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Greening Agriculture: Towards Transformation to Efficient and Climate-Resilient Agrifood Systems

Executive Summary

The Near East and North Africa (NENA) region agroecosystems are facing increasing pressures, with climate change and population growth contributing to land degradation, water scarcity, biodiversity loss, and depletion of marine and aquatic resources. Continued unsustainable management of water and land resources threaten the achievement of Sustainable Development Goals (SDGs) 2, 6, 13, 14 and 15 regarding the achievement of zero hunger, the protection of terrestrial, marine and water resources for future food security, and effective climate action. Climate change is a threat multiplier on current natural resource risks, especially water scarcity. Oceanic warming and acidification in the Gulf region and Mediterranean seas and coasts have led to significant stock reductions whilst aquaculture output has increased.

The aim of the Regional Priority on greening agriculture is to make agricultural systems more sustainable, productive and resilient, while reducing negative environmental impacts and protecting natural resources. Greening agriculture demands a diversity of practices, including conservation or restoration of vulnerable agroecosystems, as well as the development and implementation of practices that improve soil health, water use, and the treatment and reduction of waste and pollution. Integrated management approaches and nature-based solutions should be further explored where possible. With an increasing blurring of the boundaries between rural and urban environments, territorial development that recognizes urban-rural linkages for greening agrifood systems is a good opportunity to develop circular bioeconomy approaches. Environmental and climate finance opportunities continue to be leveraged to meet these needs.

With the support of FAO, Members are encouraged to shift to sustainable production practices while advocating long-term, inclusive planning necessary to address the impacts of climate change on environmental sustainability and improved livelihoods. Improved water use efficiency and productivity, while incentivizing water resources sustainability across policy and regulatory environments, are crucial. Such practices need to be equitable and inclusive, recognizing the uneven impacts of climate change and natural resource degradation on men and women, as well as the value of traditional knowledge and community approaches in sustainable natural resources management. Members can leverage existing opportunities for acceleration of knowledge

exchange to prioritize evidence-based decision-making and continue building the capacity of agriculture sector actors to leverage innovation and information for transformation.

Suggested action by the Regional Conference

The Regional Conference invites Members to:

a) take note of the resolutions[1] of the *Joint Water-Agriculture Ministerial Council* of the League of Arab States on 27 January 2022, and the recommendations[2] of the *High-Level Joint Water-Agriculture Technical Committee*, held on 18 October 2022;
b) contribute to the implementation of the FAO Biennial Theme 2024-25 on *Water resources management for the four betters: better production, better nutrition, a better environment and a better life, to achieve the 2030 Agenda for Sustainable Development*;
c) invest in tested climate-resilient adaptation options to support evidence-based planning, ensuring equitable access and acknowledging gender and socioeconomic inequalities in agrifood systems;
d) invest in sustainable aquaculture to expand food production from scarce aquatic resources; integrate freshwater aquaculture with crop and livestock production; and invest in modern technologies to sustainably produce freshwater, brackish water and marine species;
e) seize the opportunities of the eighth replenishment cycle of the Global Environment Facility (GEF-8) and the Green Climate Fund (GCF) to mobilize investments in scaling up climate-resilient practices and restoration; and
f) invest in green spaces, promote bioeconomy, and improve green infrastructure to promote urban forestry and mitigate the urban heat island effect.

The Regional Conference invites FAO to:

a) develop a policy framework for greening agriculture supporting countries to mainstream its principles into policy, decision-making, and investment priorities;
b) continue supporting the intergovernmental processes of the League of Arab States in implementing the adopted recommendations and resolutions;
c) continue supporting countries to enhance their policy-enabling environment for scaling up climate resilient practices, understand investment needs, and integrate climate smart and bioeconomy considerations into existing approaches;
d) support countries to access funds to address water scarcity, land degradation, lack of climate services, and improve capacities to scale up climate-resilient practices;
e) seize opportunities outlined in FAO's Blue Transformation Roadmap (2022-2030) to maximize the contribution of aquatic food systems to the SDGs through more efficient production;
f) support countries to enhance the linkages between dryland forests and agriculture by exploring the opportunities of agrosilvopastoralism;
g) strengthen countries' capacities to adopt ecosystem-based approaches under the United Nations (UN) Decade on Ecosystem Restoration (2021-2030); and
h) strengthen countries' capacities in developing and implementing policies that foster urban agriculture and forestry, green infrastructure and bioeconomy practices.

