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NEX-LABS

NEXUS DRIVEN OPEN LIVING LABS JOINT ACTON PLAN

B_A_2.1_0124. NEXUS-DRIVEN OPEN LABS FOR COMPETITIVE AND INCLUSIVE GROWTH IN THE MEDITERRANEAN. (NEX-LABS)

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EXECUTIVE SUMMARY

The Nexus Joint Action Plan (NJAP) has been designed as a policy-oriented outcome to drive management focus from inputs to outputs and boost the achievements and results of the Nexus Driven Open Living Labs (NDOLLs). It was initiated to address future Water, Energy and Food (WEF) Nexus challenges in European Union - Mediterranean Partnership Countries (EU-MPCs) through design thinking dynamics. In this sense, the NJAP depends on the capitalization of the outputs generated throughout the project activities.

The NJAP is considered as a roadmap that would enable countries to develop WEF nexus oriented NDOLLs and guide them to overcome the plethora of impediments that would potentially hinder the implementation processes. In this context, different analytical methods were mobilized to comprehensively identify the challenges that would confront NDOLLs, being economic, social, legal, environmental, and political, and anticipate strategic priorities to consider while developing the action plan. The Strength, Weakness, Opportunity, and Threat (SWOT), Political, Economic, Sociological, Technological, Legal and Environmental (PESTLE), and Strategic Orientation (SOR)s analysis were the methods conducted in different EU-MPCs to convey a holistic overview of the pillars and prerequisites necessary to establish NDOLLs in contexts that vary in terms of economic development, financial and human resources, and technological infrastructure.

Through interviews and focus group discussions, partner countries and experts in the field identified eight priorities to be addressed, allocated a list of recommendations and actions to be considered, and assigned the niche of key stakeholders that are essential to take part in the implementation process.

As a result of previous efforts and desk research, this report culminates in an NJAP that ranks the strategic priorities based on value, effectiveness, importance, contribution, and feasibility, and assigns a timeline and potential impact for each recommendation. Together with the NJAP, is a list if Key Performance Indicators (KPIs) that were identified to be critical for the monitoring and evaluation process that allows an enhanced adoption of NJAP, assesses the effectiveness of the action plan, and directs efforts towards achieving the ultimate capacity of the WEF nexus NDOLLs. This report lays the foundation for different EU-MPCs countries to successfully establish Living Labs (LLs) addressing WEF challenges and ensure their sustainability and extension over other regions and countries.

NEX-LABS Consortium

INTRODUCTION

This Nexus Joint Action Plan (NJAP) has two main purposes. First, it reinforces the support of the improved research-policy coordination in the WEF domains for the replication of the NDOLLs approach. NDOLLS are networking spaces that integrate scientific, industry, government, and social actors into an interactive innovation process that matches supply and demand. Thus, it allows more research tackling future societal challenges effectively through an inclusive approach for the targeted beneficiaries and end-users, initially in Jordan and Lebanon. Second, the NJAP defines the work plan, actions, tasks, responsibilities, timeline, risks, and mitigations that are updated periodically to stimulate alignment of existing initiatives in the region. This, in turn, feeds into a successful replication of NDOLLs approach, following a cooperating dynamic and integrating potential research and innovation.

The NJAP also intends to provide solutions to the detected gaps, barriers, and obstacles that hinder the economic growth of the region. It also contributes to promoting policies exploiting the possibilities provided by NDOLLs to reduce poverty, vulnerability and diminish people's risk of exposure to improper use of water, agriculture, and energy. This NJAP is an international, and cross-regional agenda for research, development, and innovation specifically for Nexus challenges, including a reinforced cooperation amongst all the stakeholders of the Nexus value chain. The NJAP is an agenda for collaboration aimed to develop new and improved business models, technologies, and other concepts in support of the stakeholders' cooperation to face future Nexus challenges in the EU-MPC region.

The existing fragmentation of the MPC region, due to its political diversity and its diverse research agendas, hinders policy attempts to increase cohesiveness, progress, and multilateral and bilateral cooperation at a regional and international level. To overcome such fragmentation, this NJAP points the way to the ultimate target of increasing Science, Technology, and Innovation (STI) cooperation, addressing Nexus challenges in the region through sustainable NDOLLs approach replication. This, in turn, responds to real and current needs for diligence, steadiness, and sustainable bench learning, not only among MPCs, but also among European countries.

The NJAP is built on the basis of different outputs (see figure 1) derived from several activities performed within the framework of the NEX-LABs project, such as surveys and consultations, as well as expert meetings, interaction with National Task Force Groups (NTFGs) members, which involved key actors from both Europe and the MPCs. Such outputs provide an excellent starting point and critical foundation for the future development of dialogue, harmonisation, and increased collaboration between MPCs and EU stakeholders in STI and sustainable development. This ensures the replication of NDOLLs approach that intends to solve the existing Nexus challenges in the region.

DIALOGUE

Experts dialogue workshops bringing together experts from EU and MPC. Such workshops are meant to prioritize, identify and define priorities that pave the way for new cooperation opportunities as well as enhance access to cooperation opportunities. This is especially important to MPC countries with low participation in EU Programmes and allows discussion of NEXUS challenges for EU-MPC cooperation.

MONITORING

The analysis, monitoring and review of science and technology research and potential replication of NDOLLs in the MPC, based on the literature review of past similar Living Labs, bibliometric analysis.

