covers a wide range of measures, including rainwater harvesting and sustainable land management and soil conservation practices such as mulching, terracing, and tillage, as well as supplementary irrigation, which all can help unlock additional yield potential in rainfed systems.

12. Agriculture is facing growing risks from water scarcity, drought, water pollution, variability in availability and conflicts. Extreme weather events will likely increase in frequency and intensity as climate change progresses, causing devastating impacts on agriculture, associated value chains and livelihoods depending on them.

13. Building on FAO's Global Framework on Water Scarcity in Agriculture (WASAG)[5], country/regional water scarcity initiatives, and, in response to requests of Members in the Near East, Africa, Asia/Pacific and Latin America and the Caribbean, a value-Added impact area (VAIA) on addressing water scarcity for agriculture and environment (AWSAMe), will scale-up actions and promote innovative practices, tools and digital solutions for achieving water and food security.

14. FAO's integrated Soil-Land-Water Information System (SoLaWISe) Initiative supports productivity, profitability and affordability of farmers by enhancing crop and field (agroecological

4 FAO. 2021. *The State of the World's Land and Water Resources for Food and Agriculture – Systems at breaking point. Synthesis report 2021.* Rome. https://doi.org/10.4060/cb7654en

5 https://www.fao.org/wasag/overview/en/

zones) integrated information system to govern water, soil and land and, simultaneously, strengthen governance, institutions and human capital by providing tools for improved decision-making.

15. FAO's existing information and data platforms such as the water productivity remote sensing portal WaPOR[6], global agro-ecological zones (GAEZ) geospatial mapping[7], the Global Information and Early Warning System on Food and Agriculture (GIEWS)[8] and the Agricultural Stress Index System (ASI)[9] for drought, soil and irrigation mapping, as well as land suitability tools, are analytical frameworks to be complemented with SoLaWISE to guide efficient and sustainable use and management of natural resources.

16. Together with the International Fund for Agricultural Development (IFAD), FAO is working in supporting countries on nutrition and water-sensitive agriculture, examining the linkages between water, food, nutrition and climate change. FAO supports capacity building of farmers and institutions to improve the access to more diverse, nutritious and affordable food options for improved dietary quality and diversity for all through water productivity.

B. FAO's actions in addressing IWRM through water supply and sanitation (WSS), water pollution prevention and the shift to circular economy

17. Global water scarcity is caused not only by the physical scarcity of the resource, but also by the progressive deterioration of water quality in many countries, reducing the quantity that is safe to use. A robust assessment of groundwater pollution is lacking at global level, triggering additional uncertainties and risks.

18. Water pollution has increased in both developed and developing countries, undermining economic growth as well as the physical and environmental health of billions of people. Every year, over 420,000 people die and some 600 million people – almost one in ten – fall ill after consuming contaminated food. More than 2 billion people lack access to basic sanitation services. Approximately, 80 percent of global wastewater goes untreated, containing everything from human waste to highly toxic industrial discharges, polluting water bodies.

19. Water pollution is challenging to tackle once it is diffused. Globally, the most prevalent water quality problem is eutrophication, a result of high-nutrient loads (mainly phosphorus and nitrogen). This problem is mainly due to agriculture; agricultural nutrient run-off, pesticides, soil sediments, and livestock effluents, all contribute to the pollution of waterways and groundwater. Once water is contaminated, it is difficult, costly, and often impossible, to remove the pollutants.

20. FAO is expanding the use of technologies, such as whole genome sequencing, to study the genomes of pathogens and track their path from water to food in order to prevent food contamination at its source. By incorporating water quality into food safety considerations and applying genomic surveillance to this process, the programme with FAO Members and other partners is enabling countries to address water and food quality as an integrated issue.

21. Developing multiple uses of water through a twin-track FAO approach, "SMART irrigation – SMART WASH[10]," ensures the basic needs of communities through enhancing irrigation and providing WASH facilities to vulnerable communities, responding to the One Health approach. Linking irrigation with WASH investments for synergistic food, health and nutrition security outcomes through integrated water management at the homestead and household scale with attention to gender and gender empowerment would leverage the financing needed for rural agriculture and water development.

22. FAO has been addressing cropland fertilizer management through the promotion of *the Code of Conduct for the Sustainable Use and Management of Fertilizers* and working with the One Health Quadripartite partners - World Health Organization (WHO), World Organisation for Animal Health

[6] https://www.fao.org/in-action/remote-sensing-for-water-productivity/en/
[7] https://gaez.fao.org/
[8] https://www.fao.org/giews/en/
[9] https://www.fao.org/giews/earthobservation/asis/index_1.jsp?lang=en
[10] https://www.fao.org/documents/card/en/c/cb1306en/

(WOAH), United Nations Environment Programme (UNEP) - on raising awareness of antimicrobial resistance as well as on pesticide management practices in the environment.

23. FAO has collaborated with UN-Water and the Toilet Board Coalition (TBC) in strengthening the sanitation economy by creating more local, closed and circular resource loops that promote composting of waste resources into fertilizer, reclaimed water or bioenergy that are then used locally.