[1] https://www.aoad.org/Mini-Sec-Meeting/Joint%20Ministerial%20Council%20Meeting%20Unofficial%20translation%20into%20English%20of%20the%20resolutions.pdf
[2] https://www.aoad.org/Mini%20Fourth%20Meeting/MA_RECOMMENDATIONS_DRAFT_POST_HLJTC_20221025_light.pdf

Queries on the content of this document may be addressed to:

RNE NERC Secretariat

FAO-RNE-NERC@fao.org

I. Introduction

1. The Near East and North Africa (NENA) region faces numerous environmental challenges impacting both near-term and long-term food security and agricultural production.

2. High demographic growth and the pressure to expand production have led to overuse of chemical fertilizers and pesticides, over-extraction of fisheries and forestry resources and non-renewable groundwater for irrigation, widespread mechanization, and expansion of intensive farming methods.

3. The consequences of unsustainable practices are evident on land, water and marine resources that sustain agricultural production, placing further limits on productivity. Already-limited land available for agriculture is shrinking accounting for less than five percent of the total land area in 2018.[3]

4. These impacts are not gender-neutral: women depending on natural resources for their livelihoods tend to be particularly vulnerable in the region, due to their unequal access to assets, information, and resources in some countries.

5. Increasing water stress, declining water quality and quantity, coupled with population growth and urbanization, threaten the ability of countries to uphold the basic human rights of access to water services and sanitation.

6. Climate change have disproportionate impacts on small-scale producers and low-income populations, especially in locations in Africa.[4] The *Sixth Assessment Report* of the Intergovernmental Panel on Climate Change (IPCC) urges the implementation of adaptation approaches that address water scarcity, soil health, sustainable land management and ecosystems-based approaches.

7. Sustainable natural resources management is also important given increasing evidence for protracted crises linked to conflicts over natural resources. Improving governance contributes to community resilience to climate and other shocks.

8. The regional flagship publication *State of Land and Water Resources for Food and Agriculture in the Near East and North Africa region* (SOLAW) highlighted the pressure on land and natural resources posed by urbanization to cities and their surrounding areas.

9. The SDG targets covered in the Regional Priority correspond to the following:

   a. enhancing sustainability and climate resilience of agrifood systems (SDG targets 2.4, 13.2 and 14.4);
   b. halting land and water degradation and biodiversity loss (SDG targets 15.1 and 15.3);
   c. halting depletion of aquatic and marine resources (SDG target 14.2);
   d. promoting Integrated Water Resources Management (SDG targets 6.4 and 6.5);
   e. sustainable Cities (SDG targets 11.7 and 11.8).

II. Status and trends in natural resources management in the NENA region

A. Water scarcity

10. Eight Arab countries are among the top ten countries globally for high water stress. In NENA region, the per capita share of renewable water is less than 500 m^3/year in 13 countries, and less than 100 m^3/year for seven of these.

11. Agriculture is the largest consumer of water in the NENA region, drawing 85 percent of available water sources for irrigation.[5]

[3] FAO. 2021. FAOSTAT. [online] http://www.fao.org/faostat/en/.
[4] IPCC. 2022. Sixth Assessment Report. [Available online] https://www.ipcc.ch/assessment-report/ar6/
[5] Nin-Pratt, A., El-Enbaby, H., Figueroa, J. L., ElDidi, H. & Breisinger, C. 2017. *Agriculture and economic transformation in the Middle East and North Africa: A Review of the Past with Lessons for the Future*.

12. During the last sixty years, per capita water availability has declined by 78 percent. Sixty percent of the available water originated outside the boundaries of the region.[6]

13. Groundwater stress levels in NENA range from moderate to extremely high due to aquifer overexploitation, driving saltwater intrusion and groundwater pollution. Weak institutional settings for coordinated policies and integrated water resources management threaten water use sustainability in the region.

B. Land and soil resources

14. Land degradation has increased from 40 to 70 percent in the NENA region over the past decades, with Iraq, Jordan, Lebanon, Palestine and the Syrian Arab Republic showing the greatest decline.[7]

15. Arable land per capita decreased in all NENA sub-regions from 1961 to 2018,[8] disproportionately affecting smallholders who display low adaptive capacity to climate risks.