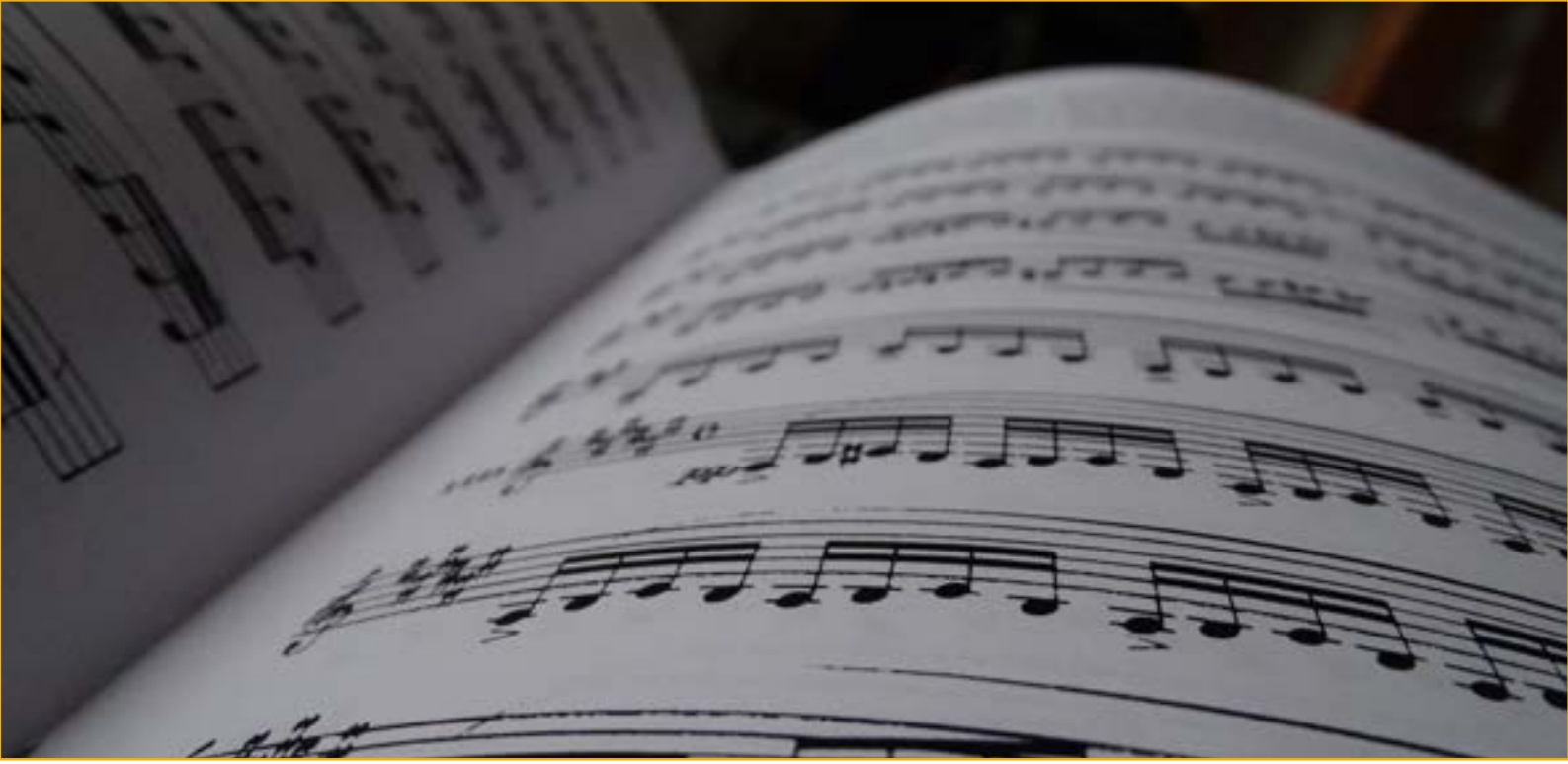
EXAMINATION

The examination of EU-MPC and EU member states' programmes and strategies for Science, Technology, Innovation and Development in the MPCs, providing information on programmes of the EU and EU member states designed for the MPC which can be used to facilitate EU/MPC NDOLLs replication addressing NEXUS challenges.

AUDIT

The examination of MPC policies in selected areas and identified societal challenges, to support monitoring policy development and NDOLLs replication hence enhancing regional research and innovation potential.

Figure 1. Outputs contributing to the development of the NEX-LABS proposed NJAP



METHODOLOGY

The strategic process for the development of the NJAP includes various steps: priority setting, implementation, follow-up, assessment, and revision. This forms a circular process taking into consideration the various timescales and stakes. In such a process, the identified stakeholders must pilot the implementation, the follow-up, and prepare for future assessments. The methodology used in the implementation process is based on information gathered within the project framework. The data is acquired by leveraging the best practice learnings from partners and key stakeholders, using the penta-helix model involved in the WEF nexus. The latter elucidates the baseline synthesis required to define correctly the actual existing international cooperation and interactions of ecosystems between EU-MPC and to overcome the future Nexus challenges. By completing these tasks and their associated deliverables, it is possible move forward with analysing measures to adapt the identified international cooperation instrument. Furthermore, it allows to enhance the framework conditions in the MPC region, enabling the replication of NDOLLs through a more inclusive perspective.

Besides, the methodology for the validation of gathered information requires consultations with relevant stakeholders and NTFGs to define a series of key relevant issues to be evaluated according to the technology, social, economic and policy perspectives. The process evaluation will allow ranking the corresponding derived recommendations. The NJAP highlights the NDOLLs' priorities, the recommendations to implement and validate these priorities, as well as the short, medium, and long-term impacts. It also identifies the involved stakeholders, and the potential external factors that may hinder the implementation of the NJAP.

THE VISION

Human prosperity requires decreasing the need for water, energy, and food resources, and improving their management efficiency. Worldwide projections show that interest for water, food and energy will exponentially increase throughout the next decades because of the growing population, economic development, urbanization, climate change, and shortage in resources. This situation is expected to be exacerbated as food production needs will increase by 60% to meet the demands of nutritious and better-quality food for the population by 2050. Global energy consumption is projected to grow approximately 50% by 2035 and 80% by 2050. Total global water withdrawals are estimated to increase by 50% by 2025 in developing countries, and 18% in developed countries. As demand surges, there will be a conflict over water, energy, and food resources. It is thus important to understand the synergies and trade-offs to develop optimal response options to ensure the sustainability of the environment and people's livelihoods in accordance with the Sustainable Development Goals. By highlighting these interdependences, the nexus concept corroborates the need to view water, energy, and food not as separate, but as complex and inextricably entwined entities (Figure 2).

Consequently, several networks of

stakeholders try to define interoperability to baseline future research, innovation, business models, products, technologies, and services to address Nexus challenges. The vision associated with the NJAP is a sustainable and recognized Nexus Driven Open Living Labs (NDOLL) ecosystem to be replicated all over the EU-MPC region, based on a consolidated meta-cluster, and initiated by NEX-LABs. Because of its smooth implementation, the NJAP is expected "*to pave the way for a sustainable circular economy addressing actual and future NEXUS challenges through an efficient NDOLLs approach, based on research, innovation, and cross regional cooperation*".

WEF FRAMEWORKS

Throughout the years, the number of WEF frameworks developed and implemented in different countries, has been growing progressively. Fortunately, several attempts were found successful, yet pitfalls remain evident. The suggested NDOLLs approach aims to harness the WEF frameworks and is set to be a lineage or continuity of previous approaches. Additionally, NDOLLs approach is considered holistic as it addresses the setbacks faced in previously adopted WEF frameworks and projects.

At early stages, WEF Nexus concept was looked at as a mercurial one that led to unpredictable changes in different aspects based on the context and scale without a clear strategy that accounts for potential challenges. Nexus was considered as an evolving concept that significantly remained in the conceptual realm while highlighting detailed insights. It was also minimally acknowledged in the field, since it lacked a coherent definition, methodology, and was found to have insufficient collaborative activities with private sectors and media outlets (Bell et al., 2016; Galaitsi et al., 2018; Albrecht et al., 2018; Fraiture et al., 2021). During the application of WEF Nexus approaches, policy processes were found to be pivotal as they either delayed the WEF Nexus or contributed to its inertia, especially in developing countries. In some contexts, the integration of local nexus issues within national and global Nexus was often undermined; this is attributed to the complex nature of the Nexus, unclear interconnections of variables, and insufficient shared data (Allouche et al.,2014; Mitchell et al., 2015; Shannak et al., 2018). The impacts of the WEF Nexus approaches is not influencing stakeholders' decision making; instead it was found to be restrictive and inadequate. It also fell short in integrating political considerations in WEF Nexus. Additionally, outcomes were considered less operational, and emphasized resource security at the expense of livelihoods (Allouche et al., 2014; de Grenade et al., 2016; Wichelns, 2017; Simpson & Jewitt, 2019).

