

# NEXUS-NESS

## NEXUS NATURE ECOSYSTEM SOCIETY SOLUTION

Fair and sustainable resource allocation demonstrator of the multiple WEF E Nexus economic, social and environmental benefits for Mediterranean regions

**GRANT AGREEMENT NUMBER 2042**

### Deliverable D2.2

## Nexus Ecosystem Lab Innovation Ecosystem Report V1.1 30 November 2022

Cite as: Xenia Schneider, Leonor Rodriguez Sinobas, Mohammed Bahnassy, Fethi Abdelli, Rudy Rossetto, Nexus Ecosystem Lab Innovation Ecosystem Report, PRIMA NEXUS-NESS Innovation Action (PRIMA H2020 GA 2042), Project Deliverable 2.2, 30 November 2022.

WP2 Leader and Task 2.2 Leader: XPRO, Xenia Schneider





**NEXUS-NESS - NEXUS NATURE ECOSYSTEM SOCIETY SOLUTION:  
FAIR AND SUSTAINABLE RESOURCE ALLOCATION  
DEMONSTRATOR OF THE MULTIPLE WEFE NEXUS ECONOMIC,  
SOCIAL AND ENVIRONMENTAL BENEFITS FOR MEDITERRANEAN  
REGIONS**

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## **Deliverable D2.2**

# **Nexus Ecosystem Lab Innovation Ecosystem Report**

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30 November 2022

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WP2 Leader and Task 2.2 Leader: XPRO, Xenia Schneider

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Partnership for Research and Innovation in the Mediterranean Area Programme (PRIMA)

The NEXUS-NESS project has received funding from the PRIMA Programme, an Art.185 initiative supported and funded under Horizon 2020, the European Union's Framework Programme for Research and Innovation.



Horizon 2020  
European Union Funding  
for Research & Innovation



## Deliverable Identification

<b>Deliverable No and Title</b>	<b>D2.2 Nexus Ecosystem Lab Innovation Ecosystem Report (Month 18)</b>		
<b>Project Number</b>	2042	<b>Acronym</b>	NEXUS-NESS
<b>Project Full title</b>	Fair and Sustainable Resource Allocation Demonstrator of the Multiple WEFE Nexus Economic, Social and Environmental Benefits for Mediterranean Regions NEXUS Nature Ecosystem Society Solution (NESS)		
<b>Funding Instrument</b>	PRIMA: To achieve, support and promote integration, alignment and joint implementation of national R&I programmes under a common research and innovation strategy to address the diverse challenges in water scarcity, agriculture, food security.		
<b>Call</b>	PRIMA SECTION 1 (IA) Demonstrating benefits of the Water-Ecosystem-Food Nexus approach in delivering optimal economic development, achieving high level of environmental protection and ensuring fair access to natural resources.		
<b>Work-Package No and Title</b>	WP2 WEFE-Nexus Transition through Innovation Ecosystem Approach		
<b>WP- Main Beneficiary</b>	XPRO		
<b>WP-Leader</b>	Xenia Schneider (XPRO)		
<b>Task No and Title</b>	Task 2.2 “Applying the NEL Innovation Ecosystem Methodology ” (M4-M36)		
<b>Task Leader</b>	Xenia Schneider		
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<b>Contributors</b>			
<b>Status</b>	Draft <input type="checkbox"/> Final <input checked="" type="checkbox"/>		
<b>Dissemination Level</b>	Internal <input type="checkbox"/> Public <input checked="" type="checkbox"/>		
<b>Reviewed by</b>	Fernando Nardi (UNISTRAPG)		
<b>Abstract</b>	The deliverable describes 1) the application of the Nexus Ecosystem Lab Methodology in the NEXUS NESS Ecosystem Labs (NELs) as specified in Deliverable D2.12, and 2) the results of the 1 <sup>st</sup> stakeholder workshops held in the four NELs as part of their WEFE Nexus transition.		
<b>Key words</b>	NELs, Responsible Research and Innovation, RRI, Water, Energy, Food, Nexus, Stakeholders, Change Management, Transition, WEFE-Nexus, Participatory Approaches		
<b>DOCUMENT HISTORY</b>			
<b>Planned Release Date</b>	30 November 2022	<b>Actual Release Date</b>	30 November 2022
<b>Version</b>	V1.1	<b>Released Version No</b>	V1

**Table of Contents:**

**1. PURPOSE OF THE DELIVERABLE..... 6**

**2. OVERVIEW OF THE NEL INNOVATION ECOSYSTEM METHODOLOGY (IEM) ..... 7**

**3. PURPOSE OF THE WEFÉ-NEXUS TRANSITION VISION AND ACTION PLAN ..... 9**

**4. PREPARING THE NEL-TEAMS FOR APPLYING THE INNOVATION ECOSYSTEM METHODOLOGY..... 13**

**5. APPLYING THE INNOVATION ECOSYSTEM METHODOLOGY IN EACH NEL ..... 18**

5.1 CURRENT SITUATIONAL ANALYSIS AND IDENTIFICATION OF THE NEL STAKEHOLDERS ..... 18

**6. NEL 1<sup>ST</sup> STAKEHOLDER ENGAGEMENT WORKSHOPS..... 22**

6.1 NEL 1<sup>ST</sup> STAKEHOLDER WORKSHOP PRESCRIBED PHASES ..... 22

6.2 HOW THE INNOVATION ECOSYSTEM LAB METHODOLOGY WAS APPLIED IN THE EGYPTIAN NEL..... 24

6.2.1 *Egyptian NEL 1<sup>st</sup> NEL Results and their Significance Towards NEL WEFÉ-Nexus Transition* ..... 28

6.2.2 *Egyptian NEL First Workshop Results Critical Review by the NEL-Leader* ..... 31

6.2.3 *Critical Review of the WP2-Leader:* ..... 31

6.3 HOW THE INNOVATION ECOSYSTEM LAB METHODOLOGY WAS APPLIED IN THE TUNISIAN NEL ..... 33

6.3.1 *Tunisian NEL Results and their Significance Towards NEL WEFÉ-Nexus Transition* ..... 40

6.3.2 *Tunisian NEL First Workshop - Critical Review by the NEL-Leader* ..... 43

6.3.3 *Critical Review of the WP2-Leader:* ..... 44

6.4 HOW THE INNOVATION ECOSYSTEM LAB METHODOLOGY WAS APPLIED IN THE ITALIAN NEL ..... 46

6.4.1 *NEL Workshop 1 Results – their significance towards NEL WEFÉ-Nexus Transition* ..... 50

6.4.2 *Critical Review of the WP2-Leader:* ..... 50

6.5 HOW THE INNOVATION ECOSYSTEM LAB METHODOLOGY WAS APPLIED IN THE SPANISH NEL ..... 51

6.5.1 *Spanish NEL 1<sup>st</sup> Workshop Results and their significance towards WEFÉ-Nexus Transition* ..... 57

6.5.2 *Critical Review of the WP2-Leader:* ..... 58

**7. CONCLUSIONS AND NEXT STEPS ..... 59**

**List of figures**

Figure 1: RRI Roadmap Milestones and steps executed in the four NELs ..... 8

Figure 2: NEL WEFE-Nexus Transition Vision and Action Plan: consists of a vision supported by long-term goals and shorter-term objectives and actions based on the NEXUS-NESS Services ..... 10

Figure 3: NEL Workshops feed each other for co-agreeing a final version of a NEL WEFE-Nexus Transition Vision and Action Plan..... 11

Figure 4: NEL stakeholders are involved in all Change Management phases for reaching a WEFE-Nexus transition and to become Nexus Innovation Ecosystem. .... 12

Figure 5: Egyptian NEL Stakeholder Communication Map ..... 20

Figure 7: Tunisian NEL Stakeholder Communication Map..... 20

Figure 8: Italian NEL Stakeholder Communication Map..... 21

Figure 9: Spanish NEL Stakeholder Communication Map ..... 21

Figure 10: NEL 1st Workshop Timing..... 23

Figure 11: NEL 1st Workshop phases and which NELs executed them or not..... 23

Figure 12: Italian NEL 1st Workshop Stakeholders distribution per type and number..... 47

**List of Maps:**

Map 1: Geographic locations of the four NEXUS-NESS Nexus Ecosystem Labs. .... 6

**List of Tables:**

Table 1: NEL Current Situational and Stakeholder Analysis with direct links to the analyses..... 19

Table 2: Egyptian NEL 1st Workshop Statements ..... 29

Table 3: Tunisian NEL 1st Workshop Stakeholder Participants ..... 39

Table 4: Tunisian NEL 1st Workshop Statements and their voting. .... 41

Table 5: Spanish NEL 1st Workshop Statements and their votes. .... 55

**List of Pictures:**

Picture 1: NEXUS-NESS Master Class on the NEL Innovation Ecosystem Methodology ..... 13

Picture 2: World Cafe remote training: Statements from breakout room table 1 ..... 14

Picture 3: Training in the World Cafe participatory method: discussion, idea generation and presentations of statements. .... 14

Picture 4: Training in the World Cafe participatory method: individual reading of statements and voting..... 15

Picture 5: Egyptian NEL leaflet: Front side and Back side ..... 16

Picture 6: Tunisian NEL leaflet: Front side and Back side ..... 16

Picture 7: Spanish NEL leaflet: Front side and back side ..... 17

Picture 8: Italian NEL leaflet: Front side and Back side ..... 17

Picture 9: Egyptian NEL stakeholders participating in the NEL 1st Workshop..... 26

Picture 10: Egyptian 1st workshop statements ..... 28

Picture 11: Discussing with Tunisian NEL stakeholders. .... 34

Picture 12: Tunisian NEL Leader discussing with CTV technicians. .... 34

Picture 13: Application of the PESTLEEC and SWOT analysis..... 35

Picture 14: Tunisian NEL 1st workshop participants ..... 36

Picture 15: Tunisian NEL 1st workshop: voting, presentation and discussions of the statements and voting results..... 38

Picture 16: Italian NEL 1st Workshop Stakeholders, Facilitators and Observers ..... 48

Picture 17: Italian NEL 1st Workshop World Cafe and generated statements..... 49

Picture 18: Spanish NEL 1st Workshop Stakeholders and Facilitators..... 52

Picture 19: Spanish NEL 1st Workshop Stakeholders voting ..... 54

Picture 20: Spanish NEL 1st Workshop presentation of the statements and the voting result. .... 54

**Abbreviations:**

D2.1	D2.1 Nexus Ecosystem Lab: Innovation Ecosystem Methodology Deliverable
IEM	Innovation Ecosystem Methodology
NEL	Nexus Innovation Ecosystem Lab
NELs	Nexus Innovation Ecosystem Labs
NEL Leader	The responsible person from the NEXUS-NESS partner responsible on location for the NEL.
NEL Team	The responsible persons helping the NEL Leader. These persons belong to the same organisation as the NEL Leader.
PESTLEEC	Political, Economic, Social, Technological, Legal, Environmental, Ethical and Citizen factors
RRI	Responsible Research and Innovation
SMART	Specific, Measurable, Achievable, Relevant and Time-bound
SWOT	Strengths, Weaknesses, Opportunities and Threats
WEFE-Nexus	Water, Energy, Food, Ecosystem Nexus
WP	Work Package of the Project consisting of tasks and subtasks
WP Leader	The NEXUS-NESS project beneficiary leading the WP

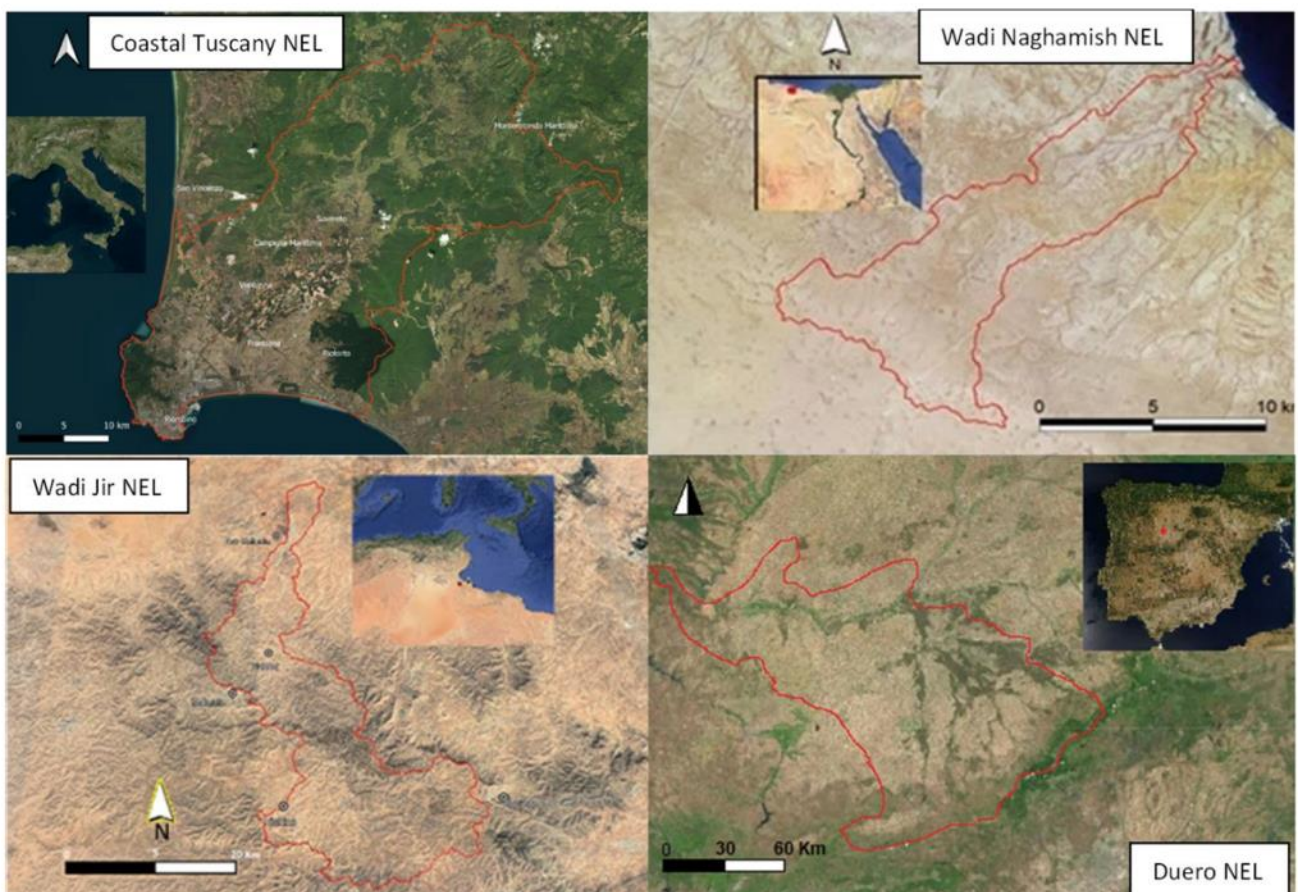


## 1. Purpose of the Deliverable

The primary purpose of this Deliverable D2.2 “Nexus Ecosystem Lab Innovation Ecosystem Report” is to provide a synopsis of the progress of the application of the Nexus Ecosystem Lab (NEL) Innovation Ecosystem Methodology (IEM) in the four NEXUS-NESS Nexus Ecosystem Labs (NELs) that began in September 2021 (M4) until November 2022 (18). The NEL Innovation Ecosystem Methodology (IEM), which is specified in D2.1 “Nexus Ecosystem Labs – Innovation Ecosystem Methodology”, was applied in the four NELs:

- a. Val di Cornia watershed, in coastal Tuscany, Italy
- b. Wadi Naghamish watershed, Egypt
- c. Wadi Jir watershed in Tunisia
- d. Duero watershed, Spain

The geographic location of the four NELs is illustrated below in Map 1.