16. Soil degradation, including salinization, sodification and organic carbon depletion, poses a threat to food production. More than half of the soils examined in 11 countries exhibit varying degrees of soil salinity with 36.8 percent of the affected soils being concentrated within the 0-30 cm depth.[9]

17. Forests in the NENA region face environmental degradation, declining quality and quantity of forest, and loss of biodiversity.[10].

18. Forest fires are a major concern, especially in recent years, with human health and safety and undermining natural regeneration and reforestation efforts. Countries with significant forest cover and prone to conditions of drought and extreme temperatures, such as Algeria, Lebanon, the Syrian Arab Republic and Tunisia are at risk.

C. Aquatic and marine resources

19. Fish and aquatic products constitute a major source of food and nutrition across the NENA region. Average consumption is low at 12 kg per capita per year, but increasing. Egypt, Oman, Qatar and the United Arab Emirates consume more than the global average of 20.5 kg per capita per year.

20. All 19 NENA countries have access to littoral marine resources but productivity varies, especially in enclosed seas including the Red Sea and the Arabian Gulf. Many fisheries have exceeded their maximum sustainable yields (MSY). There is a need for greater investment in stock assessment data capacity.

21. Climate change will greatly affect fisheries in the region, with localized effects. Forecasts in the Arabian Sea show a 4°C rise and a 40 percent precipitation reduction under the high emissions scenario.[11] Algal blooms due to pollution will become more frequent, intense and widespread. Aquaculture from local and imported sources is expected to supply most of the future demand.

22. NENA aquaculture production increased by 132 percent in 20 years to reach 1 788 666 tonnes in 2019, with Egypt accounting for 92 percent of the total of production and Saudi Arabia for 4 percent.[12] Other NENA countries are investing in aquaculture by integrating freshwater aquaculture

[6] FAO. 2022. *The State of Land and Water Resources for Food and Agriculture in the Near East and North Africa region*. Cairo.
[7] World Bank (2019). *Sustainable Land Management and Restoration in the Middle East and North Africa Region—Issues, Challenges, and Recommendations*. Washington, D.C.
[8] FAO. 2021. FAOSTAT. [online] http://www.fao.org/faostat/en/.
[9] FAO. 2023. *Regional action plan for Near East and North Africa (NENA) to sustainably manage salt-affected soils and boost soil organic carbon sequestration* (Unpublished)
[10] FAO. 2022. *The State of Land and Water Resources for Food and Agriculture in the Near East and North Africa region*. Cairo.
[11] FAO, 2018 *Impacts of climate change on fisheries and aquaculture*. Available online: https://www.fao.org/3/i9705en/i9705en.pdf
[12] FAO, 2023. FishStatJ - Software for Fishery and Aquaculture Statistical Time Series. Available online: https://www.fao.org/fishery/en/topic/166235/en

with crop and livestock production in harsh desert environments, or by investing in modern technologies to produce sustainable freshwater, brackish water and marine species.

D. Animal production

23. Animal production accounts for 40 to 80 percent of agricultural gross domestic product (GDP) and is a significant factor for sustaining rural livelihoods in NENA.

24. Climate change effects, especially extreme events like drought and floods, impact the livestock sector by reducing available feed resources and promoting the emergence and spread of vector-borne diseases. In the last two years, the cost of feed has almost doubled, leading to the abandonment of livestock activities in many countries.

E. Ecosystems management and biodiversity loss

25. FAO together with the United Nations Environment Programme launched a regional action plan for the UN Decade on Ecosystem Restoration in March 2022.

26. A stocktake of existing restoration initiatives in NENA[13] revealed that the primary drivers of degradation in Algeria, Jordan, Lebanon, Morocco, and the Sudan were climate change and human activities.

27. A FAO regional assessment[14] of pastoralism and management of pastoral ecosystems conducted in 2022[15] noted the lack of a reliable database on pastoral ecosystems, insufficient prioritization of the economic, social and environmental values from pastoral resources as well as the inadequate policy and legal frameworks that take into account traditional management systems and local knowledge.

28. The assessment highlighted the need for regional exchanges and capacity-building programmes for pastoralists and national experts in the valuation of goods and services from pastoral ecosystems.

F. Climate change and sustainability

29. IPCC released its Sixth Assessment Report[16] in 2022, stating that increasing weather and climate extreme events have reduced food and water security, slowed agricultural productivity and exposed millions to severe food insecurity, with the greatest impacts seen amongst small-scale producers and low-income households. The Report also notes economic damage in climate-exposed sectors such as agriculture, forestry, fisheries, energy and tourism.