C. FAO's actions in water for biodiversity, and restoration of ecosystems

24. Ecosystem-based solutions, which use or mimic natural processes to enhance water availability, improve water quality, and reduce risks associated with water-related disasters and climate change have been successfully applied in both urban and rural landscapes, by public and private actors. The invaluable contribution of ecosystem-based solutions has also been increasingly recognized by global agreements including Agenda 2030, the Paris Agreement on Climate Change, the post-2020 Global Biodiversity Framework, as well as the UN Decade on Ecosystem Restoration 2021-2030[11] spearheaded by FAO and UNEP.

25. FAO is promoting ecosystem-based solutions and ecosystem restoration, working with partners and Members to develop innovative financing mechanisms, and addressing barriers to conservation, sustainable use of biodiversity and ecosystem restoration, including institutional path dependence, policy, and planning frameworks.

D. FAO's actions in global dialogues and mechanisms

26. In recent decades, attempts to address water-related issues have mostly taken a sectoral approach. Although many of such attempts have been successful in various ways, the sector-focused approach now seems to have reached its limit. Agriculture is increasingly required to "make its case" for its share of water to enable food production and ensure food security.

27. FAO Committee on Agriculture (COAG), at its 28th Session in July 2022, recognized the need for enhanced water governance and water tenure for sustainable management of water resources, supported global dialogues on water tenure and encouraged Members to participate in a series of exchanges among countries in identifying principles for the responsible governance of water tenure in efforts to understand the complexity of water rights and improved sustainable water management and allocation systems.

28. The incoming UN 2023 Water Conference provides an unprecedented opportunity to raise the awareness of water's role in achieving the SDGs and to cascade down all global commitments to water at national level. FAO has put forward the proposal for a Rome Water Dialogue and for countries to voluntarily develop their national water roadmap towards achieving the SDGs, which would contribute to the water action agenda at the UN 2023 Water Conference in March 2023.

III. Looking forward: enhancing FAO's programmatic initiatives on water

29. FAO is in a unique position to support integrated water resources management and scale-up interventions linking water with climate change, forest management, ecosystem restoration, biodiversity, soil and land management, nutrition, antimicrobial resistance, food safety and One Water One Health to achieve interwoven benefits and reduce risks.

30. Recognizing the above urgencies, building upon FAO's rich experiences and comprehensive work on water, and following the guidance provided by the 133rd Session of the Programme Committee, the 28th Session of COAG and the 170th Session of the Council, a suite of programmatic initiatives will be implemented in partnership with Members to advance effective water management in agrifood systems for food security and climate resilience, including:

[11] https://www.fao.org/policy-support/tools-and-publications/resources-details/en/c/1469987/ and https://www.fao.org/land-water/water/en/

a) develop a soil-land-water digital information system (SoLaWISe) for major crops at the global and national level, so as to provide timely and quality information to support decision makers and farmers to make informed decision on soil, land and water resources;

b) implement the new AWSAME initiative – addressing water scarcity for agriculture and environment, scale out the solutions developed by WASAG and regional water scarcity initiatives, and strengthen institutional capacities of Members through the FAO inter-Regional Technical Platform on Water Scarcity;

c) scale-up the existing efforts on water data and assessments and strengthen integrated data and information, real-time and digital information systems, including water accounting and auditing, AquaStat, and WaPOR to provide comprehensive and quality data for effective agricultural water management;

d) conduct global irrigation needs mapping to address water scarcity and drought in a changing climate, and the needs for irrigation services in many developing countries;

e) develop innovative solutions to address water quality and pollution induced by agriculture, within FAO's mandate, in collaboration with relevant agencies;

f) improve nutrition, dietary quality and diversity and profitability of smallholder farmers by strengthening their capacities to adopt sustainable management of water, soil, and agronomic practices that contribute to increased yields, crop diversification, and quality of production in terms of nutrient content and its economic value;

g) develop and implement climate actions for effective agricultural water management, addressing the impacts of water scarcity, drought and floods on agrifood systems, as guided by the FAO Strategy on Climate Change 2022-2031; and

h) strengthen support to Members, upon request, in resource mobilization efforts to address water resources management-related challenges, including through the Green Climate Fund, the Adaptation Fund and the Global Environment Facility.

31. In addition, the following new initiatives are proposed to strengthen FAO’s work on integrated water resources management(IWRM):

a) organize a Rome Water Dialogue to catalyse innovation and mobilize political will towards integrated water resources management for food security and climate resilience;

b) support the development of national water roadmaps through country-led dialogues and participatory processes;

c) support Members to actively engage and drive, when appropriate, the technical and political processes, e.g. Global Dialogue on Water Tenure as endorsed by COAG 28, towards effective and inclusive water governance; and

d) support Members to improve coherence among water-related activities between agriculture and other sectors through IWRM approach.

32. Going forward, guidance is sought from the Joint Meeting for FAO to address the water challenges in agrifood systems in the context of climate change and the broader 2030 Agenda for Sustainable Development.

33. Further, following the decision by the Council at its 170th Session to encourage the discussion of water resources management by relevant Governing Bodies, and recognizing the watershed moment of UN 2023 Water Conference, it would be significant that the Joint Meeting could support the topic of water resources management for consideration as the topic for debate at the 43rd Session of the Conference and as the biennial theme for FAO Governing Body sessions in 2024-2025. In that regard, it could recommend the Council to endorse this proposal for approval by the Conference.