Map 1: Geographic locations of the four NEXUS-NESS Nexus Ecosystem Labs.

Each NEL has a NEL Leader and a NEL Team, who are staff from the NEXUS-NESS partner responsible for the NEL on location.

The deliverable D2.2 documents the progress of the systemic application of the IEM in the four NELs by actively motivating and engaging the NEL stakeholders. The NEL stakeholders were identified by the NEL Leaders and their teams as they deemed necessary. IEM is based on systemic innovation, design thinking and Responsible Research and Innovation (RRI) principles through the application of the RRI Roadmap.

While the D2.2 reports the IEM application in each NEL through the preparation, organisation and execution of the NEL 1<sup>st</sup> workshops, this report does not consolidate by any means the NEL stakeholder statements produced during each NEL workshop. A consolidation does not make sense since the NELs differ with respect to their natural and socio-economic conditions, as well as to their WEFE-Nexus challenges and focus. The NEL workshop statements must be used to by the NEL stakeholders under the guidance of the NEL Leader and NEL Team and by the NEXUS-NESS partners to:

1. improve the application of the IEM to reach a co-agreed WEFE-Nexus Vision and Action Plan for achieving WEFE-Nexus in the NEL and for achieving in moving from a Lab to creating an innovation ecosystem that will exist and operate after the NEXUS-NESS project ends, and
2. apply the NEXUS-NESS tools, models and indicators in each NEL in the continuous work of NEXUS-NESS and namely in WP3 “Nexus Ecosystem Labs for Nexus-NESS Services operationalization”, WP4 “NEXUS-NESS Service deployment and WEFE-Nexus Management Plans” and WP5 “WEFE-Nexus Socioenvironmental and Economic Integrated Assessment”.

This deliverable is divided into five parts:

1. Overview of the NEL Innovation Ecosystem Methodology (IEM) steps that the NELs were requested to follow.
2. Purpose of the WEFE-Nexus Transition Vision and Plan
3. Preparing the NEL-Teams for applying the Innovation Ecosystem Methodology
4. Applying the Innovation Ecosystem Methodology in each NEL and NEL 1<sup>st</sup> workshop results and their significance towards a NEL WEFE-Nexus Transition.
5. Conclusions and NEL directions in the second half of NEXUS-NESS.

It is to be noted that this deliverable D2.2 consists of two reports, where the first one is due in M18, the present report, and the second report is due in M36 at the end of the NEXUS-NESS project.

## **2. Overview of the NEL Innovation Ecosystem Methodology (IEM)**

The NEXUS-NESS project works with 4 very diverse geographic locations where the WEFE-Nexus concept is to be applied. The WEFE-Nexus concept is about finding a balance of resources water, energy and food by

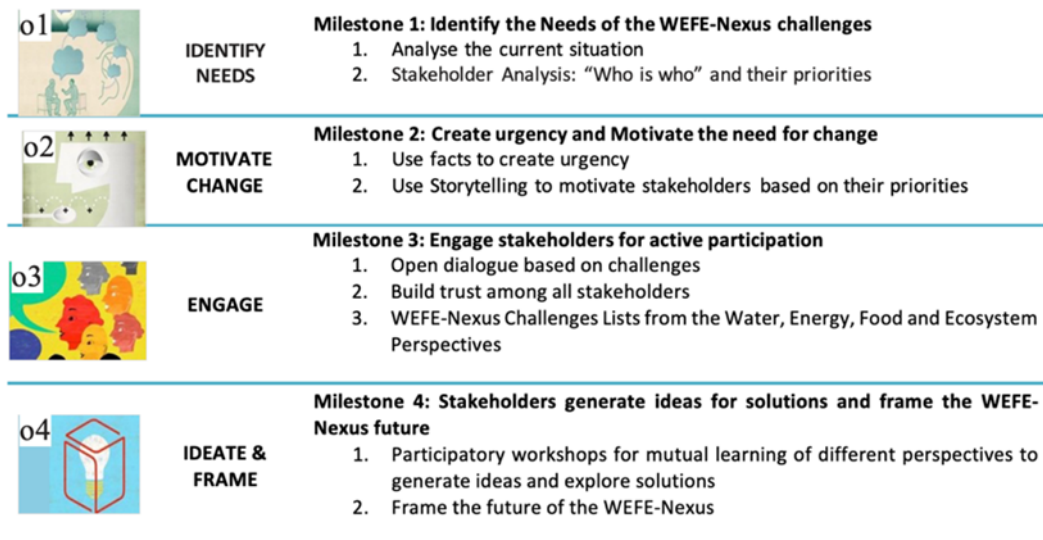


bringing together stakeholders from all three sectors to actively take actions at all levels: household, regional resource management and policy. To achieve responsible WEFE-Nexus means that impacts on the natural ecosystems must be acknowledged and minimized. Since climate, demographic, social and economic pressures are increasing, the demand for balanced management of water, energy and food is also increasing and threatens the well-being of the ecosystems we rely upon. The only way forward towards sustainable development is to take common strategic decisions about responsible natural resources management, to be better value the resources and to use them sustainably with the future in sight. For this to be achieved, stakeholders must be involved to identify collaborative and long-term innovative solutions. For this purpose, the NEXUS-NESS project has aimed to create Nexus Innovation Ecosystems Labs (NELs) as open and collaborative networks of stakeholders to

- a) demonstrate the benefits of the Water-Energy-Food-Ecosystem Nexus approach through the Nexus-Ness Services (NSS);
- b) co-agree on a WEFE-Nexus transition vision and action plan;
- c) be able to continue the WEFE-Nexus transition vision and action-plan after the project ends.

To achieve the above NEL goals, the Innovation Ecosystem Methodology (IEM) has been defined and extensively specified and exemplified in [D2.1 “ Nexus Ecosystem Labs – Innovation Ecosystem Methodology”](#).

*This D2.2 deliverable covers the first four RRI Roadmap Milestones as described in D2.1 pages 33-50 and illustrated in the Figure below*



*Figure 1: RRI Roadmap Milestones and steps executed in the four NELs*

To accomplish the NELs, four NEL-Leaders with local NEL-teams have been appointed:

- a) Wadi Naghamish, Egypt led by University of Alexandria (UA). NEL Leader: Mohamed Bahnassy
- b) Wadi Jir, Tunisia led by Institute Régions Arides de Médenine (IRA) and Comm. Régional au Développement Agricole Gabes (CRDA). NEL Leader: Fethi Abdelli

- c) River Cornia coastal plain, Val di Cornia, Italy:  
Scuola Superiore Di Studi Universitari E Di Perfezionamento Sant'Anna (SSSA). NEL Leader: Rudy Rossetto
- d) Rio Adaja, Duero Basin, Spain led by Universidad Politécnica De Madrid (UPM). NEL Leader: Leonor Rodríguez Sinobas.

### 3. Purpose of the WEFE-Nexus Transition Vision and Action Plan

The overarching goal of the NEXUS-NESS Ecosystem Labs (NELs) is to create an open and collaborative innovative network of stakeholders to

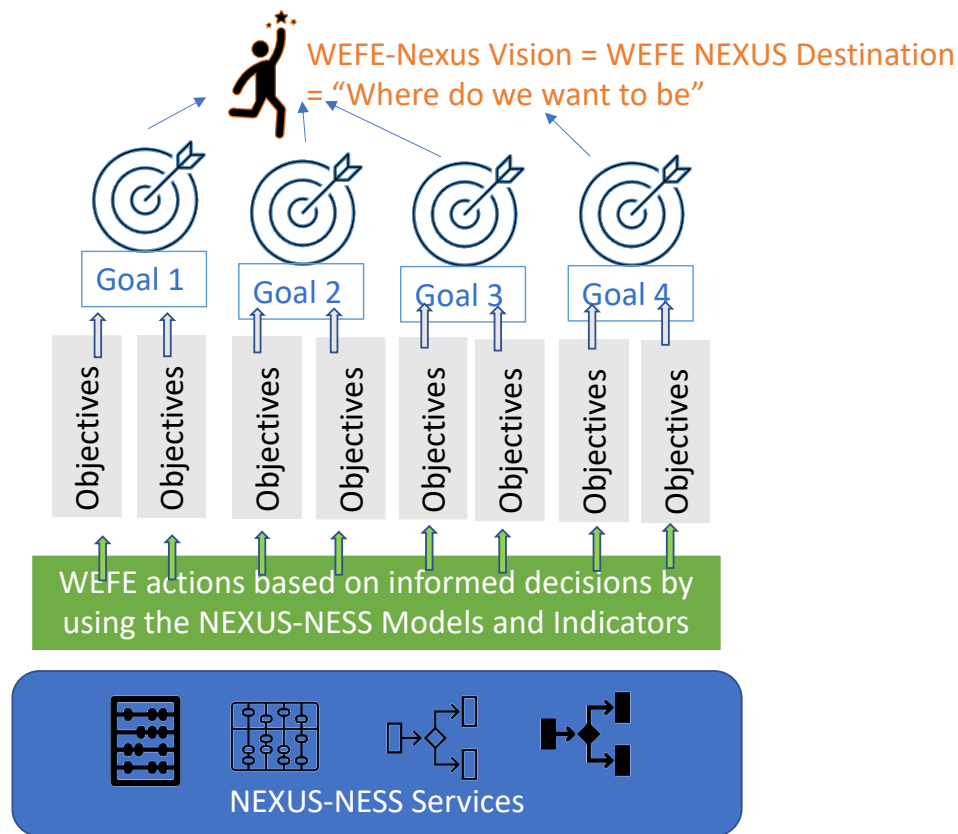
1. demonstrate the benefits of the Water-Energy-Food-Ecosystem Nexus approach and by using the NEXUS-NESS Services (NSS) to improve water and energy management for improving food production without destroying the natural environment.
2. after operating as a NEL, to become and continue operating as an innovation ecosystem after the NEXUS-NESS project ends.

It is a very challenging goal requiring careful management of mindset and practices changes that WEFE-Nexus brings to stakeholders and their ways of farming and natural resource utilisation. This change management is what the NEXUS-NESS project refers to as Transition towards WEFE-NEXUS. In other words, what are the necessary changes and actions that must take place in order to achieve a fair, integrated, and systemic management of natural resources for food production and improve the social and natural status of the NEL. To this end, the NEL Leaders and NEL teams have been following the NEL Innovation Ecosystem Methodology (IEM) to facilitate this transition as specified in the NEXUS-NESS D2.1 “Nexus Ecosystem Labs – Innovation Ecosystem Methodology”.

To achieve a WEFE-Nexus Transition so that it becomes the “new normal” the identification and engagement and motivation of stakeholders is pivotal. Following the NEL Innovation Ecosystem Methodology (IEM), the NELs must organise and facilitate workshops with relevant stakeholders. In these workshops, the NEL stakeholders are to be engaged and motivated to openly discuss, co-design and co-agree their WEFE-Nexus transition vision and action plan. The WEFE-Nexus transition vision is a clear and inspiring statement of what the future situation should be in order to have a balanced use of water, energy, and environmental resources for sustainable food production. The action plan consists of SMART goals and objectives with specific actions. The difference between a goal and an objective is that a goal is an achievable outcome that is generally broader and longer term, while an objective is shorter term and defines measurable actions to achieve an overall goal.

The WEFE-Nexus transition vision and action plan is a document that all stakeholders co-design and co-agree. It is the NEXUS-NESS goal to achieve this by the end of the project for each NEL. Based on the WEFE-Nexus transition vision and action plan, the NEL stakeholders can execute actions and achieve objectives and at the same time seek for financing for implementing larger objectives and goals. The NEXUS-NESS services

(hydrological and socio-economic models, cost-benefit analysis, and basket of indicators) are to be used to specify the actions and objectives of the NELs for financing and executing them. This is illustrated in Figure 2 below. The WEFE-Nexus transition vision and action plan can be the first item on the agenda of the NEL Innovation Ecosystem that may be a long-term achievement for the NEL’s stakeholders. The following Figure 2 illustrates the above.



*Figure 2: NEL WEFE-Nexus Transition Vision and Action Plan: consists of a vision supported by long-term goals and shorter-term objectives and actions based on the NEXUS-NESS Services*

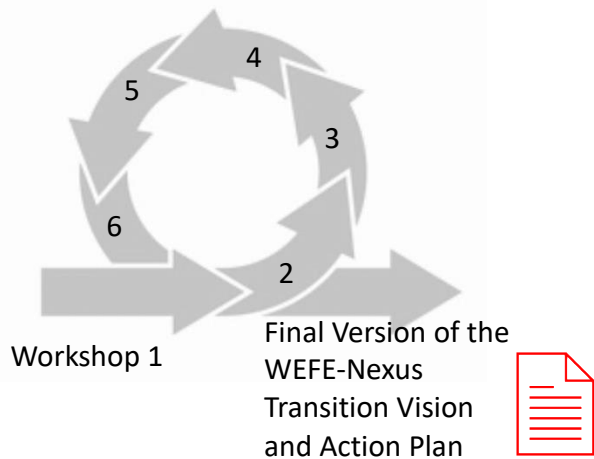
In Work Package 2 “WEFE-Nexus Transition through Innovation Ecosystem Methodology”, Task 2.2 “Applying the NEL Innovation Ecosystem Methodology” is divided into 4 Subtasks:

1. Subtask 2.2.1: NEL WEFE Situational and Stakeholder Analysis
2. Subtask 2.2.2: NEL Transition Motivation
3. Subtask 2.2.3: Co-design the NEL Common WEFE-Nexus vision and transition action plan
4. Subtask 2.2.4: Follow-up an intensify the WEFE Nexus vision and transition action plan

This Task 2.2 specifies that each NEL will organise a total of 6 stakeholder workshops, where the first one is executed in Subtask 2.2.2, the second one in subtask 2.2.3 and the four other workshops will be executed in

subtask 2.2.4. These six workshops will enable the NEL stakeholders in each of the four NELs to co-design their NEL WEFE-Nexus Transition Vision and Action Plan as illustrated in the figure above.

The four NELs have executed already Subtasks 2.2.1 and 2.2.2 and thus they have completed the first planned workshop. These activities are explained in the remaining of this report.



*Figure 3: NEL Workshops feed each other for co-agreeing a final version of a NEL WEFE-Nexus Transition Vision and Action Plan*

The NEL 1<sup>st</sup> Workshop had the goal of engaging and motivating the stakeholders. The NEL 2<sup>nd</sup> Workshop will be the first workshop of a series of 5 workshops, which will mobilise the stakeholders to start their discussions in co-defining the NEL WEFE-Nexus Transition Vision and Action Plan.

It has become evident from the NEL 1<sup>st</sup> Workshop, that the NEL stakeholders do not have yet the necessary WEFE-Nexus awareness and understanding, so that they can straightforwardly come to an agreement about a common WEFE-Nexus Vision, which will necessitate common and coordinated stakeholder actions. This fact will also become evident in the

subsequent reporting of the NEL results. As Figure 3 illustrates, all NEL Workshops No 2 to No 6 will feed each other in building NEL stakeholder WEFE-NEXUS understanding and at the same time guiding and facilitating the co-definition and co-agreement process to each at the end of the NEXUS-NESS project a co-agreed NEL WEFE-Nexus Transition Vision and Action Plan. The below Figure 4 illustrates the different phases that a NEL should go through based on the IEM to become an innovation ecosystem.