30. Gender-responsive actions need to be better incorporated into interventions. Assessments conducted in Egypt, Iraq, Jordan, Palestine, and Yemen highlight the gender-differentiated impacts of climate change and other shocks, and women's and men's differing access to data and technologies.

31. Support to countries is ongoing to amplify agriculture priorities in nationally determined contributions (NDCs) and National Adaptation Plans (NAPs) continues through Green Climate Fund (GCF) Readiness and other projects (Egypt, Oman, Palestine, Tunisia, and Yemen). However, finance for adaptation remains below the expressed needs of the region and is 5-7 times lower than that for mitigation.[17]

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[13] FAO. 2023. *Analysis of the Current Status of Existing and Proposed Actions, Initiatives and Projects for Ecosystem Restoration in the NENA Region*. (Unpublished)
[14] FAO. 2022. *Regional assessment on the current situation of pastoralism, management of pastoral ecosystems and their socio-economic potential in the Near East countries* (unpublished)
[15] The Assessment was conducted in line with the recommendation of the 25th session of the Near East Forestry and Range Commission (2021), to extend and strengthen its work on rangelands. Seven pilot countries – Algeria, Jordan, Mauritania, Morocco, Saudi Arabia, the Sudan and Tunisia – were studied, and the results presented at a regional workshop in Tunis from 14 -15 December 2022.
[16] IPCC. 2022. Sixth Assessment Report. [Available online] https://www.ipcc.ch/assessment-report/ar6/
[17] FAO. 2022. *The State of Land and Water Resources for Food and Agriculture in the Near East and North Africa region*. Cairo.

32. FAO's regional portfolio for Global Environment Facility (GEF) and GCF projects grew to USD 70 million by 2022, with 12 countries in the region supported by such funds. The last two years have also seen an increasing variety of bilateral funds for climate change projects being implemented by FAO in the region.

G. Green cities for a better environment

33. Urban sprawl and land use changes are placing stress on already-limited agricultural resources, causing shifts in production and consumption patterns in urban areas, water supply issues, with increasing pressures on waste management.[18]

34. FAO launched the Green Cities Initiative in 2020 aiming to support countries towards urban and peri-urban food production and urban greening as a climate mitigation strategy as well as urban food systems sustainability.

35. The regional SOLAW[19] highlighted that cities can provide services such as recycling and reuse of waste and wastewater that can benefit agriculture, as well as integrate food production in urban planning.

H. Opportunities and challenges

36. Opportunity 1: Advocate for the development and implementation of green and sustainable agricultural practices including:

a. diversification of crops and production systems including the preservation and scaling up of the use of genetic resources to improve soil health, biodiversity and ecosystems resilience;
b. preventing plant diseases by using certified seeds and propagative materials;
c. utilizing the farmer field school (FFS) approach to strengthen farmer capacity to understand agroecosystem dynamics and to mitigate climate risks;
d. scaling up sustainable pesticide management and harmonize pesticide registration systems;
e. climate-smart production practices that support adaptation to climate change, improve resilience of communities, and reduce greenhouse gas emissions;
f. bioeconomy practices that promote sustainable production and consumption patterns, including recovery of waste and nutrients into secondary raw materials, soil management, and replacing pesticides and fertilizers with bio-based alternatives where possible;
g. using renewable energy in agriculture for energy-intensive processes such as irrigation, with attention to the trade-offs;
h. decarbonizing agriculture through the use of more efficient and environmentally friendly technologies for agricultural production reducing fossil fuel use and environmental impact;
i. investigate opportunities in emerging carbon markets for financing the climate-resilient transformation of agriculture; and
j. promoting regenerative agriculture that prioritizes healthy soils and environment while maintaining long-term food production.

[18] FAO. 2022. *The State of Land and Water Resources for Food and Agriculture in the Near East and North Africa region*. Cairo.
[19] FAO. 2022. *The State of Land and Water Resources for Food and Agriculture in the Near East and North Africa region*. Cairo.

37. Opportunity 2: Unlock the potential of non-conventional water resources use in agriculture to halt the overexploitation of freshwater, including through bioeconomy solutions to treat wastewater and polluted water.

