WP5. CAPACITY BUILDING AND EXCHANGE OF EXPERIENCES

Output 5.2 Compendium and recommendation papers

This document reports recommendations resulting from the discussion carried out during local meetings and, in particular the one held in Jordan on May 6th, 2023. It incorporates principles, approaches and strategies highlighted by the relevant stakeholders and decision makers to contribute to mitigating groundwater nitrate contamination.

Responsible partner: NARC

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TABLE OF CONTENT

1. BACKGROUND

This document has been written in the context of the MENAWARA project on Non-conventional Water Re-use in Agriculture in Mediterranean countries.

The joint challenges of the MENAWARA project consist in providing additional resources by recycling drainage and wastewater, rationalizing water use practices and setting operational governance models in line with national and international plans. The project is designed to enhance access to water through the treatment of wastewater to be re-used as complementary irrigation and to strengthen the capacity of governmental institutions, non-state actors operating in the sector, technicians, and farmers.

The document reports the activities carried out in the fifth Work Package (WP5) of the MENAWARA project and, in particular, is related to the **Output 5.2 "Compendium and Recommendation papers" and Activity 5.2.1 "Stakeholders dialogue and water governance improvement"** as described in infographic below (Figure 1).

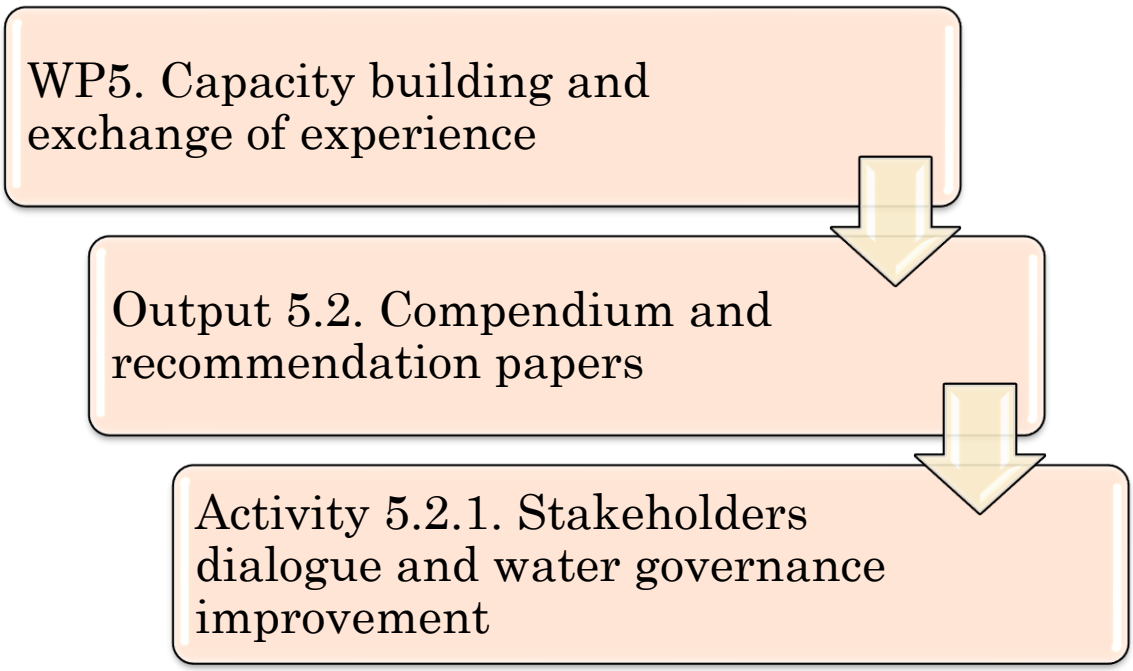

Figure 1. Infographic on the context of this technical report.

2. EXECUTIVE SUMMARY

The International Roundtable and Interchange experience held in Jordan on May 7th and 8th, 2023, provided a valuable platform for stakeholders to discuss and strategize the utilization of non-conventional water in agriculture. The event also witnessed the participation of about 30 farmers, agronomists, and water irrigation engineers from Tunisia, Palestine, and Jordan.