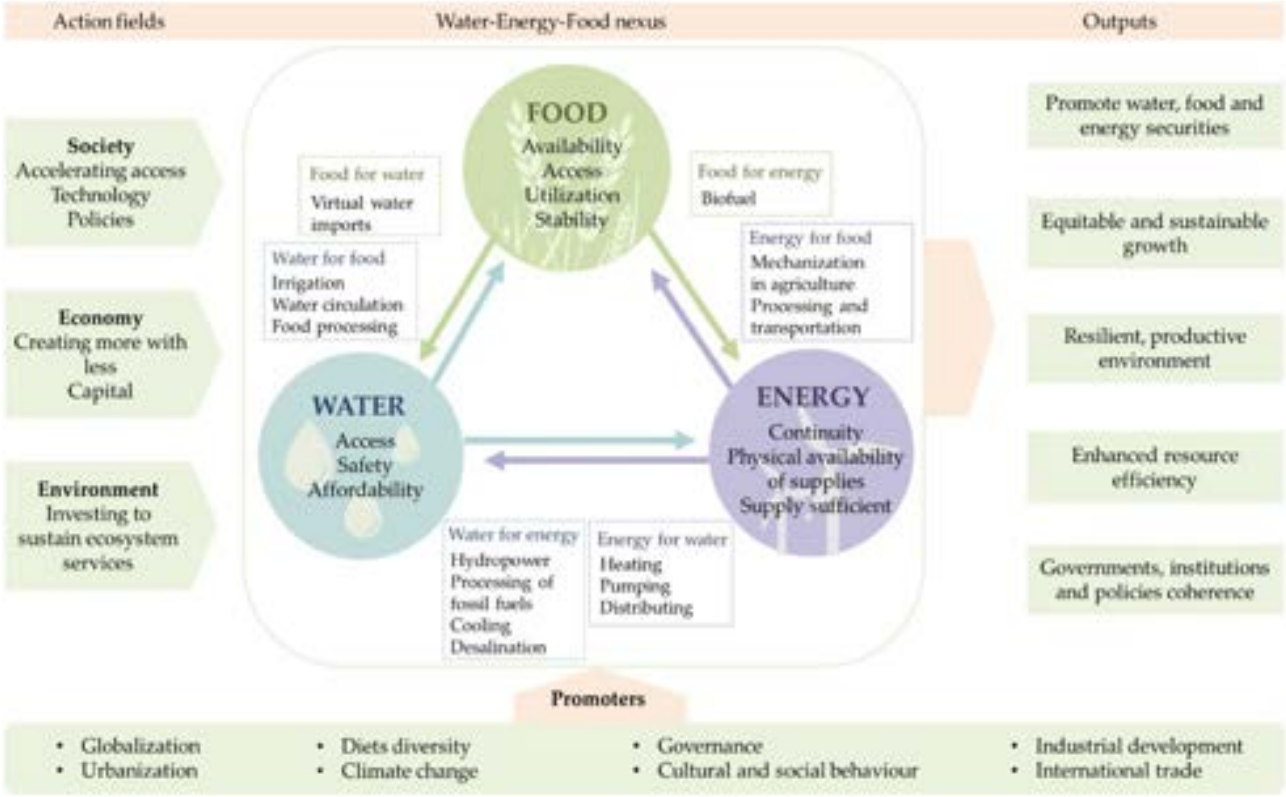


Figure 2. Water, Energy and Food Nexus (Retrieved from Rios et al., 2021)

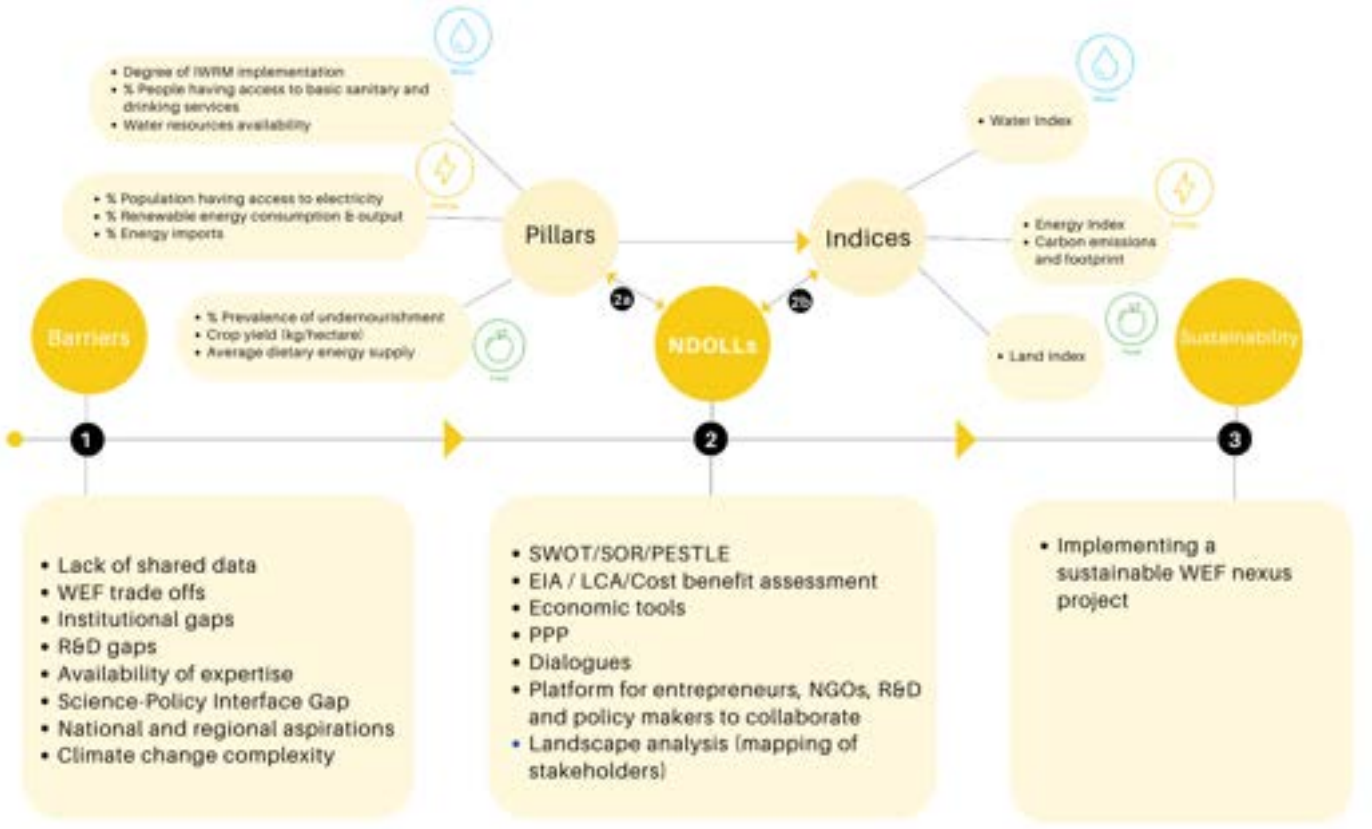


Figure 3. Assessment process for WEF solutions supported by NDOLLs ecosystem

A cumulative of 46 WEF tools were established. Despite their huge potential, few were utilized by other studies. For instance, GIS based Regional Environment Assessment tool for Food Energy Water (GREAT for FEW) and the Decision Analytic Framework to explore WEF Nexus (DAFNE) tools were only applied by their developers in the original case studies. Additionally, other tools - considered to be in medium to high frequencies in case studies - were utilized only by their original developers (Taguta et al., 2022). This could be attributed to the lack of flexibility and applicability of some WEF tools (Lin et al., 2019).