37.1 Challenge: The use of non-conventional water resources (NCWR) is usually hampered by legal, financial, institutional, technical and social factors, such as:

a. cost of non-conventional water resources infrastructure and technology (desalination plants, wastewater treatment plants, etc.), related also to the challenges of finding sites for such infrastructure close to cities;
b. lack of adequate regulatory frameworks, institutional structures and capacities, to effectively incorporate the use of NCWR within integrated water resource management strategies and plans at national and regional levels; and
c. lack of social acceptance of reclaimed water, especially the use of treated wastewater in agricultural production, and sludge as fertilizer.

38. Opportunity 3: Improve water efficiency and sustainability by integrating water accounting and water productivity tools and analytics towards science-based decision-making.

38.1 Challenge: Data availability and capacity to use adequate approaches and tools to collect, analyse and produce information to inform water management-related decision-making processes, accompanied by lack of standardization of water accounting and tools for water productivity, and analysis and comparison of trade-offs.

a. Water accounting systems need to be institutionalized within responsible bodies as a tool for assessment, monitoring and reporting.
b. Water productivity indicators can offer benchmarking tools which aim to fill existing crop water productivity gaps within the sustainable boundaries to be established with water accounting.
c. Water governance is needed to ensure informed decision-making systems around the allocation, distribution, and use of water to ensure equitable access, economic profitability and environmental sustainability.

39. Opportunity 4: Scale up the implementation of nature-based solutions including ecosystem-based (climate change) adaptation and restoration and bioeconomy solutions, that meet cross-cutting objectives of climate change mitigation, promoting community-led initiatives, indigenous/local knowledge, support for small-scale farmers, and gender-sensitive practices.

39.1 Challenge: The uptake of nature-based solutions is hampered by:

a. lack of coordination and planning, as well as limited capacities for implementing and scaling up such projects including budgeting and mobilizing resources for such projects; and
b. lack of knowledge on the technical feasibility of options; in the case of water, inadequate understanding of *in situ* and *ex situ* water harvesting techniques to increase the buffering capacity of farming systems.

40. Opportunity 5: Improve soil data and monitoring systems and capacities through data harmonization and development of national and regional soil data-sharing platforms, that can facilitate informed decision making and effective land use planning. Use mapping tools to assess interactions among climate, land use, land cover change and social context. Coordinate efforts to harmonize regional and national policies on soil issues such as soil protection, soil pollution and biodiversity loss and update existing legislation.

40.1 Challenges:

a. Lack of standardization in terms of data collection methods, limited accessibility of data within and between institutions as well as lack of national and regional soil information systems hinder the efficient exchange of soil-related data among relevant stakeholders.

b. Soil legislation and policies are often inadequate, not updated or implementation mechanisms are poor, particularly related to soil salinization, waterlogging and soil pollution.

41. Opportunity 6: Aquaculture can provide a significant contribution to the food security of a rapidly growing NENA population whilst enabling over-exploited capture fisheries to replenish.

41.1 Challenges:

a. High seafood import dependency enabled by liberal trade conditions presents a significant constraint to the emergence of commercially viable smallholder aquaculture sectors in NENA countries lacking significant freshwater endowments.
b. Significant scaling up of production, that can also be competitive against farmed seafood commodity imports, is likely to require substantial public and private investment in larger vertically-integrated farming operations.
c. Land-based closed containment systems such as recirculating aquaculture systems (RAS) (offer potential for grow-out production in higher-income, more urbanized NENA countries due to high operational and capital costs.
d. The reliance on feed sources for aquaculture.
e. Promote climate change resilience, adaptation, and ecosystem-based management for fisheries and enhance regional cooperation in marine fisheries management and aquaculture development.

42. Opportunity 7: Design and implement strategies and investment plans for animal feeding that promote sustainable use of natural resources. These include developing guidelines for forage conservation, baled hay, roughage, and the use and distribution of feed additives, and developing locality-based feed crop production systems that use non-conventional water resources and hydroponics in sustainable ways. There is an opportunity to promote the safe use of agricultural by-products in the feed industry as well as reduce greenhouse gas emissions from the livestock sector using sustainable feeding systems and adapted genetic resources.

43. Opportunity 8: Include urban systems into the greening agenda for agriculture by incorporating sustainable bioeconomy approaches and enhancing urban-rural linkages. Develop policies and strategies, and strengthen capacities to address urban sprawl and land use changes that endanger limited agricultural resources, including challenges related to water supply issues and urban waste management. Enhance the adoption of urban agriculture practices for enhancing household food security in cities.