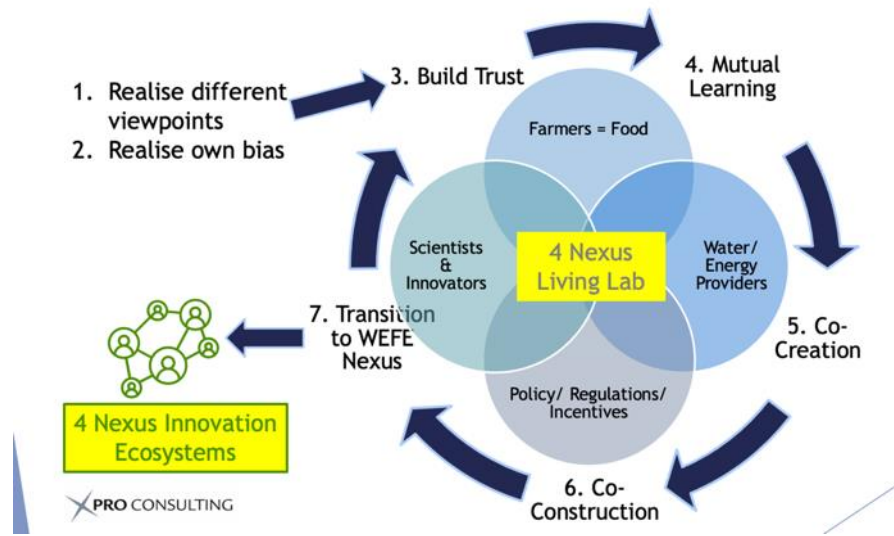


Figure 4: NEL stakeholders are involved in all Change Management phases for reaching a WEFE-Nexus transition and to become Nexus Innovation Ecosystem.

## 4. Preparing the NEL-Teams for applying the Innovation Ecosystem Methodology

For facilitating the NEL-Leaders and NEL Teams’ NEL preparation and work, all NEXUS-NESS partners received a 2-day Innovation Ecosystem Methodology Master Class 7-9 September 2021, which it is described in detail in Milestone M2.1 “[M2.1 NEL Innovation Ecosystem Methodology Master Class](#)” and shown in the picture below.

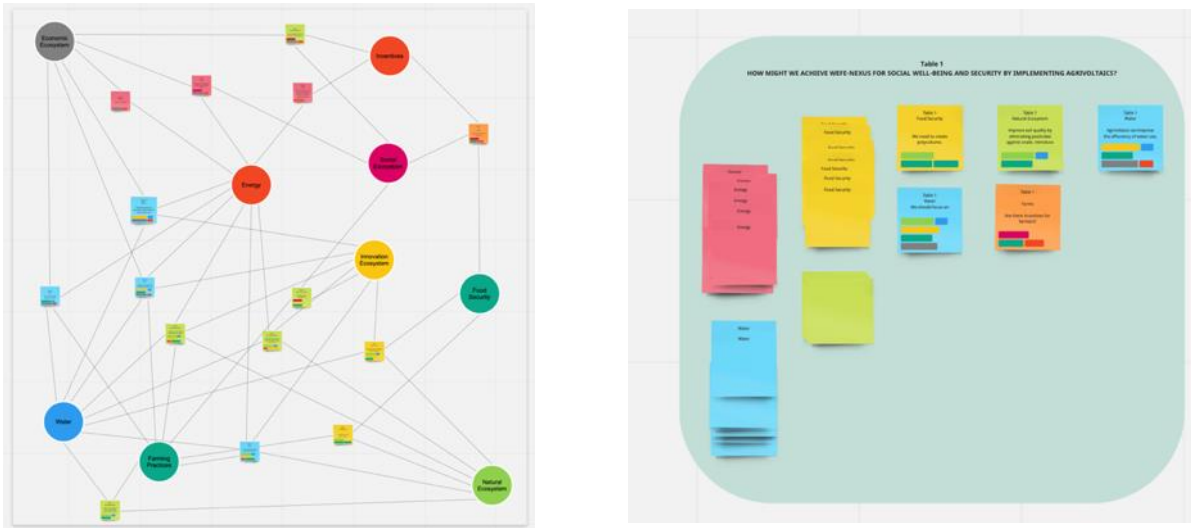
All NEXUS-NESS partners received detailed IEM training in the form of theory and practical exercises as shown in the picture, where the NEXUS-NESS partners split in break-out rooms and had to map the WEFE-Nexus challenges and connections as shown in the Picture 1 below.



Picture 1: NEXUS-NESS Master Class on the NEL Innovation Ecosystem Methodology

On 27 January 2022 09:30 – 13:30, all NEL-Leaders and NEL Teams together with other NEXUS-NESS partners received a remote interactive training in the World Café participatory method using a case study of agrivoltaic, storytelling and break-out rooms with virtual tables for performing the World Café workshop and at the same time learning to handle the World Café ropes. The below pictures illustrate some of the participatory work done in the breakout room of Table 1. The Picture 2 below show how statements interrelate to the WEFE-Nexus natural resources and goals.





Picture 2: World Cafe remote training: Statements from breakout room table 1

On 31 March 2022, during the first in-person NEXUS-NESS Consortium Meeting that took place in Rome, Italy, all NEXUS-NESS partners received specific instructions on how use storytelling for motivational purposes and how to execute a World Café workshop in reality. The participants were divided into four groups and had to perform all the steps of a World Café as shown in the pictures (Picture 3 and Picture 4) below.



Picture 3: Training in the World Cafe participatory method: discussion, idea generation and presentations of statements.



*Picture 4: Training in the World Cafe participatory method: individual reading of statements and voting.*

Additionally, all NEL-leaders and NEL Teams have received individualised instruction and support of how to apply IEM in their NELs by XPRO. Furthermore, since 15<sup>th</sup> of March 2022, a NEL Bi-Weekly Status Meeting has been organised by XPRO to support the NEL-leaders and their teams in applying the IEM. The NEL Bi-Weekly Status Meetings are joined by all NEXUS-NESS WPs and partners involved. During these meetings a progress narrative is provided by the NELs, and a knowledge-sharing forum has been created among the NELs and the NEXUS-NESS partners. These bi-weekly meetings have been and continue to be beneficial for the NEL-teams and the NEXUS-NESS partners allowing them to coordinate activities, inform each other, raise, and clarify issues.

Another major activity in supporting the NEL-teams which started in December 2021 and was finalised by mid-February 2021 was to help them create NEL-leaflets for the NEL 1<sup>st</sup> Workshops. The NEL-Leaders together with XPRO and the active support of DDATA created the leaflets in their NEL local languages with illustrations of the local WEFE-Nexus challenges. The leaflets were handed out to the stakeholders during the introduction and invitation meetings. The leaflets are illustrated below in Picture 5, Picture 6, Picture 7 and Picture 8.



Picture 5: Egyptian NEL leaflet: Front side and Back side



Picture 6: Tunisian NEL leaflet: Front side and Back side





Picture 7: Spanish NEL leaflet: Front side and back side



Picture 8: Italian NEL leaflet: Front side and Back side



## 5. Applying the Innovation Ecosystem Methodology in each NEL

In this chapter, each NEL Leader explains how the Innovation Ecosystem Methodology (IEM) was applied in the specific NEL to engage and motivate the identified NEL stakeholders to actively participate in the first NEL stakeholder participatory workshop. Each NEL Leader had to review the “D2.1 Nexus Ecosystem Labs – Innovation Ecosystem Methodology” pages 36-50 and explained the participatory process that was followed in their NEL, explain the achievements and in case of deviations from D2.1 to explain the reasons.

### 5.1 Current Situational Analysis and Identification of the NEL Stakeholders

A current situational analysis has been performed by each NEL Leader to start identifying and understanding the current situation of the NEL by analysing the political, economic, social, technological, legal, environmental, ethical and citizen factors (PESTLEEC analysis) and performing a SWOT analysis. The analyses were performed by the four NELs following provided RRI Roadmap templates as shown in the below table with direct links to the filled templates. Following the PESTLEEC and SWOT analyses, the NEL-Teams had to identify the WEFE-Nexus stakeholders to be involved in the NEL. For details see Table 1.

According to D2.1, each NEL had to identify local and regional stakeholders representing the following sectors:

- a. Water Authorities and Providers
- b. Wastewater Authorities
- c. Energy Authorities and Providers
- d. Agricultural and Husbandry Authorities and Providers (Farmers, Farmers associations, cooperatives, etc.)
- e. Food industry (other than farmers)
- f. Climate and Meteorological
- g. Research and Scientific Organisations (Public and Private Universities and Research Centres)
- h. Civil Society Organisations (CSOs) representing the society and the natural ecosystem

Since IEM is based on RRI and gender equality is one of RRI’s six dimensions, the NELs had to also involve women in their recruitment. In fact, D2.1 suggested that each NEL workshop should strive for a gender balance and that the NEL workshop stakeholders should be representing:

- 25% Farmers and farmer associations, local cooperatives, and local leaders
- 20% Scientists and researchers from WEFE sectors water, energy, food, agriculture, environment, biodiversity
- 25% policy makers and implementers including local and regional authorities representing all WEFE sectors.
- 25% WEFE industry and business representatives.
- 5% Citizen organisations

The Stakeholder Maps are visualised in the below in Figure 5, Figure 6, Figure 7 and Figure 8. Each map shows the stakeholders with high or low influence and if their interest in the WEFE-Nexus and the NEL challenge is high or low. It is interesting to notice the stakeholder mapping for each NEL highlighting their diversity and the marked differences among their stakeholders.

Table 1: NEL Current Situational and Stakeholder Analysis with direct links to the analyses.

RRI Roadmap Milestone	RRI Roadmap Step	Analysis Template per NEL	Direct Links to NEL files
M1	M1.1	NEL Current Situational “As-Is” (PESTLEEC and SWOT)	<a href="#">Egypt</a> <a href="#">Tunisia</a> <a href="#">Italy</a> <a href="#">Spain</a>
M1	M1.2.1	NEL Stakeholder Analysis Map	<a href="#">Egypt</a> <a href="#">Tunisia</a> <a href="#">Italy</a> <a href="#">Spain</a>
M1	M1.2.1	NEL Overall Stakeholder Map Visualisation	<a href="#">Egypt</a> <a href="#">Tunisia</a> <a href="#">Italy</a> <a href="#">Spain</a>
M1	M1.2.3	Detailed Individual Stakeholder Engagement Analysis Canvas: with focus on Engagement	<a href="#">Egypt</a> <a href="#">Tunisia</a> <a href="#">Italy</a> <a href="#">Spain</a>