Gaps remain evident in the versatility of WEF tools since they were found to be dominant at large spatial scales, mainly applicable at national and regional level, at the expense of local scales. Several WEF tools emerged for specific case studies, making them less scalar with limited applicability to different contexts (Byers, 2015). Flexibility across users, uses, spatial scale and adaptability, according to specific contextual input, is critical to ensure sustainability of nexus tools. For instance, the integrated analytical model for the WEF Nexus (iWEF) tool was utilized in southern Africa (regional scale), South Africa (national scale) and in Sakhisizwe municipality (local scale) (Mabhaudhi et al., 2019; Nhamo et al., 2020). Less than 30% of developed tools account for geospatial characteristics. Knowing that natural resources are spatially distributed in nature and are exposed to rapid variations in time and space, lacking the ability to display geospatial mapping and visualizing the distribution of resources, is considered a limitation.

The majority of the WEF tools can only analyze resources as aggregates rather than addressing them in their temporally disaggregated manner (Shannak et al., 2018; Ravar et al., 2020; Taguta et al., 2022). The proposed NDOLLs approach is expected to tackle the benchmarked gaps and pitfalls in terms of the multi-scalar capabilities, accounting for synergies while limiting evident biases and tradeoffs. It is ought to be a sustainable environmental approach for WEF systems that investigates the short, medium, and long-term events arising from the developed synergies. The assessment of technological, economic, and environmental scenarios will allow the improvement of resource management, production techniques, pumping or desalination methodologies; this, in turn, feeds into recorded footprints, exploitation of resources and utilization of renewable energy.

THE NJAP PROCESS

Until now, several WEF nexus tools or approaches have emerged. However, few attempts of implementation were recognized as sustainable, and several gaps were identified (Taguta et al., 2022). Requisites of the NJAP (figure 3) are based on gaps assessed through outputs and earlier implemented WEF Nexus frameworks. In this context, technical support is attainable, to a certain extent, and adapted from experiences that countries have issued. Yet, pitfalls remain evident in governance. The lack of detailed, updated, and uniform data remains an impediment in several WEF projects, especially in Mediterranean countries, where a

greater contribution of figures, dashboards and databases is required. On a micro local level and in some contexts, data is hidden or circulated privately thereby hindering inter-sectoral WEF analysis (Markantonis et al., 2019). Additionally, some countries are reluctant towards sharing their findings with other parties considering their data nationally strategic. Meanwhile, WEF projects are marginalized from geographic borderlines. WEF projects consider interlinked systems. Accordingly, WEF trade-offs have higher potential for occurrence. It is possible that actions shift burdens or enervate other areas, thereby, threatening the security and sustainability of water, energy, and food sectors. Nexus evolution is also hampered by institutional barriers and capacities.

Regions have different levels of institutional engagement and trust in stakeholders. Predominantly, ministries are allocated the responsibility of managing water, energy, and food sectors. However, governance in some cases is divided between several parties or held within one ministry. Both scenarios reflect negatively on WEF projects as hierarchy is complicated. There resides a gap in communication, and challenges are raised because of social and political differences. The cooperative initiatives of research and policymaking are poorly represented in WEF projects designs. This could be attributed to the lack of trust arising from both entities and the existence of different agendas and priorities. Uncertainty is usually directed towards the role of governments, its political will to be engaged, and readiness to adopt a WEF Nexus approach (Markantonis et al., 2019). On the other hand, natural resources rate of degradation is rapidly escalating putting an increasing pressure on any WEF concept. Also, limited capacities and technicalities required to foresee and mitigate climate change events are hindering the implementation of WEF projects (Alzubari & Alrwris, 2020).

Accordingly, NDOLLs approach is considered a part of a strategy that paves the way for entrepreneurs, state administrators, policy makers, researchers, and non-governmental organizations to nurture and consolidate an ecosystem that collaborates for the essence of establishing sustainable WEF Nexus services and solutions. However, several requisites are required to ensure NDOLLs are successfully implemented, applicable for replication at different scales and WEF outputs are sustainable. It is imperative that dialogues between stakeholders are nurtured, and entrepreneurs are incentivized and subsidized to share their innovations and expertise. It is vital that the interlinkages are attained between stakeholders as WEF Nexus follows a multidisciplinary approach. Attendees of the first launch of NDOLLs, that occurred on June 7, 2022, in Berytech - Lebanon, emphasized the need for Intellectual Property Rights (IPR) subsidization and demanded leverage to import equipment and material that would aid their prototypes. Additionally, during the launch, several scenarios were discussed creating virtual synergies in terms of financial, human, and technical resources, as well as political affiliations and economic situations. The latter reflected the theoretical aspect of WEF projects that are designed to scale fit to local or regional levels. It was also highlighted that to anticipate any risks during the implementation of living labs, it would be imperative that NDOLLs are tailored according to the policies and regulatory framework of each country, while accounting for pre-determined identified gaps and barriers. As such, this would escalate chances of having a successful implementation of NDOLLs and ensures their expansion and sustainability.

The launch of NDOLLs established the need to integrate evaluations and economical instruments to assess WEF projects. For instance, economic efficiency would be achieved if marginal cost-pricing rule, meaning the incremental cost of supplying an additional unit equals the incremental amount that will be paid for a volume of water, in other words, a marginal willingness to pay. This indicates that if water services, for example, are valued at the real marginal cost, including environmental costs, they are put to their highest economically valued use (Mohtar & Daher, 2015). Life Cycle Assessment (LCA), cost-benefit analysis, and environmental impact assessment (EIA) are all tools that are utilized to hamper WEF tradeoffs. They ensure that best practices are adopted. This is based on contextual determinants that mainly tackle local or regional physical constraints such as: topography, soil characteristics, and water source locations; state of development, industry in region, extent of food production, incidence of water and energy dependent entities, regional income, economic stability, macro-economic conditions; water allocation rules, property rights, land tenure, regulations; capital availability; human resource capability and availability, labor skill, and leadership capabilities (Mccarl et al., 2017; Mohtar & Daher, 2015; Markantonis et al., 2019).

Pillars of WEF projects revolve around availability of natural resources and accessibility (Simpson et al., 2022). Additionally, sustainability index is best adopted as a tool for decision-making and as a methodology to assess the ongoing status of a WEF Nexus project. Sustainability index is a function of water, land, energy, and financial indices. A step towards benchmarking and quantifying accurate acceptable limits would be through cross-sectoral stakeholder engagement representing different resource consuming sectors under the guidance of scientific input. This would facilitate developing quotas of resources to be used for executing different growth strategies across sectors (Mohtar & Daher, 2015).

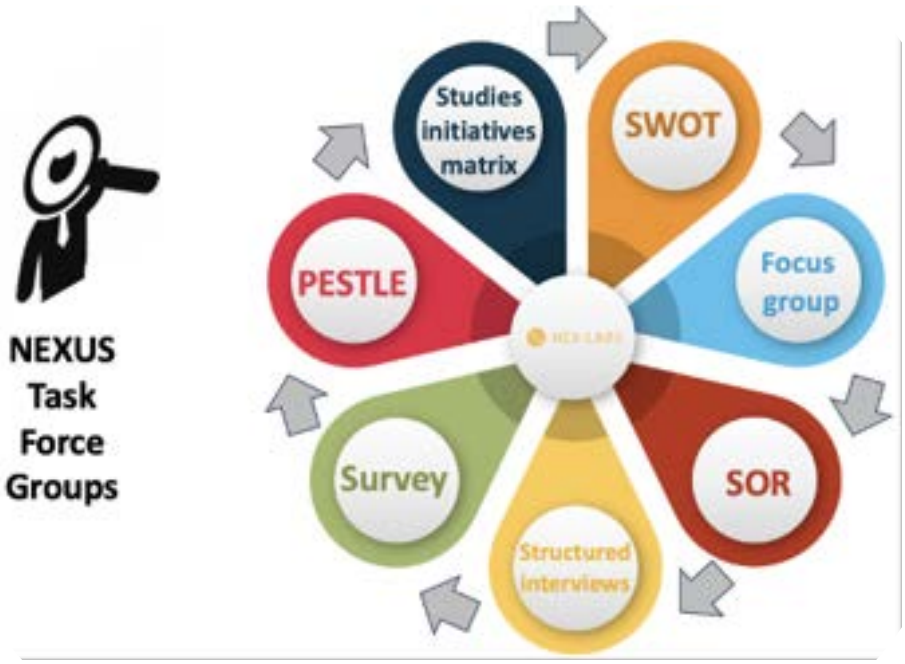


Figure 4. Employed building blocks to define the NEX-LABS NJAP.