The insights gained from the MENAWARA project and collaborative efforts across Mediterranean countries underscore the importance of shared and participatory solutions. Key recommendations derived from the roundtable discussions are reported in the document.

3. INTRODUCTION

Jordan, located in the water-scarce Mediterranean region, faces severe water scarcity, with annual renewable water resources averaging less than 100 m3 per capita. Factors such as population growth, climate change, urbanization, over-exploitation, and water quality degradation worsen the situation, particularly in arid and semi-arid regions. Agriculture, the largest water consumer globally, utilizing about 70% of available freshwater, is significantly impacted by water scarcity. Gross irrigation requirements are expected to rise by 4% to 18% without adaptation to water scarcity conditions.

Mediterranean farmers historically adapted to environmental changes, employing strategies such as transitioning to more efficient irrigation systems. Improving water use efficiency and exploring alternative resources, like non-conventional water, are crucial. Reusing treated wastewater for irrigation has gained prominence as an alternative, alleviating pressure on limited freshwater resources. However, this approach demands careful management to avoid environmental and health risks.

In recent years, a shift towards subsurface-drip irrigation has gained traction, presenting a potential solution to challenges associated with treated wastewater in agriculture. However, all irrigation methods, including surface-drip, surface (flood), sprinkler, and subsurface-drip, demand careful management and maintenance when utilizing treated wastewater.

Despite the positive aspects of wastewater reclamation for agriculture, concerns persist about the sustainability of wastewater-irrigated agriculture, necessitating studies to explore the impacts of different irrigation methods on crop quantity and quality, as evidenced by this investigation into alfalfa cultivation under semi-arid conditions. Farmers' attitudes toward wastewater reuse and its impact on sustainability are critical aspects to consider in ensuring the long-term viability of such practices.

4. RE-USE OF NON-CONVENTIONAL WATER IN AGRICULTURE – INTERNATIONAL ROUNDTABLE

The use of non-conventional water was the topic discussed during the International Roundtable and Interchange experience held in Jordan on May 7th and 8th, 2023. The event, organized by the National Agricultural Research Center (NARC), brought together national and international stakeholders from Jordan, Palestine, Tunisia, Italy, Spain, Greece, Egypt, and Malta. Participants included public authorities, researchers, farmers, and members of civil society who engaged in discussions on the MENAWARA project's achievements, strategies for its capitalization, and the management and promotion of non-conventional water use in Jordan's agricultural sector. The aim was to support and shape national policies in this crucial area.

Dr. Nizar Haddad, Director General of NARC, opened the roundtable by emphasizing the institution's commitment to finding effective solutions for the challenges faced by the agricultural sector, particularly those related to water, climate, and the environment. Dr. Haddad expressed NARC's dedication to supporting farmers and the agricultural sector, highlighting the positive impact that modern technology, facilitated by MENAWARA, can have on water efficiency through innovative approaches such as sub-surface irrigation, which reduces evaporation.

Dr. Alberto Carletti, the MENAWARA Project Coordinator from the Desertification Research Centre of the Sassari University, praised the event for providing a valuable platform to gather authorities, experts, and farmers from multiple countries for an open dialogue on challenges, opportunities, and the promotion of sustainability.

During the roundtable, Dr. Naem Mazahrih, the National Coordinator of the MENAWARA Project, presented promising results in terms of irrigation efficiency and productivity achieved in the project's demonstration fields. Dr. Mazahrih also highlighted the MEDWAYCAP project's potential to design concrete solutions for addressing water scarcity challenges using non-

conventional water. This objective was further explored during the subsequent Innovation Camp held on May 10th and 11th, which involved the active participation of all MENAWARA partners.