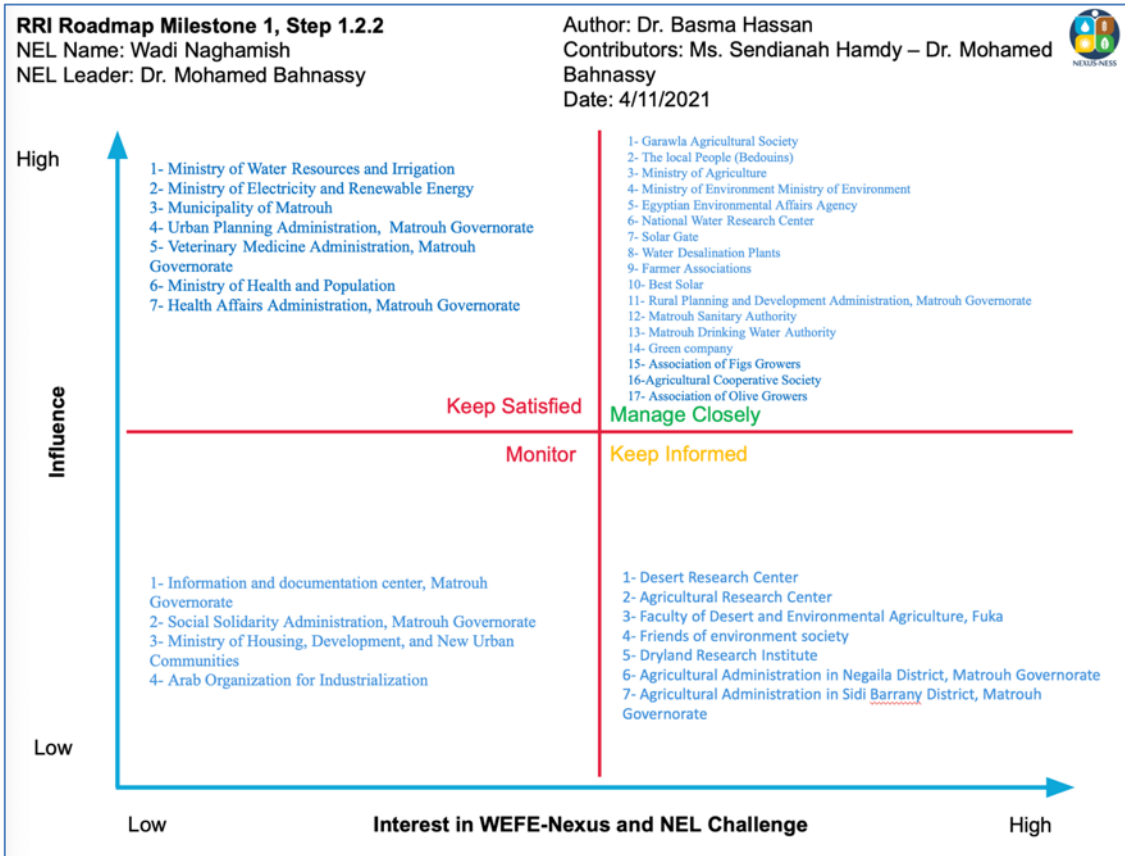


Figure 5: Egyptian NEL Stakeholder Communication Map

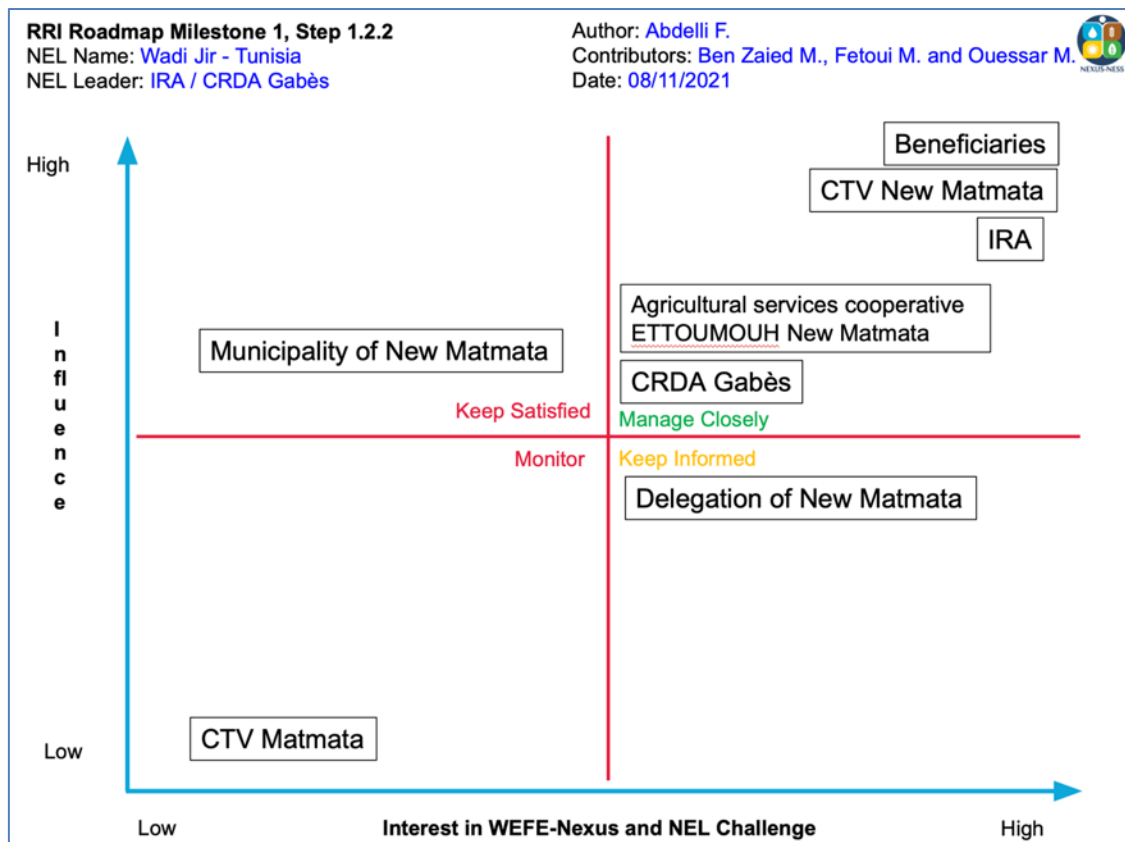


Figure 6: Tunisian NEL Stakeholder Communication Map

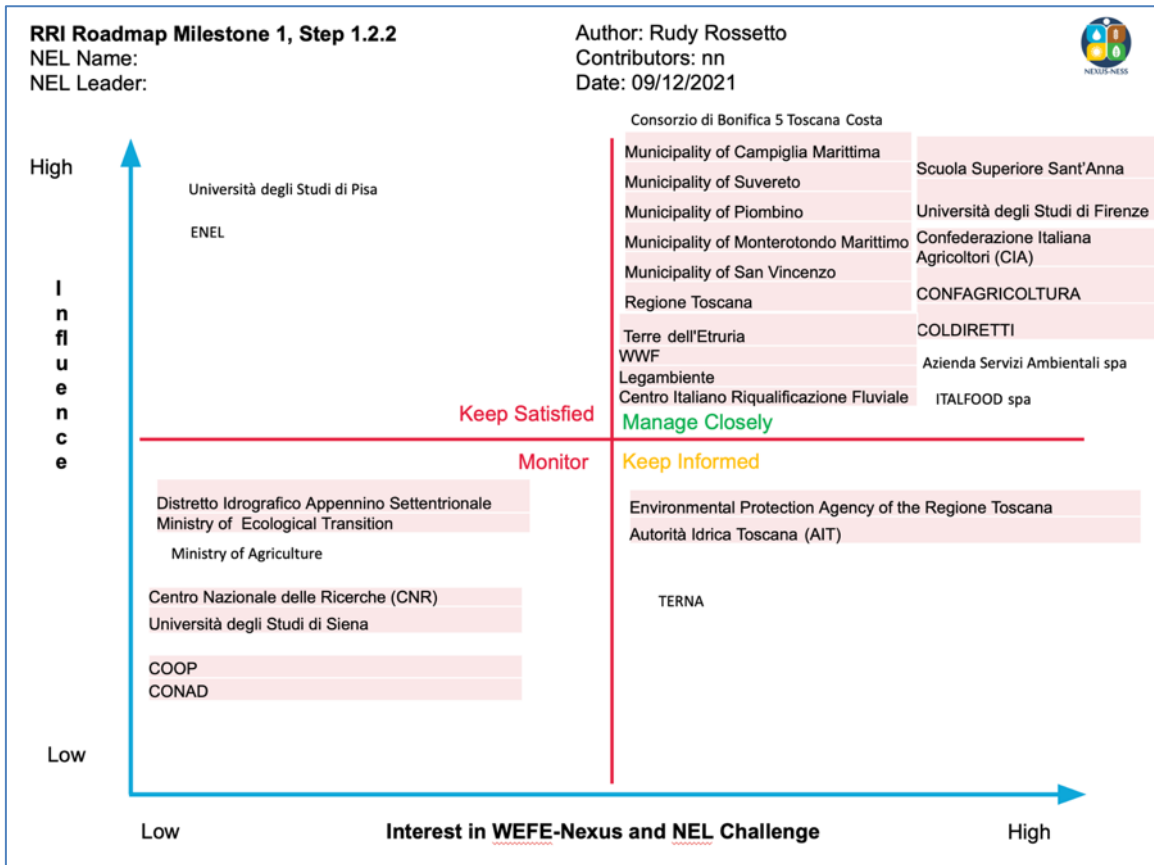


Figure 7: Italian NEL Stakeholder Communication Map

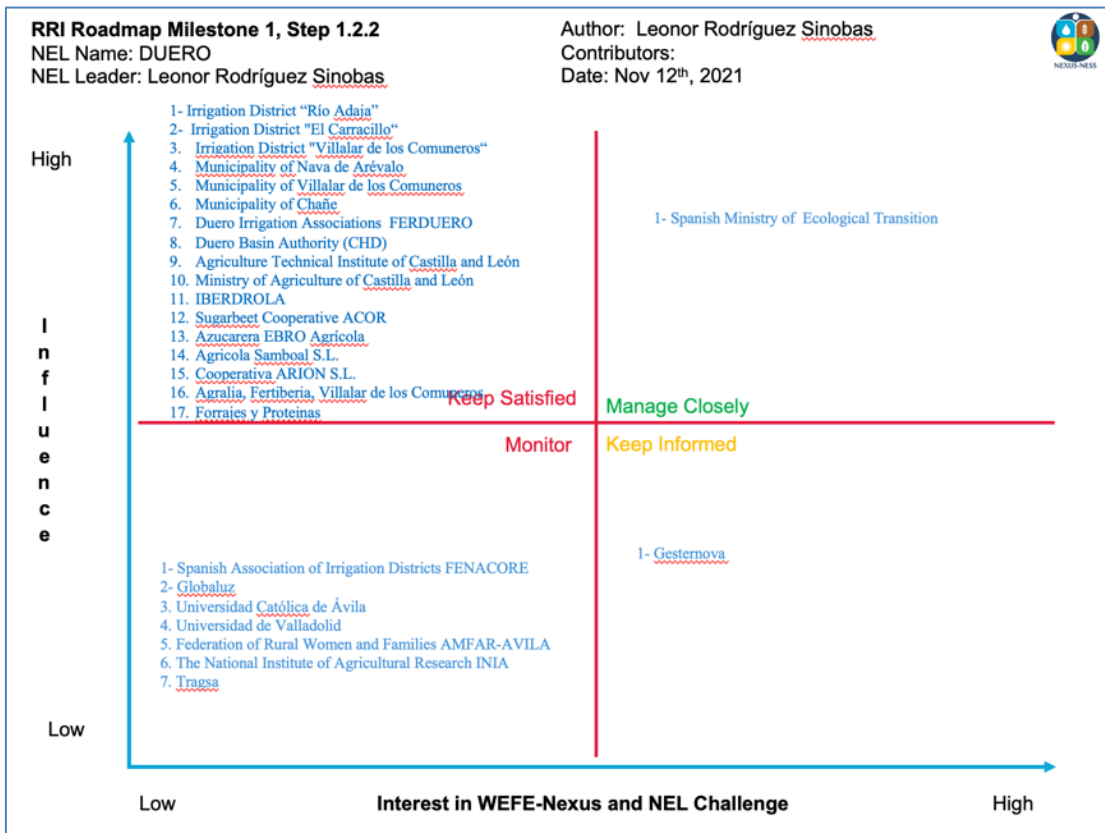


Figure 8: Spanish NEL Stakeholder Communication Map

## 6. NEL 1<sup>st</sup> Stakeholder Engagement Workshops

This chapter starts with an overview of all the steps required to organize, facilitate, and execute the 1<sup>st</sup> NEL workshop in each NEL. Then an overview of the four 1<sup>st</sup> NEL workshops execution dates is provided to be followed by a graph illustrating if the NELs followed the prescribed workshop-steps. Then the chapter is divided into four sections one for each NEL explaining the steps followed, the choices they made and the position they are in at this moment in the NEXUS-NESS project. The NEL Leaders provided the text for these four sections.

### 6.1 NEL 1<sup>st</sup> Stakeholder Workshop prescribed phases

The 1-day workshop preparation and specific workshop steps are explained in great detail and with specific instructions and time-table pages 40-50 in Deliverable [D2.1](#).

The 1<sup>st</sup> NEL stakeholder workshop phases are defined as follows:

1. Purpose of the Workshop.
2. Inspirational speaker focusing on the NEL Challenge.
3. Motivational Story based on the NEL Challenge to create urgency and to motivate change.
4. Engaging the stakeholders, familiarise themselves with the WEFE-Nexus concept by discussing and start building mutual trust, to create a Nexus dialogue among participants using the Nexus Challenge Sheet to guide the discussion.
5. Each Table to present the discussion results through the Nexus Challenge Sheet.
6. Run a World Café with the stakeholders to ideate together for how to tackle the NEL water scarcity challenge from a WEFE-Nexus perspective.
7. Presentation of the World Café generated statements by each table.
8. Voting of the Statements.
9. Discussion of the voting results
10. Frame the NEL WEFE-Nexus Challenge
11. Identify and state possible negative concerns and barriers
12. Workshops Wrap-up

The four NEL 1<sup>st</sup> workshops were held between 26 of April 2022 and 29 of June 2022 as illustrated in Figure 9. It took longer time for the NEL Teams to develop capacity and skills and to be confident in organizing, hosting and facilitating a multidisciplinary and multisectoral stakeholder participatory workshops, than originally expected in the NEXUS-NESS work plan. Moreover, the preparation of the workshop and the identification of the right people to participate as representatives of the stakeholder organisations took much longer time than expected. Furthermore, the same NEL Teams had to also work on the analysis of the NEL

WEFE-Nexus challenges (WP3), which run in parallel. The following figure illustrates the four NEL 1<sup>st</sup> workshops timeline.



Figure 9: NEL 1st Workshop Timing

The following flowchart (Figure 10) illustrates the above NEL 1<sup>st</sup> Workshop phases and which NELs executed which phases. The green phases were executed by all NELs. The yellow phases were executed but not by all NELs. The red phases were not executed by any NELs.

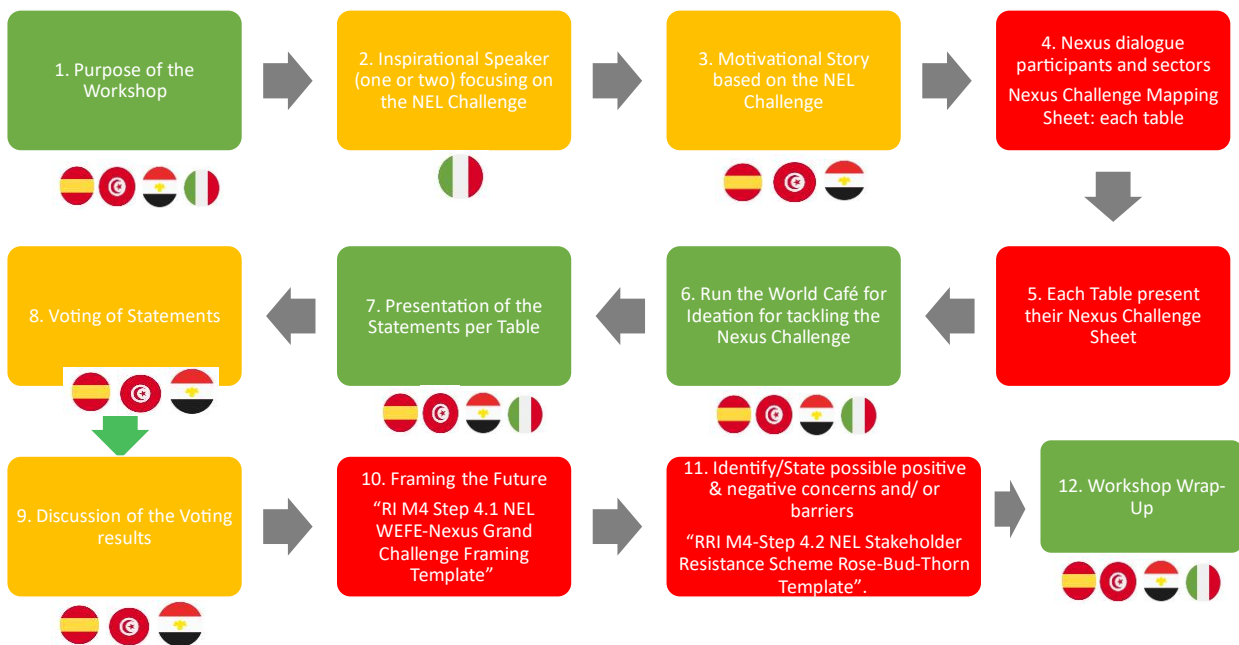


Figure 10: NEL 1st Workshop phases and which NELs executed them or not.

## 6.2 How the Innovation Ecosystem Lab Methodology Was Applied in the Egyptian NEL

Text provided by the Egyptian NEL Leader: Mohammed Bahnassy (AU). Text editing and additions by Xenia Schneider, WP2 Leader.

The Egyptian NEL 1<sup>st</sup> Workshop was held on 9<sup>th</sup> of May 2022 in Marsa Matrouh City, Egypt by the NEL Leader. Dr. Mohamed Bahnassy and his team from Alexandria University. A detailed report about the workshop and the obtained results can be read [here](#).

This chapter provides a summary of the steps followed and the obtained results.

NEL Challenge: The Egyptian NEL is dealing with challenges related to land degradation, water availability, and food production using new energy sources and ecosystem integrity.

On the 9th of May, Alexandria University (Alex U team) organized and executed the 1st NEL workshop with the title “Societal Solutions for Ecosystem Problems in wadi Nagamish” in El-Fursan Hotel in Marsa Matrouh, Egypt. The goal of the workshop was to mobilize and engage the NEL Stakeholders for creating awareness about the Water, Energy, Food, Ecosystem (WEFE) Nexus challenge in their location and to initiate a discussion for co-defining a WEFE-Nexus common vision and transition plan, and to prepare them for collaboration in the coming NEXUS-NESS NEL workshop(s) and activities.

The workshop was held in the framework of the NEXUS-NESS project and of the application of the NEL Innovation Ecosystem Methodology (D2.1).

12 participants were recruited based on their expertise and interest in the NEL Challenge.

The workshop has engaged farmers’ associations, Agriculture Research Centre (ARC), Egyptian Environment Affairs Agency (EEAA), and local Bedouins as NEL stakeholders in a participatory debate to examine the WEFE-NEXUS Challenge(s) and to co-define WEFE-Nexus ideas for co-creation of a transition WEFE-Nexus vision, plan, and actions.

The half-day-long workshop was facilitated according to the World Cafe method in 3 rounds with 4 participants at each table. This method allows for integrating contributions from individuals with diverse views, backgrounds, and perspectives through a process that is structured, inclusive, and collaborative. During the workshop, the participants formulated 23 statements of WEFE-NEXUS actions based on the triggering question: “Societal solutions for Ecosystem Problems in Wadi Nagamish”. These statements were grouped into 4 groups named water, energy, food, and ecosystem. The host at each table presented the statements and these were discussed among the stakeholders and voted.

The main messages were on how to overcome the water scarcity problems given the current situation of rain fluctuation and flash floods, how to increase the income of the farmers by introducing new crops and other varieties from the currently planted ones, and establish a local market to facilitate the distribution, introduce new energy sources to the local population and to help improve the sustainability of the used energy sources in the area, and finally, regarding the ecosystem how to decrease the use of chemicals and make safer disposal for the containers.