Figure 4 illustrates the building blocks of creating the NJAP. Later, through the corresponding parallel sessions of the project meetings held virtually, the gathered information is refined through the contributions of the partners and is further confronted with the vision of the NTFGs members and the advisory board. This methodology assists the task force (figure 4) in charge of the NJAP writing. Besides, the consortium was required to organize consecutive virtual meetings to stay on track with the evolution of the gathered priorities and recommendations, after their validation and prioritization during different events.

THE NJAP POSITION & IMPLEMENTATION

The NJAP solicits the identification of strategic priorities, recommended actions of implementation, means of verification, impacts at short/ medium/long-term, internal, and external factors, and WEF nexus stakeholders. It is concentrated on success stories to promote a greater use of these applications and scale them up, as well as the barriers that hindered the implementation process. The EU-MPCs can then transfer this expertise to regional institutions through intermediaries (clusters, Living Labs, innovation programs, technologies, technology transfer offices, and incubators). Initiating dialogues between countries and introducing the WEF Nexus at a macro-regional level first is more representative of the conditions and specificity of ecosystems and less clouded by conflicts. In this context, dialogue capacities can be built through regional and national activities and can be targeted to both national and regional partners/stakeholders.

A successful implementation of the NJAP is to bridge existing national initiatives and strategies together and find regional complementarities that are stronger together. The role of NEX-LABs consortium is to lay a foundation on certain strategic priorities and recommended actions, and to act as a facilitator to form appropriate clusters to implement the suggested actions for the replication of NDOLLs. In general, the assumption is that a post NEX-LABs collaboration must manage the NJAP, which will facilitate the initiation of the actions and cluster building. The cluster members depend on the action. However, the general recommendation is to always involve all the stakeholders along the value chain of the WEF Nexus targeted challenges. Incidentally, these recommended actions will also serve as a platform for further collaboration towards the goals of the NJAP.

The general agreed condition is to reinforce the forthcoming clusters, so they can come up with solutions that respond to suggested actions, and they can implement these solutions efficiently. This essentially means that from the start, the cluster members facing each recommended action should be aligned in their interest towards the action. A key aspect in the NJAP, summarized priorities, and recommended actions is that they have been designed to keep bridging national interests together. This enables cross-border collaboration, starting with the MPC region, and extending to the EU as the industry moves forward. The rationale is to leverage the best capabilities to enable mutual learning across EU-MPC regions. The further international scope of the project, addressed to face future WEF nexus challenges, will enable attracting a wider base of funding as well as acquiring a sustainable impact.

ACTIVITY GROUPS

The NJAP methodology was first discussed during the NEX-LABs project kick-off meeting (KoM) that took place in Barcelona (09/21) to start defining the supporting mechanism required to gather the necessary information. Activity groups were identified as the strategies utilized in Living-Labs (LLs). The SWOT and SOR analysis, formulate priorities and recommendations within a series of strategic actions.

PRIORITIES AND RECOMMENDATIONS

NEX-LABs intends to provide a reliable detailed strategy allowing partners to make informed decisions and increase their competitiveness among the MPCs in the water, energy, and food sectors, whether academically, industrially, or in external collaborative terms. In addition, it is important to specify the assumptions underlying the significant data in the strategy and the timeframes (1-3 years) for the achievement of targets throughout the different strategic priorities. This strategy provides actions for the future and aims to support the decision of public policies regarding cooperation in EU-MPC area, as well as respond to economic pressures, political and environmental issues, market trends and technological trajectories that the water treatment sector will face in the close future.

The SWOT and PESTLE analysis conducted by NEX-LABS consortium resulted in the development of the strategic orientation. Such process provides a focus for the NJAP by setting goals and a vision to be fulfilled through the identified strategic priorities and recommended actions. PESTLE analysis was intended to complement outcomes derived from SWOT and expand the analysis of external context by looking in detail at specific types of issues that have pressing impacts on the implementation of projects/ initiatives. The outputs of the analysis were then translated into practical recommendations that support services of emerging business, raise capacities of NDOLLs, and maximize innovation.

The conclusions extracted from such exercise serve as a drafting basis for the development of NEX-LABs' NJAP. The analysis of all the considered variables made it possible to understand which internal factors could be considered as strengths and which external factors may hinder the development of the replication of NDOLLs approach in the MPC region. This was done through a balanced innovation-friendly ecosystem in the Southern Mediterranean Neighborhood (SMN) based on quintuple helix approach.

The NJAP includes a series of actions to be undertaken and promoted jointly by the target stakeholders aimed at addressing the issues identified in the SWOT, using the internal strengths and external opportunities to correct the detected weaknesses and be ready to face potential threats. Such actions have been verified considering the identified impacts at short mid and long-term and complemented with the analysis of a series of indicators to consider the influence of some identified external factors that might influence, and in some cases, jeopardize the effect of the summarized actions themselves. Finally, the design of the NJAP has allowed to define the different key stakeholders that should be targeted during the implementation of the NJAP to include them on the design process as well as on the validation of the content, the developed strategies, derived actions, and evaluation process.

Besides, the outputs of the project's deliverables allowed defining a series of recommendations and measures. These act as practical implementation ideas for the development of a strategy in the region to support the replication of NDOLLs approach for the

improvement of research-policy coordination between academia and private sector. In addition, these outputs are used in the elaboration of a series of actions under the framework of the established strategic priorities.

PRIORITIES OVERVIEW

The main aim of NEX-LABS at this stage is to assess the landscape for NDOLLs and perform scenarios evaluation through identifying and validating the external and internal factors within EU-MPC countries. This would support better planning and implementation of relevant policies that would facilitate the technological transfer and commercialization of research results. Country-based studies and initiatives were collected at the beginning of the work and assessed against relevant indicators. This step was essential for performing SWOT analysis along with the SOR and PESTLE analysis activities. Stakeholder matrix was developed and shall be updated throughout the lifetime of the project. Various techniques were used in this deliverable including focus group, interviews, brainstorming sessions, and a cross-sectional survey addressing a wide range of participants.

The analysis revealed common advantages and disadvantages existing in southern and northern EU-MPCs that were factors to facilitate or hinder the implementation of NDOLLs approach. These interconnections were realized because of the primary research and data collected prior commencement of SWOT, SOR and PESTLE analysis. The research focused on the following three main criteria of the studied countries:

- Current inclusive growth and support available in the country to achieve the primary target of NDOLLs implementation.
- General characteristics of the inclusive growth services & practices identified.
- Trends of the inclusive innovation process and the practices identified.
- Engaging with different EU-MPCs in discussions, interviews and focus groups solicited enhanced chances of surpassing roadblocks that previously confronted other countries during NDOLLs implementation phase. Discussions allowed better perception of benchmarked gaps and challenges and reflected an accurate depiction of countries' stages of transition to adopt the WEF nexus approach.