43.1 Challenge: Different sectoral mandates render it challenging to coordinate and plan across the urban-rural interface. There is a lack of systems for recovering and recycling water and residues.

I. Response actions

44. Response 1: Enhance the sustainability and climate resilience of agricultural production practices (SDG targets 2.4 and 14.4)

a) Design agrifood systems that take into consideration climate risk, biodiversity loss, and resource depletion. These include sustainable intensification and diversification of agricultural production systems, adoption of nutrition-sensitive agricultural systems, species and varieties, and supporting research for crops and practices that are better adapted to drought, heat and salinity to withstand climate change.
b) Strengthen the preventive measures of plant diseases by using certified seeds and propagative materials.
c) Promoting the development of local biocontrol industries in NENA countries.
d) Strengthen capacities of countries in the design and implementation of innovative and environmentally friendly options for the control of animal and plant pest and diseases and for adopting climate-smart pest management techniques.

e) Explore the potential of carbon markets, such as carbon farming to sequester carbon in unproductive lands and the trading of carbon credits, with the necessary policy and financial support.
f) Promote a sustainable bioeconomy approach across farm production systems and their value chains that support the recycling of waste and relevant agricultural residues and reducing food loss and waste.
g) Adopt ecosystems-based approaches with low- or organic inputs such as agroecology, bioeconomy, agropastoral systems, agroforestry, protected agriculture, conservation agriculture, integrated pest and weed management systems, practices that emphasize crop rotation, improved soil fertility and improved crop, livestock, forest and aquaculture diversity that also promote positive social transformations towards improved human health, equity and natural resource governance.
h) Accelerate adoption of climate-resilient agricultural practices especially those with co-benefits for addressing water scarcity, soil and ecosystems health, biodiversity and cultivar improvements, and climate change mitigation. Promotion of such practices should include the concomitant development of inclusive value chains and seek to improve the adaptive capacities of rural and agricultural communities especially the most vulnerable to climate change.
i) Scale up the use of early warning systems, climate services and agrometeorological advisories within national and sectoral adaptation plans to support decision-making for resilient on-farm practices. Examples include supporting farmers to acquire cost-effective agrometeorological systems to monitor crop evapotranspiration, and better integrating climate information with irrigation scheduling.
j) Support countries in the assessment of greenhouse gas (GHG) emissions and implementation of innovative climate resilient good practices in the livestock value chains.
k) Build on national climate change plans and climate commitments to enhance agriculture sector integration into NAPs, NDCs and long-term strategies and build sector capacities to plan and implement climate change adaptation projects with mitigation co-benefits in agrifood systems.
l) Support countries to mobilize climate finance and other sources of finance towards sustainable and resilient food systems, including opportunities availed by GEF, GCF, bilateral funds and the emerging Loss and Damage facility.

45. Response 2: Halting land and ecosystems degradation and biodiversity loss

a) Promote sustainable soil, water and land management and bioeconomy practices including the use of mulching and organic fertilizers; enhancement of soil organic carbon stocks through the adoption of sustainable soil and land practices that improve soil microbiome, such as conservation agriculture, agroforestry and use of cover crops and manure to enrich soils with organic matter.
b) Support countries in the design and implementation of policies and investment plans for community-based sustainable management of rangelands, including innovative animal feeding strategies and local forage production.
c) Accelerate ecosystem restoration efforts at regional and national level in alignment with the UN Decade on Ecosystem Restoration to address climate change across diverse ecosystems and enhance carbon sequestration, preserve biodiversity and promote the conservation of natural resources.
d) Embrace digital tools and remote sensing data for land use planning, agroecosystem assessment, and climate adaptation to promote sustainable land management.
e) Enhance the governance of land and water resources and support sustainable and gender-responsive natural resources management, access and tenure, based on guidance such as the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests (VGGT), and the Global Dialogue on Water Tenure. Create an enabling environment to invest in green infrastructure and encourage the integration of urban and peri-urban forestry and agriculture in urban and regional planning that can

ameliorate the loss of agricultural land, enhance carbon sequestration in urban and peri-urban environments and create short food supply chains.

f) Enhance the mainstreaming of biodiversity into projects, policies and plans, including support to National Biodiversity Strategies and Action Plans.