### **Planning Phase:**

1. Exploratory visit to the study Wadi Nagamish area: the NEL team members needed to get familiar with the study area and observe the different conditions and levels of stakeholders within it.
2. Meeting with the key stakeholder representatives and individuals in the NEL for building trust with the Bedouins and take their point of view in consideration while identifying the main challenges facing the NEL area.
3. Collect all needed information's related to NEL area (physical, social, demographic, economic characteristics etc.) to fill out the different milestone templates required for the preparation of the workshop.
4. Develop SWOT analysis model and PESTLEEC analysis model to step on the current situations on the study area.
5. Prepare stakeholder analysis using the bottom-up approach to identify the stakeholders' levels and specify the stakeholder types and their area of expertise.
6. Visit stakeholders with high interest and high influence (according to stakeholders mapping) to provide them a brief about the project.
7. Invite the stakeholders to participate in the NEL 1<sup>st</sup> workshop.
8. Training the team members on the method of World Café to be used in the workshop.
9. Prepare a story identifying the current situation highlighting the felt and unfelt challenges to propose to stakeholders attending the workshop and end with triggering question to start the discussion.

### **Implementation Phase:**

1. Reserve a venue for the workshop then prepare all needed instruments for the workshop and World Café participatory approach.
2. Perform different rehearsal sessions with the different NEL-teams members according to their roles.
3. Start World Café workshop with the [presentation](#).
4. [Story](#) was told with the triggering question and the attendees were allocated to different tables randomly.
5. The tables were 3 instead of 4 due to the number of attendees.
6. Moving the stakeholders from table to table based on the World Café method.
7. Statements were written based the opinion of the stakeholders by each table host.



8. The gender issues were not discussed at all according to cultural and societal barriers, as well as, the participant focus on discussing the WEFE Nexus-challenges.
9. All stakeholders voted the resulted statements. There was no specific number of votes given to each participant as prescribed by the EIM. Everyone was allowed to vote on all the statements each vote represented an agreement on the statements.
10. There was no further discussion about the statements after voting out of consideration to not impose the time and schedule of the workshop.
11. Gender survey was handed to the participants to receive their opinion concerning the questionnaire.
12. The data collected from the workshop were assorted into an Excel sheet and sorted into categories.
13. The Egyptian NEL [first workshop report](#) and [results presentation](#) were prepared and submitted.



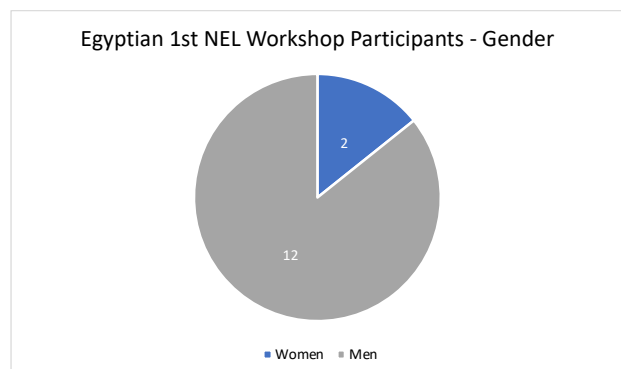
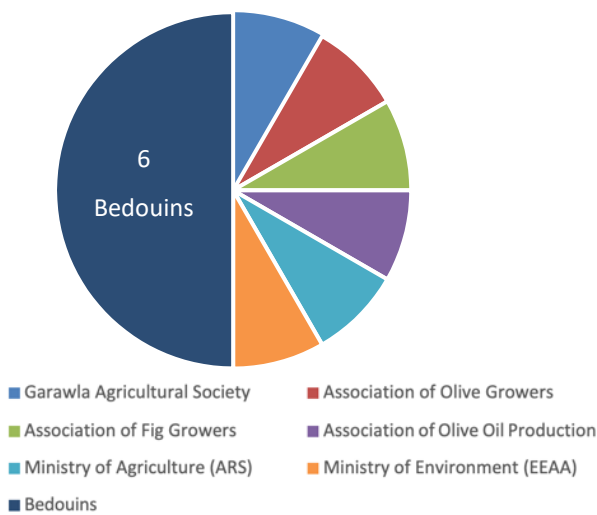
Picture 9: Egyptian NEL stakeholders participating in the NEL 1st Workshop.

The Egyptian NEL 1<sup>st</sup> workshop participants were:

Participant's Organisation name	Participant Type (Water, Energy, Food, Ecosystem)	No of Participants invited	Type of prior Contact and Invitation used (Telephone, Letter, Face-to-face Meeting, follow-up telephone)	No of the Participants participated
Local bedouins	Food and water	10	Face-to-face meeting	6
Ministry of agriculture	Food and water	2	Face-to-face meeting	1

(agriculture research center)				
Ministry of environment (Egyptian environment Affairs Agency)	Ecosystem Energy	2	Face-to-face meeting	1
Garawla agricultural society	Water Food	1	Face-to-face meeting	1
Association of olive growers	Food	1	Face-to-face meeting	1
Association of fig growers	Food	1	Face-to-face meeting	1
Association of olive oil production	Food	1	Face-to-face meeting	1
Total		18		12

It is interesting to note that a prior face-to-face meeting was necessary to invite each stakeholder to the workshop. The following two pie-charts show that the majority of stakeholders participating were local Bedouin farmers, which is positive as it shows interest into the project. The second pie indicates that only 2 out of the 16 workshop participants and facilitators were women. In fact, the two women were facilitators and not stakeholders.



### 6.2.1 Egyptian NEL 1<sup>st</sup> NEL Results and their Significance Towards NEL WEFE-Nexus Transition

The main results and conclusions of the 1<sup>st</sup> workshop of the Egyptian NEL are:

1. Engaging relevant stakeholders.
2. Creating sectoral awareness among the stakeholders, but not achieving WEFE-Nexus awareness.
3. The NEL stakeholders are not used to participating in interactive workshops.
4. The NEL Stakeholders generated 10 statements: food table, 5 statements: water table, and 9



Picture 10: Egyptian 1<sup>st</sup> workshop statements

statements: energy and ecosystem table (5 statements for the ecosystem, and 4 for the energy).

5. The NEL Team did not follow fully the workshop instructions effectively facilitating the voting and the follow-up discussion of the generated statements.

The following Table 2 lists all the stakeholder statements, and the number of votes stakeholders gave.

Table 2: Egyptian NEL 1st Workshop Statements

Statement	Table No	Perspective:				Total No of Votes
		Water	Energy	Food	Eco system	
1- Planting Fig is preferred over olive due to high productivity		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	9
2- Figs Agro-industry is not preferred due to low ROI and the need of highly skilled labors		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	10
3- Training on use of agricultural machinery is needed to develop a better farming system		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	11
4- Beekeeping is not applicable due to lack of experience and absence of suitable plant cover		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	zero
5- Planting drought resistant crops (such as Quinoa) are accepted when seeds are provided		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	12
6- Harvesting Figs and Olives is carried out by family members (man, woman, and children).		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	12
7- Prickly Pear (Optunia Ficus) is not favored as it has low income, and thorns might harm the sheep herd.		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	11
8- Fig market needs an oriented supply chain system		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	12
9- 100 million olive tree initiative did not reach the wadi.		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	12
10- A new olive species (shemlaly) should be introduced to the farmers		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	12
11- Cisterns numbers should be increased and maintained		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12
12- Treated wastewater usage is not acceptable		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12
13- Dykes numbers should be increased to maintain high level of soil moisture		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12
14- Artesian wells are saline and needs desalination units (needs high capital) to allow planting vegetables to increase farm income.		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12
15- Financial aid (ex. FAO, USAID, GIZ, ... ) is needed to build stone dykes enforced with wire net, and digging artesian wells		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12

16- Climate change led to appearance of new diseases and pests, which needs the introduction of new pesticides, and climate resilient strategy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	12
17- WWTP caused leaking problems to the Wadi, triggered flies, and mosquitos to appear as well as the bad odor, and it should be moved 34 km to the south	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	12
18- Vocational training sessions should be held to help people dispose the pesticides containers correctly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	12
19- Lately, flash floods caused soil erosion and destruction of dirt dikes and submersion and death of olive trees.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	12
20- It is required to use bio-pesticides instead of synthetic pesticides	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	12
21- Biogas (cooking gas) network should be installed using the WWTP sludge-	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9
22- Solar energy could be used providing the availability of financial aid (ex. FAO, USAID, GIZ, ..... )	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9
23- Windmills needs maintenance to extract groundwater.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9
24- Solar based desalination units are required to provide cheap good quality, providing the availability of financial aid water (ex. FAO, USAID, GIZ, ..... )	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12

### 6.2.2 Egyptian NEL First Workshop Results Critical Review by the NEL-Leader

1. The workshop with 12 stakeholder participants from 6 stakeholder-categories represent those, who are directly affected by the WEFE-Nexus challenges. However, these stakeholder categories are not inclusive to all stakeholder categories identified during the Stakeholder Mapping.
2. The resulted 24 statements cover all WEFE (water, energy, food, ecosystem) sectors, and they represent the different points discussed regardless of they are not in line with the challenges, since these were too broad.
3. The proposed drastic statements/ideas are too hard to implement because of the resistance to change combined with the conservative mindset, which impacted the overall discussions as well as the resulted statements.
4. Stakeholders were not fully aware or understood the concepts of the WEFE-Nexus and their traditional mindset impacts their agricultural activities and their environment.
5. More awareness is needed to aid the transaction towards WEFE-Nexus for helping them co-create and implement the action transition plan.
6. Some stakeholders believe that solutions to their problems could be achieved through financial aid which exclude the whole idea of the NEXUS-NESS project to create a NEXUS innovation ecosystem.
7. The project idea needs to be framed as a concept to be impeded within the day-to-day activities of the stakeholders.
8. The gender representation was too weak for many different reasons first for Bedouins (Cultural, Social, Demographic, etc.) and for the other stakeholders (long distance to the workshop, transportation difficulties, etc.).

### 6.2.3 Critical Review of the WP2-Leader:

It is to be noted that the NEL-Team did not give to the workshop participants the recommended number of votes, which was five. The number of votes had to be limited in order to push the participants to prioritize what to vote and to push the participants to converge their opinions. Instead, the participants had the possibility to vote all the statements and thus, as the table shows below, there is not critical prioritization of the statements and thus the stakeholders were not pushed make choices and to further discuss their choices. Furthermore, the statements show that there is a will to improve the local conditions, yet there is no co-agreement on their prioritization and many of them are wishes lacking a deeper discussion and concreteness. Additionally, the results show that the NEL stakeholders lack WEFE-Nexus understanding and they would need to build first this capacity before they are able to codesign a WEFE-Nexus Transition Vision and Action Plan for their NEL. The significance of the Egyptian NEL 1<sup>st</sup> workshop results show that activities are necessary to increase the stakeholders WEFE-Nexus understanding and how different actions in one sector affect the other sectors as for example the use of pesticides to the natural environment. The voting on the statements also shows a



willingness to improve and or change practices on one hand and on the other their holistic effects are not fully understood. Thus, in order to the Egyptian NEL stakeholders to be able to co-create and co-agree a NEL WEFÉ-Nexus Transition vision and action plan, they would need to first understand and become aware of what WEFÉ-Nexus is and how to better analyse their suggested statement before they implement them.

### 6.3 How the Innovation Ecosystem Lab Methodology Was Applied in the Tunisian NEL

Text provided by the Tunisian NEL Leader: Fethi Abdeli (IRA). Text editing and additions by Xenia Schneider, WP2 Leader.

The Tunisian NEL 1<sup>st</sup> Workshop was held on 18<sup>th</sup> of May 2022 in New Matmata, Tunisia by the NEL Leader. Fethi Abdeli and his team from Institut des Régions Arides (IRA) and Commissariat Régional au Développement Agricole de Gabès (CRDA). A detailed report about the workshop and the obtained results can be read [here](#).

This chapter provides a summary of the steps followed and the obtained results.

NEL Challenges:

1. Identification of the best water allocation and adapted crops for sustainable food production and ecosystem conservation.
2. Ensure self-sufficiency in required water and energy.
3. Ensure rural development (tourism, HMAP production) with stakeholders for discussing and for describing these challenges in order to co-define WEFE-Nexus transition actions for addressing the WEFE-Nexus challenges and for improving the local WEFE-Nexus conditions.

It is already to be noted that the NEL Challenge number 3 is important to the local communities, however it does not directly relate to the WEFE-Nexus concept.

The workshop was held in the framework of the NEXUS-NESS project and of the application of the NEL Innovation Ecosystem Methodology (D2.1).

The Tunisian NEL Team has actively involved the identified stakeholders early in the process as they realized that a WEFE-Nexus transition necessitates all stakeholders' involvement. To achieve this, the Tunisian NEL Team identified a development stakeholder, who has good relations with all the other stakeholders in the region and at the same time is accustomed to this type of national and international cooperation projects. Moreover, this stakeholder must be cooperative, used to working in a team, be responsible and disciplined and above all have good relations with other managers. Thus, the Tunisian NEL Team chose the CTVs, which are the territorial extension units in the NEL region. The CTVs, especially the New Matmata CTV, have good knowledge of the area, the factors related to the communities, living conditions, economic, social, and cultural conditions of the region, as well as strong relationships among the different stakeholders.

The Tunisian NEL-Team, with the help of CTVs officials, contacted relevant stakeholders in the NEL to first understand their reaction to the NEL-proposal and their intentions of cooperating. At first and as expected, the NEL-Team was met with opposition, but they managed to convince these stakeholders to participate and



Picture 11: Discussing with Tunisian NEL stakeholders.

voice their concerns (Picture 11). In this respect, to facilitate the task, the concept of RRI, as defined in D2.1 was applied as much as possible. The concept of RRI was used to facilitate and channel stakeholders' communication enabling them to generate ideas and to guide the co-definition and co-design phase towards WEFÉ-Nexus Transition vision and action plan. As a first step, the NEL-Leader started meeting with the other Tunisian partner in the NEXUS-NESS project, the CRDA of Gabès, represented by the CTV of New Matmata in the study area to coordinate efforts to realize the tasks of the project. The technicians of CTV of

the new Matmata are better positioned to give a general idea of the area from the point of view of social relations, economic parameters, and the development plans applied and in the process of being applied in the region. Just after the first icebreaker meeting, the NEL Leader started the WEFÉ-Nexus transformation process with the identification of the societal needs of the Tunisian NEL and describing the WEFÉ-Nexus challenges.

For analysing the current situation, learning about and better understanding the stakeholders in the study area, we proceeded, by making a series of meetings with three CTVs, of new Matmata, Mareth, and Matmata and



Picture 12: Tunisian NEL Leader discussing with CTV technicians.

with the selected stakeholders (Picture 12). The NEL Flyer (Picture 6) was well appreciated, and it facilitated the stakeholder communication. All meetings were held in the local language, which further eased discussions.

As tools, the Tunisian NEL team used the PESTLEEC and SWOT analysis and stakeholder mapping approach. These methods are prepared beforehand by the "WP2 leader" and formulated as templates to be completed. The PESTLEEC analysis is used for environmental scanning of the NEL. It covered

Political, Economic, Social, Technological, Legal, Environmental, Ethical, and Citizen factors that may have a direct or long-lasting impact on the NEL. The results of the analysis, shown in the following "[RRI M1-Step 1.1 PESTLEEC and SWOT Template FV NEL-Tunisia.docx](#)" will be used as part of the NEL's strategic

planning by providing NEXUS-NESS an oversight to the NEL's current situation and how to proceed by designing a specific change management approach towards the NEL's WEFE-Nexus Transition vision and action plan (Picture 13).



Picture 13: Application of the PESTLEEC and SWOT analysis

The Stakeholder analysis was used to describe selected Tunisian NEL stakeholders. We selected only stakeholders that have an interest in a challenge and may be actively involved, and their interests may be positively or negatively affected by the challenge. The results of the analysis, shown in the template “[RRI M1-Step 1.2.1 NEL Stakeholder Analysis Template FV NEL-Tunisia.xlsx](#)”. To perform the Stakeholder Mapping we used the prioritization provided by the stakeholder analysis. This method helped focusing project actions for greater stakeholder involvement and augmentation of project results. It is based mainly on the level of interest of the stakeholder, whether it will be affected by the NEL positively or negatively, and also the level of power and influence, which is the ability of that stakeholder to affect the NEL's activities and outcomes positively or negatively.