Knowing that southern MPCs recognize living labs as an emerging approach for WEF nexus strategies, it was observed that the northern MPCs unveiled significant expertise in the field of LLs and were considered a reference point, in this regard, that directed the analysis and recommendations generation. The maturity of LLs in northern partner countries was utilized throughout the analysis to formulate a framework that can quickly elevate the establishment of the LLs in the southern MPCs. This would enable countries to attain the LLs' goal of generating synergistic activities between different actors and key stakeholders in the ecosystem, and further extend the WEF NDOLLs approach to regions and potentially encompass neighboring countries.

Despite the differences that exist within the EU-MPC region, common factors were established as priorities. The set of priorities were at the center of focus groups discussions, led the interview questions, and were thoroughly tackled during the SWOT, SOR, and PESTLE analysis. All stages of the analysis, questions and discussions were tailored to each national context and culture, and a margin for adaptations was considered.

The complete summary of identified factors that may have a positive or negative impact at the Political, Economic, Social, Technological levels are represented in the figure next page. The benchmarked barriers were found to be in line with previous findings of NEX-LABS partners. The SWOT analysis done on EU-MPC found that weaknesses to implement NDOLLs, that reflect the ability to develop and sustain WEF nexus projects, reside in governance, Public-Private Partnerships platforms (PPPs), academia and industry collaboration. Another major impediment confronting the adoption of WEF nexus approach, establishing LLs, and ensuring their sustainability and advancement was the lack of expertise. In fact, Egypt and Italy showed low capacity to exploit research results into innovative products and services due to insufficient and not fully operational mechanisms that link private sectors with academia. Additionally, entrepreneurs and expertise were found to be few and least represented in Lebanon and Italy due to brain drainage and a demography that has an average age of 50 years, respectively. The main priorities tackled during the interviews and were identified as pioneers in the conducted analysis were found to be eight, the PPPs, Clusters, Human Resources, International and EU Funding, Intellectual Property Rights (IPR), Business and Technology Transfer, Strategies, and Database. Within pages 16 and 17, the identified priorities are listed and it is highlighted the definition of each one and points that guided their validation.

ACTIONS, RECOMMENDATIONS AND EXPECTED IMPACTS

After setting the priorities, specific and targeted recommendations were found imperative to outline the action plan that would ultimately generate an informed strategy, supporting the implementation of LLs and ensuring the success of the intended WEF nexus approach. As such, consecutive sessions with partners were organized that were diverse and ranged between virtual meetings and in person workshops that resembled the intended LLs. The MURAL, an interactive online platform, was used to host partners of these projects and experts in the field, engaging in discussions and fulfilling tasks required for the development of the NJAP. The MURAL incorporated a series of steps to be followed during various sessions. The tool built upon the recommendations from previous NEX-LABS activities, implementing measures to assess and prioritize the necessary actions. As such, over several meetings and focus group discussions, partners were able to assign several targeted actions for the pre-assigned recommendations, identify the timeline and impacts of the actions, assigned scores, and ranked the priorities, by that validating the determined priorities.

The objectives of these discussions were to encourage participants to reflect their expertise, open the space for sharing findings and knowledge, and limit any bias or misleading information during the synthesis of the action plan. Sessions started by developing sets of recommendations for each identified priority, and then listing specific actions that were critical to formulate the holistic framework of the action plan. In this context, an overview of the potential impacts at the short, medium, and long-term, that may be driven from a successful implementation phase of the listed actions, was delineated. The impact of actions was defined as the period required to initiate the envisioned outcome of this action. The following includes a culmination of the outputs that resulted from the NTFGs focus groups and PIPA sessions. This section entails the specific recommendations of each priority, the actions required to direct and accelerate implementation processes, impact term and outcomes, and corresponding KPIs.

Political diversity and a frail regional integration movement matching complexity of legislation and regulations	-P1	POLITICAL	P1+	Developing coherent national-regional policies for sustainable strategies for resources management
Lack of common policy/regulatory umbrella	-P2		P2+	Development of hybrid governance systems vs centralized or decentralized
Unsystematic evaluation and monitoring systems of S&T policies	-P3		P3+	INNO-EDU programs to sustain long-term success in innovation
Rigidity and bureaucracy of administrative mechanisms and processes together with significant overlaps in responsibilities	-P4		P4+	Management strategy policies coherent with the emerging need
Lack of an integrated approach and coordination structures at national	-P5		P5+	Extension of EU regulatory frameworks to refine and reinforce national policy stakeholders' approach
Political instability and regional conflicts	-P6		P6+	Research policy and strategic plans to consolidate innovation as the major driver for competitiveness and growth
Vague framework of institutional regulations prevents researchers' engagement and flexibility	-P7		P7+	Engaged actions dedicated to training, coaching and mentoring programs to strengthen business and managerial knowledge
Lack of financial resources/funding for R&I in the long term. Low involvement of private sector	-E1	ECONOMIC	E1+	New technologies and new markets to improve the application of new circular economy models
Limited access to finance that constrains availability of resources	-E2		E2+	Adequate funding to stimulate the industry academia cooperation and availability of trained personnel
Nature and weaknesses of socio-economic environment	-E3		E3+	Growing demand for loan availability to interest investors and lenders
Innovation and exploitation consulting costs are still perceived as barrier	-E4		E4+	Socio economic circumstances in the long term
Slow improvement towards innovation because of cost recovery or financial support	-E5		E5+	Strengthened regulatory framework must be promoted and enforced by national legislation
Inefficient use of resources and difficulties for new efficient technologies to enter the market	-E6		E6+	The role of social and solidarity economy to complement governmental incentives
Insufficient overall funding hindered by fragmentation and duplications	-E7		E7+	SMEs ecosystem to sustain aggregation forms
Lack of mechanism of financial support at local level	-E8			
Rigidities, distortions, mentality and different motivators for private sector and academia build barriers for knowledge sharing among stakeholders	-S1	SOCIAL	S1+	To decrease the lack of knowledge acquisition and reinforce the absorption and use of knowledge to surpass the limit of human development
Social awareness of the sustainable development pillars	-S2		S2+	Networking and exchanges of resources between R&D scientists across organizations
Social environmental factors, like culture, living index, crime level degrade the opportunities for collaboration	-S3		S3+	MPC Diaspora could establish effective long-term cooperation
Unavailability of qualified workforce with expertise due to inappropriate institutional management skills and lack of knowledge about open innovation, knowledge sharing	-S4		S4+	"Climate Change" is a cooperation and an ideal framework to promote intersectoral, regional and international cooperation
Consultation processes for the development of national and regional research and innovation strategies do not include civil society	-S5		S5+	Young age population structure provides the human capital for future growth and be a major driver for development.
Differences in visions, culture ethnic, political, and cultural limit collaboration	-S6		S6+	Increasing number of research actors to sustain the R&D
Actual critical mass limits research capacity	-S7		S7+	Unique ecosystem to valorize unique natural resources and take advantage of its untapped potential,
Lack of "focal points of contact", common vision and targets	-S8			
Mismatch between the technological output of the scientific/academic sector and the technological need of the productive sector	-T1	TECHNOLOGICAL	T1+	Need of cross-checking procedures for innovative technologies during the test on different scenarios
Lack of platforms/information system to link university-enterprise activities to formulate, plan, assess and transfer policies to the productive sector	-T2		T2+	High demand for improved availability of data, new efficient technology and innovation/improvements in infrastructure can facilitate interregional knowledge sharing
Lack of market vision and legislative lack of financial support and government support do not allow innovative developments to be properly implemented	-T3		T3+	Need for cluster cooperation/agreements/partnerships with foreign institutions for successful implementation of innovative technologies
Lack of IPR/trademarks knowledge and legal frameworks for technical / administrative mechanisms to help the owner ensuring IPR	-T4		T4+	Developing sustainable innovative technologies and concepts in resources saving/use efficiency/productivity and conservation
Insufficient innovative infrastructures/lack of equipment and maintenance	-T5		T5+	The role of incubators, development agencies, Technology to support the innovation development in the region
Restrictions remaining at the institutional framework, affecting the flow of human resources	-T6		T6+	To build an innovative framework environment in which technology transfer offices may transform ideas / concept into concrete innovations
Limited technological absorption capacity of industry due to disconnect between academia and business	-T7		T7+	Harmonization and integration efforts pave the way for collaborative implementation (e.g., -regional living labs concept)
Local level projects are scattered, and fragmented hampering the overall coordination and detection of complementarities	-T8		T8+	Incubators, development agencies and innovation support services as institutions to preserve the unique ecosystem
Technical perception of risk / value for technologies is different in MPC	-T9			
Legal harmonization for the short/mid-term hinders innovative products' penetration	-T10			