46. Response 3: Halting depletion of aquatic and marine resources

a) Limit transmission of transboundary diseases, support capacity building at enterprise, national and regional scales, for proactive biosecurity planning (including emergency preparedness, risk analysis, monitoring and surveillance) and design of progressive management pathways (PMP) at national levels.

b) Support comprehensive regional adoption of spatial planning guidelines for design and management of Allocated Zones for Aquaculture (AZA)[20] consistent with the ecosystem approach to aquaculture (EAA) and regulation based on environmental quality standards (EQS) in order to minimize adverse environmental and socioeconomic impacts and negative interactions with other resource uses.

47. Response 4: Promoting integrated water resources management

a) Enhance inter-sectoral coordination and policy coherence at regional and national levels by supporting the discussion on cross cutting issues between water and agriculture under high level political will.

b) Enhance capacities for improved water allocation for agriculture.

c) Promote use of non-conventional water resources as an alternative solution to reduce pressure on freshwater use for agriculture and their integration in water resources planning and management.

d) Ensure equitable access to efficient and productive technologies and innovative practices that respect sustainability limits, including innovative approaches that strengthen women's role in water management, governance and monitoring the effects of interventions.

e) Support countries in improving water efficiency, productivity, and sustainability by enhancing capacities in use of water accounting and productivity tools.

f) Explore and promote integration of the water-energy-food nexus approach and models in national water resources plans and strategies.

g) Improve knowledge and enhance capacities in the use of remote sensing tools to produce data to support agricultural water management related decision-making process.

h) Advancing inter-regional collaboration and partnerships through specialized data and information platforms that can facilitate capacity development, knowledge sharing, peer-to-peer learning and South-South collaboration across water-related actors and sectors.

J. Accelerators and cross-cutting issues

Inclusiveness and gender

48. Women and small-scale producers are disproportionately affected by climate change, due to differential access to agricultural resources, and services.

49. Implementing tested approaches such as inclusive Water Users Associations (WUA) and FFS, strengthens women's roles and improves their access to water-saving or climate-smart practices, while challenging unequal social norms.

Innovation

50. FAO, through the Water Scarcity Initiative, enhanced the validation of estimated actual evapotranspiration through establishing a regional network for field measurements using new

[20] Based on General Fisheries Commission for the Mediterranean Resolution GFCM/36/2012/1 https://gfcmsitestorage.blob.core.windows.net/documents/Decisions/GFCM-Decision--RES-GFCM_36_2012_1-en.pdf

technology such as the ET-Cordova stations. FAO has also supported national stakeholders in designing mobile applications that use remote sensing data for irrigation.

51. Member countries should engage in regional exchanges on climate change planning and on-farm climate-smart innovations for agrometeorological advisories, early warning, geospatial monitoring and decision-making tools.

52. Countries should invest in contextualizing innovative technologies for local communities and farming systems in both rural and urban environments to avoid maladaptation and ensure inclusive and gender-sensitive technology adoption.

Governance

53. Addressing water scarcity necessitates effective water allocation and governance. Guidelines on improved water resources allocation for agriculture are under pilot implementation in Egypt, Jordan, Palestine, and Tunisia.

54. Water governance and tenure assessments, when combined with water accounting, can help understand the causes of water resources mismanagement and establish a dialogue and action plan.

Data

55. Sex- and age-disaggregated data help better understanding the role of youth and women as environmental stewards, leaders of WUA and as advocates of climate-resilient solutions.

56. An improved network of measurement stations which track changes of water, soil, biodiversity attributes, combined with remote sensing, can enhance environmental monitoring.

57. Members should explore regional sources of downscaled data on climate change and water scarcity to inform scenario planning for climate risk analyses.

Partnerships

58. Engaging private sector in dialogues on water scarcity and environmental sustainability is critical for financing, knowledge transfer, and capacity building.

59. Multi-stakeholder knowledge and exchange platforms including FAO Hand-in-Hand Geospatial Platform, AQUASTAT, FAOSTAT, the Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region (RICCAR)21, the NENA Soil Partnership and the Inter-Regional Technical Platform on Water Scarcity (iRTP-WS) are important for strengthening international and regional collaboration towards greening agriculture.

[21] RICCAR, 2023. Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-economic Vulnerabilities in the Arab Region. Available online. https://riccar.org/