The Overall Stakeholder Map Visualisation, each stakeholder is evaluated and plotted in the graph depending on their degree of influence and interest to the challenge and to the NEL's objectives and work. The results of the analysis, shown in the template “[RRI M1-Step 1.2.2 NEL Overall Stakeholder Map Template FV NEL-Tunisia.pptx](#)”

At final of this part of the stakeholder analysis, in order to determine the engagement of each stakeholder, each one is subjected to a detailed individual analysis using the Canvas method. The results of the analysis, shown in the template “[RRI M1-Step 1.2.3 NEL Individual Stakeholder Engagement Analysis FV Template NEL-Tunisia.pptx](#)”

Before the NEL 1<sup>st</sup> workshop, the NEL-Team organized at least one face-to-face meeting with each stakeholder to explain the objective of the project and the approach that we will use. After agreeing to participate in the



first workshop, an officially signed letter of invitation was sent followed by a telephone reminder to ensure stakeholder participation.

On May 18th, 2022, the NEL stakeholders (Picture 14) were mobilised in the 1<sup>st</sup> NEL participatory workshop following most of the steps proposed in D2.1. During the Ice-Breaker session, a video presenting the region and the study area animated the meeting. This 1<sup>st</sup> NEL participatory workshop was organised and executed by the Institut des Régions Arides (IRA) and Commissariat Régional au Développement Agricole de Gabès (CRDA). The workshop lasts 0,5 day (from 09:28am to 02:30pm, + 1h lunch). The hosts and facilitators were Hajer Zayeda, Noureddin Elazzi, Hatem ben Mohamed and Ali Bennour. They were selected according to the profile of each one and the position occupied in their organizations. They were briefed by Mongi Ben Zaied, Fethi Abdelli and Mohamed Ouessar.



Picture 14: Tunisian NEL 1st workshop participants



**Implementation Phase:**

1. Reserve the venue “Culture House” of New Matmata for the workshop then prepare all needed instruments for the workshop and World Café participatory approach.
2. The workshop title was “WEFE-Nexus to ensure Water, Food, Energy and Environmental security in the Wadi Jir Watershed” with the goal to mobilise and engage the NEL stakeholders for creating WEFE-Nexus awareness and to initiate a discussion for co-defining a WEFE-Nexus common vision and transition plan and to prepare them for collaboration in the coming NEXUS-NESS NEL workshop(s) and activities. The workshop focused on the three WEFE-Nexus Challenges as defined by the NEL-Team and their stakeholder interventions to:
  - a. Challenge 1: Identification of the best water allocation and adapted crop for sustainable food production and ecosystem conservation. The specific objectives are first, ensuring equitable and effective surface water use by reducing upstream downstream conflicts, and solving the problem of water management in the spreading perimeter. Second, evaluating the potential impact of introducing water-saving technologies (underground cisterns) and eventual changing cropping practices in spreading perimeter
  - b. Challenges 2: Ensuring self-sufficiency in water and energy needed. The objective is to investigate the ability to collect groundwater and lighting up rural houses using solar energy (photovoltaic films).
  - c. Challenge 3: Ensuring rural development. with stakeholders by discussing and for describing these challenges in order to co define WEFE-Nexus transition actions for addressing the WEFE-Nexus challenges and for improving the local WEFE-Nexus conditions.  
 In that case, we fixed the analysis on how to promote and protect the underground houses (troglodytes) of Matmata, which represent the most important asset of the socio-ecological systems of the region and country. Furthermore, to propose a plan to preserve biodiversity, promote the use of herbal, medicinal and aromatic plants (HMAP), and create business opportunities for the region, and mainly on the poor rural population in the mountainous area.
3. 36 participants (Table 3) were invited based on their expertise and interest in the workshop and 32 participated.
4. Start World Café workshop with the [presentation](#).
5. [Story](#) was told with the triggering question and the attendees were allocated to different tables randomly.
6. The tables were 4 with 5-6 participants and one host.
7. Three rounds of 20 minutes each and moving stakeholders from table to table based on the World Café method.
8. Statements were written based the opinion of the stakeholders by each table host.

9. Each host present a summary of results obtained in the table at the start of each round.
10. At the end of all three rounds, each host presented a summary of obtained results for all stakeholders.
11. After regrouping results, each person utilized five votes. After the voting session, there was a classification of most voted actions (Picture 15).
12. Next, there was a big discussion, especially about the classification results as shown in the [video](#) of the group discussions in the official Facebook site of New Matmata Culture House.
13. Gender survey was handed to the participants to receive their opinion concerning the questionnaire.
14. The data collected from the workshop were sorted into an Excel sheet and sorted into categories.
15. The Tunisian NEL [first workshop report](#) and [results presentation](#) were prepared and submitted.

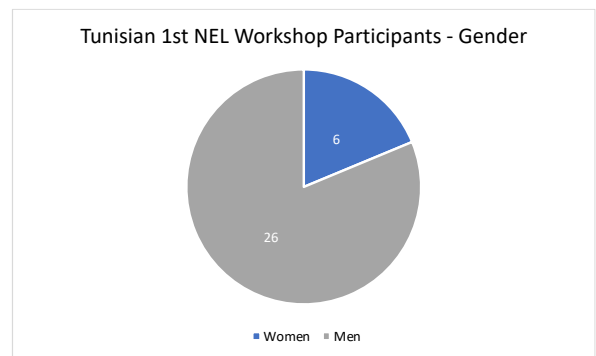
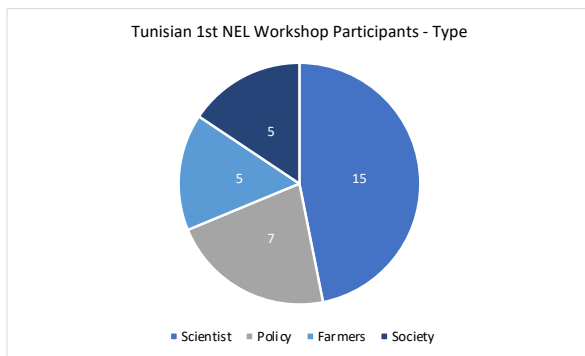


Picture 15: Tunisian NEL 1st workshop: voting, presentation and discussions of the statements and voting results.

Table 3: Tunisian NEL 1st Workshop Stakeholder Participants

Participant's Organisation name	Participant Type (Water, Energy, Food, Ecosystem)	No of Participants invited	Type of Contact and Invitation used (Telephone, Letter, Face-to-face Meeting, follow-up telephone)	No of Participants participated
Commissariat Régional au Développement Agricole de Gabès (CRDA)	Multidisciplinary stakeholder Water, Energy, Food and Ecosystem	5	-face-to-face Meetings. - phone calls -Before the 1 <sup>st</sup> workshop we sent a letter invitation signed officially.	5
Cellule Territoriale de Vulgarisation (CTV) - CTV of New Matmata	Water, Food and Ecosystem	3	-face-to-face Meetings. - phone calls -Before the 1 <sup>st</sup> workshop we sent a letter invitation signed officially.	3
Cellule Territoriale de Vulgarisation (CTV) - CTV of Matmata	Water, Food and Ecosystem	1	-face-to-face Meetings. - phone calls -Before the 1 <sup>st</sup> workshop we sent a letter invitation signed officially.	1
Cellule Territoriale de Vulgarisation (CTV) - CTV of Mareth	Water, Food and Ecosystem	1	-face-to-face Meetings. - phone calls -Before the 1 <sup>st</sup> workshop we sent a letter invitation signed officially.	1
Delegation of New Matmata	Policy	1	-face-to-face Meetings. - phone calls -Before the 1 <sup>st</sup> workshop we sent a letter invitation signed officially.	0
Municipality of New Matmata	Policy	1	-face-to-face Meetings. - phone calls -Before the 1 <sup>st</sup> workshop we sent a letter invitation signed officially.	1
Institut des Régions Arides of Médenine (IRA)	Scientific	10		10

Participant's Organisation name	Participant Type (Water, Energy, Food, Ecosystem)	No of Participants invited	Type of Contact and Invitation used (Telephone, Letter, Face-to-face Meeting, follow-up telephone)	No of Participants participated
Agricultural services cooperative ETOUMOUH of New Matmata	Water and Ecosystem	3	-face-to-face Meetings. - phone calls -Before the 1st workshop we sent a letter invitation signed officially.	2
Farmers	Food	5	-face-to-face Meetings.	3
Local representative of Ministry of Equipment And Housing	Water	1	-Only one face-to-face Meeting. - Before the 1st workshop we sent a letter invitation signed officially.	1
Civil Society (New Matmata culture house)	Social Representative	5	-face-to-face Meetings. -Before the 1st workshop we sent a letter invitation signed officially	5
<b>Total</b>		<b>36</b>		<b>32</b>



### 6.3.1 Tunisian NEL Results and their Significance Towards NEL WEFE-Nexus Transition

The following table lists all the stakeholder statements, and the number of votes received. The Tunisian workshop followed the instructions of 5 votes per participant. Thus, the participants were forced to be selective and to converge in their opinions. After the voting, the facilitators asked the participants to further discuss the statements with the highest votes and to together agree on actions, who should be responsible for the actions and their follow-up.

Table 4: Tunisian NEL 1st Workshop Statements and their voting.

Statement	Table (No or Perspective)	Perspective:				Total No of Votes
		Water	Energy	Food	Eco system	
Restoration and maintenance of hydraulic structure, traditional cistern and create management organisation.	Table1: Water	x	<input type="checkbox"/>	x	x	14
Rehabilitation study of the spreading area on the new Matmata dam.	Table1: Water	x	x	x	x	14
Creation of aquifer recharge structures	Table1: Water	x	x	x	x	04
Create a well for supplement irrigation during dry years	Table1: Water	x	x	x	x	04
Creation of aquifer recharge structure for conservation spreading water technique	Table1: Water	x	<input type="checkbox"/>	x	x	01
The intervention of the Agricultural Real Estate Agency to reduce dispersal of ownership	Table1: Water	x	<input type="checkbox"/>	<input type="checkbox"/>	x	00
Visit to a successful story (spreading water area in Sidi Bouzid Governorate)	Table1: Water	x	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00
Reformed the legislation on the exploitation of solar and wind energy	Table2: Energy	x	x	x	<input type="checkbox"/>	11
Supply forage (Matmata 5) with solar energy	Table2: Energy	x	x	x	<input type="checkbox"/>	03
funding programs for NGOs to promote energy	Table2: Energy	x	x	x	<input type="checkbox"/>	02
funding programs supply rural area with solar energy	Table2: Energy	x	x	x	x	02
Creation of an electricity production station with solar energy	Table2: Energy	x	x	<input type="checkbox"/>	<input type="checkbox"/>	03
Creation of an electricity production station with wind energy	Table2: Energy	<input type="checkbox"/>	x	<input type="checkbox"/>	<input type="checkbox"/>	03
Use of solar energy for public enlightenment of rural agglomeration located in wadi Jir catchment	Table2: Energy	<input type="checkbox"/>	x	<input type="checkbox"/>	x	02
Elaborate program to supply touristic projects and publics establishments with solar energy	Table2: Energy	<input type="checkbox"/>	x	<input type="checkbox"/>	x	01
Work to obtain the distinctive quality mark for olive oil, (category ZARAZI)	Table3: Food	<input type="checkbox"/>	<input type="checkbox"/>	x	x	11



Create an organisation to takes care of the local varieties (olive oil, almonds, figs,...)	Table3: Food	<input type="checkbox"/>	<input type="checkbox"/>	x	x	07
Conservation of the same agriculture practices related to local varieties.	Table3: Food	<input type="checkbox"/>	<input type="checkbox"/>	x	x	05
Encourage farmers to obtain certification and product valorisation	Table3: Food	<input type="checkbox"/>	<input type="checkbox"/>	x	<input type="checkbox"/>	02
Creation of gene banks for local varieties of annual cultures	Table3: Food	<input type="checkbox"/>	<input type="checkbox"/>	x	x	01
Encouraging the cultivation of carob trees	Table3: Food	<input type="checkbox"/>	<input type="checkbox"/>	x	x	01
Afforestation (Carob, <b>Argan</b> , Arar, Caletus)	Table4: Ecosyst em	x	x	<input type="checkbox"/>	x	16
Rural area preservation and livelihood provision through program of developing agricultural and touristic initiatives	Table4: Ecosyst em	x	<input type="checkbox"/>	x	x	06
Accelerate the finishing of the wastewater project and future using of treated water for tree irrigation	Table4: Ecosyst em	x	<input type="checkbox"/>	x	x	02
Prevent messy construction around Wadi Jir watershed	Table4: Ecosyst em	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	x	02
Create an alternative tourism : touristic transect, Mountains ksours,...	Table4: Ecosyst em	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	x	02
Create South Geo-park	Table4: Ecosyst em	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	x	02
Develop a program for reforestation in the Wadi Jir watershed. To fight climate change.	Table4: Ecosyst em	x	<input type="checkbox"/>	<input type="checkbox"/>	x	02
Traditional industries to improve and develop the product	Table4: Ecosyst em	<input type="checkbox"/>	<input type="checkbox"/>	x	x	01
Creating nature reserves to preserve biological diversity and wildlife	Table4: Ecosyst em	x	<input type="checkbox"/>	<input type="checkbox"/>	x	01

Sensibility and rationalization of farmers of pastures use	Table4: Ecosystem	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	x	01
Addressing arbitrary estuaries in Wadis	Table4: Ecosystem	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	x	01
Elaboration of program for rural woman	Table4: Ecosystem	x	x	x	x	00
Valorisation of local agriculture product	Table4: Ecosystem	<input type="checkbox"/>	<input type="checkbox"/>	x	x	00
Capacity building for rural women	Table4: Ecosystem	x	x	x	x	00

### 6.3.2 Tunisian NEL First Workshop - Critical Review by the NEL-Leader

The strong point of the IEM is that solutions do not necessarily have to be selected by the National authorities (ministries) and then sent to be applied in the regions (top-down approach). Rather, it is based on face-to-face contact with key stakeholders to better identify and prioritize solutions together, benefiting from a global discussion by considering the WEF-E Nexus perspective.

As part of the NEXUS-NESS project, stakeholders are directed and guided to consider and integrate the priorities of the region through a workshop. These priorities may require compromise by sometimes accepting decisions that may not be optimal for a single sector, but which give global compromise solutions for all the sectors concerned (Water, Energy, Food and Ecosystem) or at least do not harm other sectors.

The first Tunisian NEL Workshop is an example of these processes of dialogue and negotiation. This workshop strongly involved directly the scientific-technical dimensions, which were a supporting element because it provided scientific evidence for evidence-based policymaking.

We noted that the NEL Stakeholders are with different degrees of decision power and of willingness. In fact, there are participants who were inactive. However, others had a spirit of leadership and talking all the time. The facilitator did not intervene and try to also engage the quiet participants. This issue should be resolved during the following NEL workshop.

The total deception is in the non-interest of participants to the rural women, even in punctuation, they did not have a point, despite the fact that there are women who took part in the vote.

During the first workshop, the participants formulated 36 statements of WEFE-NEXUS (13 Ecosystem + 7 Water + 8 Energy + 8 Food). The statements are analysed and discussed to identify the interlinkages of water, energy, food, and ecosystems and the impact that can cause it.

In spite of the big difference between our expectations and their order of priorities, we used the statements proposed by stakeholders. We have selected certain statements to be used as feasible solutions for the proposed challenges. For the first challenge “Identification of the best water allocation for sustainable food production and ecosystem conservation” we selected two solutions from the proposed statements:

1. Ensuring equitable and effective surface water use (Reducing conflicts)
2. Evaluating the potential impact of generalizing water-saving technologies (underground cisterns) to mobilize water.