Figure 5. Identified positive and negative factors derived from the PESTEL analysis influencing the implementation of proposed priorities.

Public Private Partnerships

- The existing PPPs platforms, technology alliances, and engagement between different key actors.
- Mismatch between governmental strategies and private sector expectations for commercialization.
- Lack of capitalization of existing regional PPPs.
- Fragility of existing mechanisms to link industry and academia, and insufficient coordination measures between investment and economic agencies with science and technology agencies.
- The availability of programs that leverage resources and support the engagement of SMEs in R&D activities in cooperation with academia.
- Promotion of new products or infrastructure that tackle the WEF challenges to private energy investors.

Clusters

- Possibilities for the valorization of regional innovation and existing clusters.
- The insufficient diligence to create synergies/ partnerships / industrial platforms and/ or Clusters in manufacturing and product distribution chains.
- The present regional collaboration efforts, opportunities, expertise exchange, regional programs, and clustering around the nexus topic.
- The potential of developing national technology platforms and innovative business clusters.
- The lack of consolidated interactions and connections between existing WEF networks and communities.
- The existence of highly skilled networks within WEF NEXUS domain.

Intellectual Property Rights

- Availability of facilitations and application of intellectual property rights.
- Low degree of quality certification and unsatisfactory registration of patents and other forms of intellectual property protection for industrial design and further exploitation through licensing and production of new technology.
- The use of IPR policies in universities and research centers.

Technology transfer

- Agility of business type to market needs, and the transfer of research results into economic value chains.
- Adoption of innovative technologies to facilitate development of different sectors, particularly in rural areas that lack basic technological advancements.
- Obstacles impeding mitigation measures and technology transfer pace of progress that include, pandemics (COVID-19), and extreme weather conditions, especially in the agricultural sector and rural areas that are highly vulnerable to and affected by climate change.
- Lack of interest, commitment and incentives among farmers and local communities to adopt new technologies.
- Comprehensive capacity of farmers about sustainability issues of natural resources exploitation.
- New investment opportunities in renewable energy, transportation, and their improved integration into agro-food sectors.
- Ability of LLs to provide feedback, implying an ameliorated incentive system and better incorporation of developed products/technologies,.
- Excessive dependence on imports and adopting high production cost processes.
- The effect of national political and security stability on research, innovation performance, and fluctuation in world market prices.

Human resources

- Capitalization of skilled human resources, scientific young researchers, and experts abroad with scientific and industrial expertise.
- Legislations that allow hiring highly skilled personnel in governmental positions.
- The gap between human resources/skills and the market demand.
- Loss of expertise due to brain drainages, migration of local talents, experts, and companies.
- The availability of exchange programs, missions abroad, and SMEs.

Funding

- Methods of EU funding utilization and capitalization of existing schemes tailored for NEXUS domains.
- The ease of access to EU funding as approaches to address WEF challenges.
- Routine research administration and its effect on institutional competitiveness in the international funding programs.

Strategies

- Lack of benchmarking concepts, research parameters and interoperability standards, and evidence based strategic planning.
- Available landscape management measures for adaptation with growing demand and reduce pressure on natural resources. This includes inefficient management of agricultural yield utilization, lack of preventive measures for future shortcoming and population growth, lack of disaster risk management plans, and loss of biodiversity due to urbanization and extension of investments lands.
- Fragmentation of national funding of scientific research.
- Lack of coordination measures among public innovation support organizations.
- Absence of stringent standards and lack of policies stimulating and encouraging innovation and clean-tech incentives; absence of a clear and proper classification/ranking criteria for SMEs.
- The presence of a robust evaluation and monitoring framework for diverse funding schemes, which in turn results in solid economic and technological ramifications.
- Low number of effective mechanisms for empowering and engaging young scholars and SMEs owners in policy planning.
- Political support in establishing living labs, think tanks, science parks, and new science cities. This is evident by fragile policies with unclear incentives to encourage researchers and investors.

Database

- The available technological advancements and infrastructure, and equity in distribution of equipment and devices among innovators and researchers.
- Lack of multidisciplinary databases, and shared data.

P1 PPPs Platforms

RECOMMENDATIONS

- Allow an increased engagement of existing PPPs and technology alliances.
- Achieve support and coherence between existing regional PPPs.
- Strengthen current relationships through capitalization of activities.

ACTIONS

- Lead PPPs platforms to train committed successors.
- Consolidate existing platforms for more focus and functionality.
- Incentivize consortia.
- Consolidate scattered PPPs initiatives and success stories.
- Map PPPs and establishing visibility and outreach strategies.

OUTCOMES

- Hospitable environment for replication of PPPs platforms.
- Consortia that would enhance the effectiveness of PPPs platforms, and ensure the sustainability of existing ones.

ASSOCIATED KPIs

- The capacity for cross-regional mobility. Facilitate flow of academics, researchers, and scientists between countries in joint cross-regional PPP (public/private/partnerships), as mobility restriction hinders participatory and inclusive cooperation.
- Availability of effective cluster cooperation, agreements, and partnership to increase knowledge sharing with foreign institutions and OLL networks (e.g., ENOLLs).

P2 Clusters

RECOMMENDATIONS

- Enlarge the valorization of regional innovation and existing clusters.
- Develop national technology platforms, expanding business clusters.
- Connect WEF networks.

ACTIONS

- Detect good practices and replicate developed strategies and mechanisms.
- Achieve connection, engagement and learning from pioneer clusters.
- Improve and upgrade existing practices (non-successful ones).
- Expand European Network of Living Labs (ENOLLs) antenna in southern region.
- Organize periodic workshops for MPC NDOLLs for clustering and networking.
- Assign people of expertise that are dedicated to formulating these clusters.
- Support skill development .
- Participate in COST actions research network that brings researchers and innovators together to investigate topics for a specific period.
- Create supportive platforms.
- Maintain an active role from funding frameworks for clustering of projects.
- Develop specialized calls for clustering and building on existing projects.

OUTCOMES

- Strategies for clusters formulation.
- Calls and funding for clustering.
- Sustainability of clusters.