Scientific findings from the living labs in Beit Dajan, Palestine, supported by results from the demo site in Ramtha, were shared by Dr. Giovanna Dragonetti from CIHEAM-Bari. These findings showcased the added value of collaborative efforts and the positive impacts of innovative irrigation methodologies and approaches on agricultural communities and the environment.

The roundtable sparked a lively debate, with public officers and approximately 30 farmers, agronomists, and water irrigation engineers from Tunisia, Palestine, and Jordan, who were directly involved in the project activities, offering their valuable insights. The event was followed by field visits to Ramtha and Deir Allah, where technological solutions employed to enhance wastewater treatment processes and irrigation strategies were showcased.

The participants demonstrated enthusiasm for the exchange, which was evident during the subsequent workshop where Palestinian agricultural practices were shared among peers. The rich and productive discussions underscored the MENAWARA project's success, as farmers were fully engaged and aware of the project's progression, which was conducted in collaboration with and thanks to them. This demonstrated the tremendous potential that shared and participatory solutions offer in addressing complex challenges within a "living lab" environment. This ongoing collaboration among Mediterranean countries reaffirms the commitment to fostering sustainable practices and ensuring the efficient use of non-conventional water in agriculture, ultimately benefiting both farmers and the environment.

5. RECOMMENDATIONS

The International Roundtable and Interchange experience held in Jordan on May 7th and 8th, 2023, provided a valuable platform for stakeholders to discuss and strategize the utilization of non-conventional water in agriculture. The insights gained from the MENAWARA project and collaborative efforts across Mediterranean countries underscore the

importance of shared and participatory solutions. Here are key recommendations derived from the roundtable discussions:

1. Policy Advocacy and Implementation:
    - Encourage national policymakers in Jordan, Palestine, Tunisia, Italy, Spain, Greece, Egypt, and Malta to integrate the findings and recommendations from the MENAWARA project into their agricultural policies.
    - Promote the establishment of policies that incentivize and support the adoption of innovative irrigation methodologies, such as sub-surface irrigation, to enhance water efficiency.
2. Capacity Building:
    - Advocate for continuous training programs for farmers, agronomists, and water irrigation engineers to ensure they are well-versed in the latest technologies and approaches presented by the MENAWARA project.
    - Establish knowledge-sharing platforms, workshops, and training sessions to disseminate successful practices and experiences among agricultural communities.
3. Research and Development:
    - Allocate resources for ongoing research and development initiatives, building on the success of the MENAWARA project, to further enhance irrigation efficiency and productivity.
    - Foster collaboration between research institutions and agricultural communities to address emerging challenges and identify new opportunities for sustainable water use in agriculture.
4. International Collaboration:
    - Strengthen collaboration between Mediterranean countries to create a network for sharing best practices, scientific findings, and innovative solutions in the realm of non-conventional water use.
    - Facilitate joint projects and initiatives that leverage the expertise of each participating country, reinforcing a united front against water scarcity challenges.
5. Public Awareness and Engagement:
    - Launch public awareness campaigns to inform farmers, civil society, and the broader public about the benefits of non-conventional water use in agriculture.
    - Involve farmers and local communities in decision-making processes to ensure their active participation and ownership of sustainable water use practices.
6. Scaling Up Success Stories:
    - Identify successful case studies and best practices showcased during the roundtable and field visits and work towards scaling up these initiatives across different regions.
    - Encourage replication of successful models, with a focus on adapting strategies to local contexts and conditions.

7. Continued Monitoring and Evaluation:
    - Establish a robust monitoring and evaluation framework to track the long-term impact of non-conventional water utilization on agricultural productivity, environmental conservation, and community well-being.
    - Regularly assess and update strategies based on the evolving needs and challenges faced by the agricultural sector.

In conclusion, the recommendations outlined above aim to leverage the collaborative efforts initiated by the MENAWARA project and propel the efficient use of non-conventional water in agriculture. By implementing these suggestions, stakeholders can contribute to the sustainability of agricultural practices, address water scarcity challenges, and foster a resilient environment for farmers and communities across the Mediterranean region.