However, for the second challenge “Ensuring self-sufficiency in water and energy needed (Water-Food Energy)”, we selected the solution of using solar energy for all agricultural activities such as pumping water from the deep well "Matmata 5", as well as lighting up rural houses.

For the third challenge “Ensuring rural development (tourism, “HMAP production”)", the focus will be on three solutions:

1. Promoting and protecting the underground houses of Matmata
2. Promote rural women’s activities
3. Preserve biodiversity, promote the use of HMAP and create business opportunities

For the program of the workshop day, we followed, or almost, the program proposed in D2.1. In addition, as an Ice-Breaker session, a video representing the region and especially the study area animated the meeting room. It is a video of 7min, but it has rebounded for more than 30 min.

For this first workshop, the main remark is that the time (1 day) is very short to review and discuss planned actions. The constraint is that the participants are mostly administrative people and their return to their offices is essential before the end of the day. Therefore, they cannot start early in the morning, however, they want to leave right after lunch.

### 6.3.3 Critical Review of the WP2-Leader:

The statements and the discussions which followed show the stakeholder engagement and motivation to improve local conditions through their prioritization through voting and co-agreement through a deeper discussion and concreteness. Several of the statements show that stakeholders wish to better preserve their natural ecosystem and cultural heritage. However, the results show that the NEL stakeholders need to increase their WEFE-Nexus understanding, so that they can codesign their NEL WEFE-Nexus Transition Vision and Action Plan. Lastly, the stakeholders will be able to see the consequences of their suggested statement through the NEXUS-NESS models and tools before co-agreeing to specific actions based on the statements.

Regarding the time constraints of the stakeholders, the NEL 1<sup>st</sup> workshop could have been extended to one more half-day to allow deeper discussions. In any case the results illustrate that the stakeholders need time to adjust to participatory approaches and discussions where all have an opinion but with guidance, they can converge their opinions and arrive to a co-agreement realising compromises.

## 6.4 How the Innovation Ecosystem Lab Methodology was Applied in the Italian NEL

Text provided by the Italian NEL Leader: Rudy Rossetto (SSSA). Text editing and additions by Xenia Schneider, WP2 Leader.

The Italian NEL of Val di Cornia has a recent tradition in participatory processes for managing natural resources. During the EU-financed LIFE REWAT project, the main water-related stakeholders were mobilised to discuss challenges in the water sector. Shared solutions to these challenges were then devised and co-agreed in a “River Contract”. This voluntary agreement was finally signed by all the involved stakeholders on 1<sup>st</sup> of July 2022. The activities of the Italian NEL started from this initial context.

The WEFE-NEXUS Transition of the Italian NEL is developed through a series of steps defined in the NEXUS-NESS project workplan and specifically by following the IEM of D2.1 specified within WP2 and through synergies with WP3 Task 3.1.

The Italian NEL 1<sup>st</sup> workshop was held in the framework of the NEXUS-NESS project and of the application of the NEL Innovation Ecosystem Methodology (IEM, D2.1). The Italian NEL 1<sup>st</sup> Workshop was held on 29<sup>th</sup> of June 2022 organised by the NEL Leader SSSA. A detailed report about the NEL 1<sup>st</sup> workshop and the obtained results has not been yet submitted to the WP2 Leader.

### **RRI Roadmap Milestone 1: M1.1: Map the NEL Current Situation through a PESTLEEC Analysis - NEL current situation “As is”**

The current situation at the NEL in terms of environmental and socio-economic factors was highlighted by means of desktop analyses of these factors performing [PESTLEEC and SWOT analyses](#) (Month 6). This was later complemented by the preparation of a booklet resulting from work done in Task 3.1 as an annex to *Deliverable 3.1 The NEL: depicting the WEFE resources and challenges of the 4 NELs*. The WEFE-Nexus Challenges of the Italian NEL is defined as and specified in :

“Striving for non-conventional use of water for agricultural production. Treated wastewater reuse and agricultural production for reducing groundwater exploitation and energy consumption (C-W-E-F) vs. release of secondary treated wastewater in the environment.”

### **RRI Roadmap Milestone 1: M1.2: Stakeholder analysis and mapping:**

Following the IEM and for the preparation for the workshop, the NEL Leader identified an initial list of stakeholders to be involved in the NEL (Month 3). Visits to main stakeholders and phone calls were made in order to make them aware of the NEXUS-NESS project, expected objectives, and to call for involvement in forming the NEL. The detailed list of the stakeholders is documented in the [RRI M1-Step 1.2.1 NEL](#)



[Stakeholder Analysis Template FV NEL-Italian v2](#). The mapping of the stakeholders is documented in [RRI M1-Step 1.2.2 NEL Overall Stakeholder Map Template FV NEL-Italian v1](#).

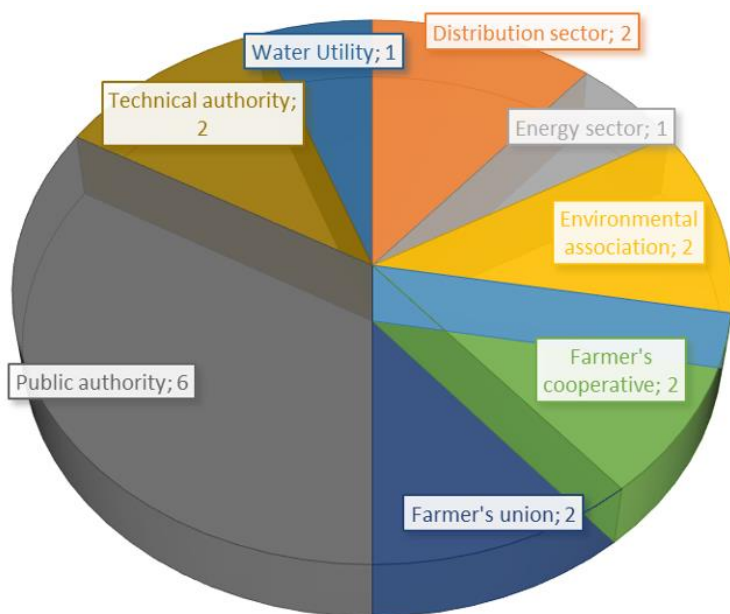
#### **RRI Roadmap Milestones 2, 3 and 4:**

Next step was to start the process of stakeholder's engagement toward the NEL 1<sup>st</sup> workshop for engaging and motivating the NEL stakeholders for a WEFE-Nexus transition by creating urgency and for framing the NEL WEFE-Nexus challenge through stakeholder co-agreement.

The design of the NEL 1<sup>st</sup> workshop was performed by the NEL Leader by critically analysing the IEM steps specified in *Deliverable 2.1 NEXUS Ecosystem Labs – Innovation Ecosystem Methodology* (D2.1) for tailoring the methodology on the specificity of the Italian NEL and on the NEL leader's experience in previous performed participatory workshops.

The NEL Leader and his team, skipping the D2.1 steps of the RRI Roadmap Milestone 2, focused (starting from the initial list of RRI Roadmap Milestone 3.1) on having a wide spectrum of stakeholders involved in the NEL and on trying to engage both women and men as actors in the NEL 1<sup>st</sup> workshop applying the World Café participatory method. The NEL team was then trained on the methodologies to use in the workshop (i.e., World Café). The NEL Leader decided not to follow the Storytelling (RRI Roadmap Milestone 2) for creating urgency because in the Italian NEL context it was evaluated as mature to participatory approaches. Furthermore, the NEL Leader thought that using storytelling be seen as a naïve approach, contrary to the Change Management theory and approaches explained in D2.1. Storytelling was seen as taking a high risk to bias freedom of thinking and speech of the participating stakeholders and then the following discussion. Instead, the NEL Leader chose to use two inspirational speakers to motivate the stakeholders as it is also suggested in IEM D2.1 (page 85).

The NEL team identified 36 relevant local stakeholder organisations, which were invited through phone calls and a formal invitation. Due to the expected high number of participants (more than 1 participant per stakeholder organisation) the NEL team had



change the workshop date and venue. The NEL Team decided to execute the NEL1<sup>st</sup> workshop in two parts because in their experience full stakeholder participation is not feasible for a full day workshop. Finally, 18 local stakeholders out of the 36 invited participated with 23 people (Figure 11; 23 persons), covering the 8 different NEXUS areas. Three academic institutions with 7 persons participated as observers. About gender, the composition of the local stakeholder was male dominated (19 men and only 4 women). Among women, one of them was the Mayor of the Suvereto municipality.

Figure 11: Italian NEL 1<sup>st</sup> Workshop Stakeholders distribution per type and number.

Before the workshop, the NEL Team was trained on the activities to be run during the workshop.

Initially, the *Consorzio di Bonifica 5 Toscana Costa* offered to hold the meeting on its premises. The workshop was finally held on June 29<sup>th</sup>, 2022, at the Auditorium of Terre dell'Etruria (Venturina), a farmer cooperative, which hosting the workshop. A small coffee break and a final light lunch were organised and offered to the stakeholders participating to the meeting.



*Picture 16: Italian NEL 1st Workshop Stakeholders, Facilitators and Observers*

Instead of the initial motivational storytelling, the workshop began with a short introduction to the NEXUS-NESS project aiming at presenting NEXUS issues and followed by two inspirational keynote talks on future sustainability of agricultural processes (Prof. Luca Sebastiani from Scuola Superiore Sant'Anna) and on the state of irrigation in Tuscany (Stefania Nuvoli from Regione Toscana). These two talks triggered the stakeholders' interest, which were followed by a wider discussion as the ice-breaker exercise. A short session was devoted to recall the achievements of the LIFE REWAT project and how they feed into the NEXUS-NESS project and about gender issues. A questionnaire on gender issues was handed-out to the participants and their answers collected. The human spectrogram session, although prepared, was not run as thought to be divisive, given the good discussion environment created.

After the coffee-break, the participants were introduced to the main workshop theme, or NEL challenge: "Let's have a vision for Val di Cornia in 2030". The participants were asked to think about the WEF resources and their relationships. This ideation work was performed using the World Café participatory method, where participants were divided in three tables: Agriculture, Water, Energy and Environment (Figure 2). At each table participants were asked to answer two questions: 1) What are the main challenges to achieve sustainability goals in the long term for the resource of the table they sat at (10 minutes discussion), and 2) What are main actions and measures to be set in operation to achieve the sustainability goals (20 minutes discussion). Regarding the second question participants were asked to identify the main NEXUS relationships with the other two assets and define them by using a particular colour sheet. Figure 2 shows a combo of the produced cardboard.



Picture 17: Italian NEL 1st Workshop World Cafe and generated statements

A total of 33 statements (Picture 17) were identified (13 for the water sector, 12 for the agricultural, 3 for energy, and 5 for the environment). More than 50 statements (actions/measures) were proposed to target these challenges. The time to perform the World Café exercise (Picture 17) lasted approximately two hours, longer than what was suggested in D2.1. Differently from what was proposed in D2.1, the produced statements were not presented by the host of each table, not explained, and not voted by the participants and thus no convergence of the statements has been achieved yet. The NEL Leader believes that the NEL participants need time to rethink the statements, and that the collected challenges and actions/measures have to be further developed and duly presented and discussed before any voting can take place. Based on the experience of the NEL Team, this should be one of the final outcomes of the planning process.

The workshop whole duration was about 5 hours. It ended with a short wrap-up and inviting the stakeholders to the following leg of the first workshop where all the challenges and potential solutions would have been thoroughly discussed. Participants were enthusiastic of the performed activities and of the outcomes achieved within the workshop duration and declared their will for continuing their participation.

Main deviations:

Aside the above-mentioned deviations, main changes to 1<sup>st</sup> workshop suggested agenda (D2.1) were related to:

1. WEF E NEXUS challenges mapping sheet was not run. This because the participants have very little knowledge of the WEF E NEXUS concept, and a stakeholder introduction is required.
2. Workshop Part 5: *Frame the NEL WEF E-NEXUS Challenges* and Part 6 were not performed. Understanding and analyses of challenges requires more time from the stakeholders and cannot be achieved at a good level in just a one workshop (even if 8-hours long).
3. A small number of women took part to the workshop. This fact lies within the socio-economic context of the area. In particular, the agricultural sector in the area is a male dominated sector.
4. The longer the workshop lasts, the higher number of stakeholders leave due to various kind of commitments.

#### 6.4.1 NEL Workshop 1 Results – their significance towards NEL WEFE-Nexus Transition

The workshop helped the stakeholders to begin understanding the WEFE NEXUS frame of mind. The Italian NEL team realised and did not expect that in so short time the stakeholders would jump into the new frame of mind. Capacity building and examples are necessary to make stakeholders aware of WEFE-Nexus and to improve their skills to improve to embrace WEFE-Nexus. Awareness and capacity building are needed for allowing them in making well informed and considered choices. However, as said, the workshop participants were deeply involved in the workshop and really interested in the opportunity, as well as, motivated to perform an exercise on long-term integrated resource planning.

The stakeholders identified a large number of challenges – 33 in total. They were mostly focused on agricultural- and water-related challenges, while energy and environment were considered much less. Still, within the short time available, they found it hard to develop the concepts behind the proposed challenges. Moreover, the participants had difficulty to define interrelations among challenges under the NEXUS context. The Italian NEL team believes that this is due to lack of understanding the WEFE-Nexus concept. The workshop's outcomes may be though considered as the first step towards the definition of the NEL NEXUS Grand Challenges to be further developed once stakeholders will have a deeper understanding of the NEXUS concepts and a broader discussion on the highlighted challenges is developed.

The results of the workshop are useful in terms of having established the NEL community of practice and of triggering interest and motivation towards further WEFE-Nexus work. The results achieved are being developed by the Italian NEL team to provide material to be discussed by all of the stakeholders in a next workshop, highlighting within the proposed challenges and solutions the WEFE-Nexus interrelationships. This will also help in increasing WEFE NEXUS awareness and motivation for transition.

As such the results indicate a first step into WEFE-Nexus transition, in the sense of having an open mindset to change. We could not talk about having progress towards a co-created WEFE NEXUS Vision and Action Plan at this point. In fact, the stakeholders in the first workshop understood about the existence of an innovative way to conceive resources planning and made the first steps in trying to understand the new WEFE-Nexus language. It should be highlighted that no resistance and barriers were observed during the workshop among the stakeholders; on the contrary they are motivated to develop the proposed work in their NEL

#### 6.4.2 Critical Review of the WP2-Leader:

It is positive that the Italian NEL stakeholders do not object or resist the WEFE-Nexus concept and they are motivated to continue the NEL work. The 1<sup>st</sup> workshop was clearly a mobilisation and engagement workshop for introducing the stakeholders into the WEFE-Nexus concept and thinking. It is evident that the Italian stakeholders need longer time to discuss and to find a common voice and ground for moving forward. It is also important to realise that stakeholders need a deeper understanding with examples before they are ready to begin co-defining their WEFE-Nexus Vision and Action Plan.

Contrary to the instructions of the World Café participatory method, the workshop participants did not move from table to table to exchange knowledge and pick-up different ideas from their own. It is also not evident how the discussions were facilitated at the different tables.



## 6.5 How the Innovation Ecosystem Lab Methodology was Applied in the Spanish NEL

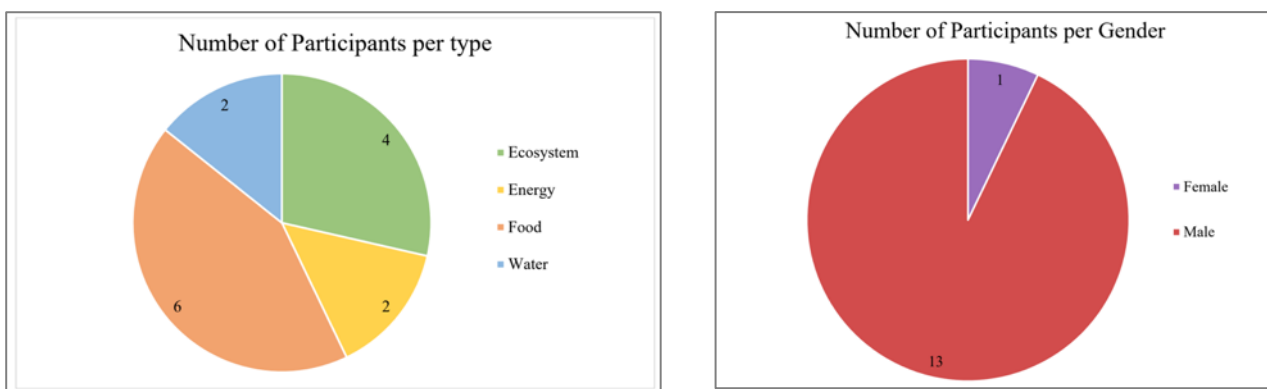
This chapter describes the organisation and development of the NEL-Duero (Spain) workshop that was organised by the University Politécnica de Madrid (UPM) in Valladolid, Spain on Tuesday 26 April 2022.

The workshop addressed the WEFE-Nexus Challenge: “Water-Energy-Ecosystem Nexus: Fair and sustainable agri-food systems”. The invited stakeholders were asked to discuss and to describe this challenge, in order to co-define WEFE-Nexus transition actions for addressing the WEFE-Nexus challenge(s) and for improving the local WEFE-Nexus conditions. The workshop followed the IEM (D2.1) and executed the workshop based on the World Café participatory approach. The workshop lasted half a day and offered a meal. The purpose of the lunch was to offer a relaxed space to generate conversations, strengthen networks and deepen connections among the stakeholders. The start time was at 9.45 and the workshop was concluded at 14.30, the lunch took place between 15.00 and 17.00. The full report for the Spanish NEL 1<sup>st</sup> workshop can be read [here](#).

The organization of the workshop began once the stakeholders’ mapping and the definition of the Grand Challenge (D3.1) were finished by the application of Responsible Research and Innovation (RRI) Roadmap Milestones Templates shown in Table 1.

During the process, 20 stakeholders were identified within farmers, Duero basin authorities, small rural enterprises, energy big companies, agricultural technical authorities, women rural associations, mayors, and scientists.

A tailored Spanish NEL flyer and a formal invitation letter was sent to all of them, but only 17 confirmed their participation. Finally, just before the workshop three participants could not come. Among the 14 participants, who did participate in the workshop (Picture 18), only one of them was a woman, as shown in the graphs below.







Picture 18: Spanish NEL 1st Workshop Stakeholders and Facilitators

The main challenge of the NEL-Duero is to find fair and sustainable agri-food systems through the WEFE-Nexus. Within this challenge, two key questions were identified for the Spanish NEL by the Spanish NEL Team:

1. Analysis of water and energy consumption together with the expansion of irrigated agriculture in the three irrigation districts (IDs) since 2010. The Duero Basin Authority (CHD), ITACYL and the IDs will provide the databases for water, food, and energy, respectively. The data will be analysed to observe trends and relation among variables. The results will present the evolution of water-energy and main crops (sugar beets, cereals, sunflower, potato, clover) area once the IDs were settled. Likewise, the added economic value in the irrigated area will be assessed by considering the food production chain.
2. Quantify Green and Blue water and energy consumption for the major agricultural crops: at local scale and daily temporal scale (during the irrigation season) and a monthly scale otherwise. The NEXUS-NESS agro-hydrological model for WEFE Nexus "WATNEEDS" will be used to make the estimations and then, map the water-energy needs in the NEL based on the current situation. The model will be validated with the previous point information. Thus, it will estimate WEFE-Nexus needs at real scale and will include predictions of water-energy needs, within the climate change scenarios, in a short term, as well as, to find critical targets for ecological services. The information will assess and quantify the interlinkages between nature-based solution and the WEFE-Nexus providing evidence on food production issues and the effect of river restoration measures.

To answer these two questions, it was determined that the workshop triggering-question would be the following:

“How can technology contribute to agriculture, improve water management, balance energy and fertilizer expenses, and improve our ecosystem?”. The workshop stakeholders were asked this question, so that their statements would aim at solving this great challenge and focus on how technology could transform agriculture into a more fair and more sustainable food production system.

The workshop began with the “thermometer dynamic” exercise to allow each participant to briefly introduce themselves and to break the ice. Then, the main part of the workshop began by showing the prepared [video](#) as the Storytelling to trigger the participants’ interest and increase their engagement in the workshop. The Spanish Team decided to create a professional video the storytelling, so that the inspiring words were accompanied by music and images that reflected the reality of the Duero Basin and motivate the stakeholders to think about the triggering question of the workshop. The story focused on a local farmer to generate greater empathy and identification with the problem and the collective solution. The video was well received and fulfilled the objective of reaching the participants, making them feel part of the solution and motivating them to participate and talk to improve the agri-food systems of the Duero Basin. The video ended with the triggering question that the stakeholders were asked to address at the tables of the World Café. After the presentation, the participants were asked to move to three tables to begin conversations and discussions on possible solutions. Each table had a facilitator from the NEL Team, who facilitated the conversation and helped formulate the statements concisely and well-formulated. Each table had a sheet with the World Café dynamics’ rules. Three rounds took place and each lasted 25 minutes. The NEL Team was time-tracking the rounds and warned the participants when to change tables. Participants were active and involved in the conversation at all moments. At the beginning of the workshop, there was difficulty to identify the WEFE-Nexus element in the stakeholders’ statements due to statements with several links. There were also situations where participants proposed several solutions to the same idea. The role of the facilitator in these cases was relevant to make stakeholders synthesize and reformulate their ideas. After a few minutes and several statements, the purposes of the WEFE-Nexus and the objective of the workshop became clear. The stakeholders were interested in participating and sharing their opinions, as well as, listening and discussing the solutions proposed by other people at the table. Even if the triggering question focused on the use of technology to improve the current situation of the Duero’s basin, political issues came up. This situation was more frequent in the natural environment table since environmental European and Spanish policies and how they are perceived by the stakeholders were a central issue. On some occasions, there were dialogues with opposite or different points of view, but all participants debated respectfully, with a friendly tone and listened to opinions that were different from their own until they reached a consensus or proposed complementary actions to be implemented simultaneously to achieve better results. The time allocated per table was extended from 25 to 30 minutes per round. All participants were involved at each of the three tables and contributed to the statements that had already been discussed and introduced new ideas. Many of the statements and comments were based on previous experiences that participants have had, or on ideas that were being studied, or that had been applied

at other times or places. At the end of the World Café exercise, a total of 10 statements were counted at the water table, 9 statements at the energy table and 14 in the environment table.



*Picture 19: Spanish NEL 1st Workshop Stakeholders voting*

For the voting of the statements (Picture 19), fifteen stickers were distributed to each participant (five per topic/sheet), and they were asked to read all the statements before voting, since it was important that they could vote once they knew all statements. To make the dynamic more fluid, the sheets were passed through the tables, so that everyone could vote in all of them and had enough space to read them calmly. Once all participants had voted on their prioritized statements (Table 5), they were sorted according to the number of votes. Then the sheets with the statements were hanged and presented by host of each table (Picture 20).



*Picture 20: Spanish NEL 1st Workshop presentation of the statements and the voting result.*

At the closing of the event, the NEL Team explained how the statements would be integrated in a NEXUS-NESS living lab framework (NEL). It was described what a living lab is and how it is proposed to create one

as the NEL-Duero, providing follow up and support throughout the NEXUS-NESS project. The gender survey was distributed to be filled out and the stakeholders received the NEL-Duero t-shirts and the booklets of the NEL Grand Challenge, where the analysis of the situation in the Duero Basin and the current problems of the area were detailed.

Table 5: Spanish NEL 1st Workshop Statements and their votes.

Statement	Table	Perspective:				N° of Votes
		Water	Energy	Food	Ecosystem	
Improvement of energy efficiency in the distribution of irrigation water: introduction of renewable energies (photovoltaic) and repumping from hydrants	Energy	x				13
Intelligent fertilization; real-time measurement of soil needs	Water			x		11
Improvement of water storage capacity: Surface reservoirs, public domain ponds and groundwater for joint use	Water	x				10
Control and measurement of irrigation water use	Water	x				10
Modernization of irrigation. Improved efficiency in water use: flow is released for other (environmental) uses	Water	x				10
Design of the irrigation distribution network to improve efficiency. Avoid dissipation in pressure regulating valves (VRPs)	Energy		x			10
Efficient control of the consumption of phytosanitary products, water and fertilizers through digitalization. Data needed.	Ecosystem				x	10
Better production management, avoiding food waste	Ecosystem			x		10
Training to the farmer with soil analysis to provide only the necessary nutrients that the crop needs	Ecosystem				x	10
Improved fertilizer efficiency. Lower energy consumption	Energy				x	9



Statement	Table	Perspective:				N° of Votes
		Water	Energy	Food	Ecosystem	
Improved efficiency. Use low-pressure emitters to reduce nozzle pressure	Energy		x			8
Modernization of irrigation to compensate for restrictions on water use (e.g. ecological flows) for food production	Ecosystem	x				8
Promote the construction of user communities, especially groundwater	Water	x				7
Tools for decision making. Management of data sources: fertilizers, water-nitrogen, crop evaluation	Ecosystem				x	7
Digital agriculture. Decision-making tools (e.g. GIS) that help to save costs: Monitoring, sensorization (watering what is needed)	Energy	x				6
Use water energy to provide nutrients at the right time, the way and the amounts adequated (fertirrigation)	Water		x			5
Better management of irrigation water; waste of water in the application and in the reserve of the same (reservoirs, canals, swamps, rafts)	Water	x				5
Modelling of infiltration into the soil. Use of green covers	Water			x		5
Savings in water use by the combination of photovoltaics and agriculture: Energy generation and agricultural production	Energy	x		x		5
Energy audits: Measuring energy efficiency and replacing it with more efficient and technological equipment	Energy	x				5
Accurate monitoring of the water table in wetland areas, as well as monitoring of water quality in these areas	Ecosystem	x				5
Leveling of plots to improve efficiency	Energy		x			4
Self-consumption in food production of energy generated in photovoltaic fields	Energy			x		4

Statement	Table	Perspective:				N° of Votes
		Water	Energy	Food	Ecosystem	
Integrated pest control, improvement in the use of phytosanitary products in crops	Ecosystem			x		4
Promoting organic production to address the problem of biodiversity loss	Ecosystem			x		4
Application of Agriphoyovoltaic, combination of agriculture and photovoltaic energy. Savings in water use due to lower evaporation	Water		x			3
Knowledge transfer for the use of technologies that improve water efficiency and decrease environmental impact	Ecosystem				x	3
Consumption of seasonal foods and proximity (awareness)	Ecosystem			x		3
Floating photovoltaic parks in reservoirs preventing evaporation	Water		x			2
Access to capital to incorporate technology into the exploitation. Tools provided by the administration	Ecosystem			x		1
Introduction of renewable energies to reduce the use of fossil fuels	Ecosystem		x			1
Agriculture and the environment must find a balance.	Ecosystem				x	1
Reduce fertilizer expenses by switching to a crop that requires less quantity	Ecosystem			x		1
33		11	7	10	6	

### 6.5.1 Spanish NEL 1<sup>st</sup> Workshop Results and their significance towards WEFE-Nexus Transition

All the steps in the workshop preparation and execution were accomplished as prescribed in the EIM of D2.1. Likewise, no resistance to change was found among the workshop participants and therefore the Stakeholders map does not need to be modified after the workshop. As already mentioned above, the NEXUS-NESS agro-hydrological model for WEFE Nexus “WATNEEDS” will be used to make the estimations and then, map the water-energy needs in the NEL based on the current situation. All voted statements of the Spanish NEL 1<sup>st</sup> workshop have been fed into the WATNEEDS model and the work progresses in order to illustrate their effect to the stakeholders at the coming Spanish NEL workshops.



### 6.5.2 Critical Review of the WP2-Leader:

It is positive that the Spanish NEL stakeholders are interested and motivated to collaborate for identifying possible solutions for the Duero WEFÉ-Nexus challenge. It is evident that the Spanish stakeholders are quite comfortable with participatory approaches and that allowing longer discussion time helped the formulation of statements, which point already in types of solutions. However, not asking the stakeholders to complete the initial WEFÉ-Nexus dialogue step right after the motivational film, illustrates that the interdependencies among the statement-solutions are not considered or unclear. The video-storytelling did achieve its goal to personally engage the stakeholders in the workshop, the question remains how these stakeholder-participants can motivate their own organisations.

Contrary to the instructions of the World Café voting method, the workshop participants received too many votes, 15 in total instead of a total of five, which did not push them further in prioritising all statements before voting. Less votes would have facilitated the framing of the Spanish NEL challenge in their own words using the prioritised statements and even initiating the discussion for identifying the interrelations among the top-voted statements. Nevertheless, the stakeholders are engaged and motivated for commencing the co-designing their Nexus Transition Vision and Action Plan, activities for the upcoming NEL workshops.

## 7. Conclusions and Next Steps

The conclusions of the NEL 1<sup>st</sup> workshops are:

- The NEXUS-NESS NEL Leaders and NEL Teams (AU, IRA, CDRA, UPM, SSSA) have had a steep learning curve in participatory methods, RRI and change management approaches. The training activities provided by XPRO in group and at individual level have been helpful.
- The stakeholder analysis, mapping and recruitment took much longer than expected in all NELs since the NEL Teams had to move out of their own sector (mainly water).
- Most NEL stakeholders are not used to participatory and bottom-up approaches.
- The WEFE-Nexus concept is complex to understand and very complicated to apply for stakeholders.
- Takes much longer time to engage stakeholders in WEFE-NEXUS and to be able to change paradigm. This also applies for NEXUS-NESS partners.
- Stakeholders tend to fall back to singular focus instead of focusing on the interconnections of interventions.
- It will take much longer time to be able to bring stakeholders together to co-define and co-agree a WEFE-NEXUS transition vision and action plan.
- Gender equality and gender issues are not sufficiently covered mainly due to cultural and traditional norms and values.
- It is unclear if the workshop participants will be able to bring change of mindset in their own organisations.
- It is doubtful if the NEL stakeholders will be able to understand the advantages of close collaboration among authorities, local communities and resources providers in order to become an Innovation Ecosystem.
- The multi-level governance necessary for WEFE-Nexus is lacking behind in the NELs at this point in time and more work has to be done from the NEXUS-NESS partners to illustrate to the NELs how food security and socio-economic challenges can be addressed through a WEFE-Nexus by operationalizing abstract notions and development of meaningful indicators at different levels that NEL stakeholders can easily understand and use.

In face of the above and after several discussions among partners during the NEL Bi-weekly meetings, WP Leader meeting and project meetings, the following steps have been agreed:

1. Improve the WEFE-NEXUS understanding at NEXUS-NESS partner level by creating a common language and perform Train the Trainer WEFE-Nexus capacity building activities (T3.4) to enable NEL stakeholders better understand WEFE-Nexus.

2. Continue the Gender Equality and Gender Issues activities by having a whole workshop dedicated to women in these sectors. Already two workshops are being planned for 8 March (International Woman's Day).
3. Realising that the NEL stakeholders and NEL challenges are so diverse, adjust NEL expectations, so that the goal with the future NEL workshops in 2023 is to achieve a co-agreed WEFE-Nexus Transition Vision and Action Plan along with the proposed NEL Management Plans (T4.5).