ASSOCIATED KPIs

- Availability of effective cluster cooperation, agreements, and partnership to increase knowledge sharing with foreign institutions and OLL networks (e.g., ENOLLs).
- Conservation of resources. Sustainable innovative technologies and concepts in conservation of resources should be successfully demonstrated through the NDOLLs (saving/use and efficiency/productivity).
- Established ecosystem frameworks for innovation management. Foster the conversion of ideas into concepts, products, or services which will decrease the knowledge gap and reinforce the absorption and use of knowledge that surpasses the limit of human development.
- Deliverables and sustainable practices in the MPC context. Support Nexus-driven research which can translated into deliverables, as well as increase know-how, infrastructure, and manpower through collaboration with clustering partners.

P3 Human resources

RECOMMENDATIONS

- Favor missions abroad for scientists, academics, and SMEs to stay updated.
- Leverage young researchers and experts abroad with high scientific capabilities and industrial experience.
- Direct efforts towards limiting brain drains, and migration of local talents, experts, and companies, and meeting gaps between skills and market demand.

ACTIONS

- Reintegrating specific calls for talents management, exploiting, and connecting with existing NDOLLs
- Involving master studies in clusters management
- Diffusing and spreading ENOLL trainings.
- Acquiring funding opportunities to create the seeds of a cluster of NDOLL managers, support installment, and attract diaspora.
- Capitalizing funds for research and innovation that equip researchers to achieve their maximum capacities (e.g., Marie Skłodowska-Curie Actions (MSCA) possibilities, etc.)
- Creating supportive ecosystems for the development of innovation/ policies/ gaining access to infrastructure
- Promoting collaborative programs for Research-to Business-to Research missions among cluster managers
- Opening chambers of commerce periodic missions to academia
- Ensuring data availability and accessibility to support SMEs and researchers.
- Human Resources should implement and organize various workshops to acquire and disseminate knowledge about NDOLLs.

OUTCOMES

- Strategies for clusters formulation.
- Calls and funding for clustering.
- Sustainability of clusters.

ASSOCIATED KPIs

- Policies that incentivize individual involvement from different stakeholders. Government should enact consolidated policy changes that help increase joint initiatives between the private sector and individuals from different stakeholders to face industrial applied innovations and WEF NEXUS challenges using the NDOLLs ecosystem.
- The capacity for cross-regional mobility. Facilitate flow of academics, researchers, and scientists between countries in joint cross-regional PPP (public/private/partnerships), as mobility restriction hinders participatory and inclusive cooperation.
- Availability of effective cluster cooperation, agreements, and partnership to increase knowledge sharing with foreign institutions and OLL networks (e.g., ENOLLs).


TEAM
CONCEPT
TARGET
IDEA
CREATIVE

P4 Funding

RECOMMENDATIONS

- Redirecting, diversigy and capitalizing existing funding.
- Utilizing EU funding for WEF challenges.

ACTIONS

- Capitalizing funding to enhance the replication of NDOLLs and promote further partnerships.
- Upgrading and promoting professional project managers' careers
- Boosting funds through second capitalization phase to all funded projects
- Increasing coordination and capitalization calls
- Ensuring sustainability of NDOLLs after the end of projects
- Expanding capacity building processes and widening the scope of work to include initiatives, researchers, think tanks, and key actors in the field of WEF sectors.
- Establishing Experienced National Contact Points (NCPs)
- Clustering through Widening instrument
- Participating in Excellence Hubs to increase chances of collaboration and exposure.
- Develop a strong communication strategy to enhance the reputation of Living Labs and attract funds.

OUTCOMES

- Increase in funding resources.
- Multidisciplinary projects, clusters, and Hubs.

ASSOCIATED KPIs

- The focus on research and innovation ecosystems targeting WEF NEXUS priorities. Optimize public resources implementation by coordinating between sectoral strategies, national research priorities, and smart specialization strategies at the government levels.
- Additional, viable, and sustainable EU and MPC funding. Allow relevant stakeholders access to applications, supported by a massive and wide promotion to capitalize the NDOLLs opportunities.
- Effective dissemination of WEF Nexus projects and NDOLLs results. Success stories and best practices are widely disseminated to a network of national and regional stakeholders, multipliers, media, etc.

P5 Intellectual property rights

RECOMMENDATIONS

- Augmenting the utilization of IPR in universities and research centers.
- Supporting the availability of communication strategies and dissemination channels.

ACTIONS

- Identifying the right people in each "channel" and create a list of contacts to keep updated.
- Gathering best practices from other institutions.
- Raising awareness: It is essential to educate researchers and faculty members about the importance of IPR policies and their benefits. This can be achieved through workshops, training sessions, and informative materials.
- Working closely with press and journalists.
- Recruiting skilled community managers in institutions.
- Incentivizing researchers: Offering incentives to researchers who commercialize their innovations can encourage them to take advantage of IPR policies. This can include royalties, bonuses, or other financial rewards.
- Developing action plans aligned with policies to enlarge IPR.
- Amplifying outreach of successful case studies.
- Encouraging collaboration between researchers, industries, and investors.
- Organizing training workshops on IPR advantages for universities and research centers.
- Facilitating the process of IPR acquisition and reducing paperwork or procedures., Through standardization, developing and implementing standard operating procedures for the protection and commercialization of IPR.
- Developing solid policy frameworks that thrust for tested and validated IPR policies.

OUTCOMES

- Policy frameworks for IPR acquisition.
- Improved collaboration between researchers, industries, and investors.
- Engagement of skilled personnel and community managers.

ASSOCIATED KPIs

- Policies that incentivize collaboration between stakeholders and funding institutes in WEF NEXUS challenges. National legislation (e.g., development of hybrid governance systems) should direct efforts towards strengthening the regulatory framework which encourages skilled human resources and dedicated institutional strategies and achieves win-win joint ventures within stakeholders.
- Policies that incentivize individual involvement from different stakeholders. Government should enact consolidated policy changes that help increase joint initiatives between private sector and individuals to face industrial applied innovations and WEF NEXUS challenges using the NDOLLs ecosystem.
- Established ecosystem frameworks for innovation management. Foster the conversion of ideas into concepts, products, or services which will decrease the knowledge gap and reinforce the absorption and use of knowledge that surpasses the limit of human development.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P6 Business & Technology transfer

RECOMMENDATIONS

- Motivating local communities to adopt and commit to new technologies.
- Investing in renewable energy and transportation, and integration within the agri-food sectors.
- Using feedback to enhance the integration of products/technologies within WEF sectors and optimize the incentive system.

ACTIONS

- Providing periodic trainings and introductory workshops on emerging technologies, like Service-Oriented Architecture technologies, sensors, drones, data analytics and AI, to researchers and local communities.
- Organizing periodic missions to explain opportunities, and guiding end users on potential vouchers to employ at NDOLLS.
- Testing technologies in NDOLLS open days and engaging in organized brokerage activities.
- Networking with farmers who have successfully adopted new technologies to provide a inspiring community.
- Providing farmers with technical assistance to overcome challenges faced when adopting new technologies through partnerships with agribusinesses, extension services, and research institutions.
- Providing demonstrations and trial opportunities to view new technologies and show the benefits of new technologies
- Providing incentives (subsidies or tax breaks) for adopting new technologies, motivating farmers to take the leap. Governments provide financial assistance (grants and loans) to help farmers purchase or upgrade existing infrastructure.
- Marketing and presenting technologies in NDOLLs or events hosting investors.
- Organizing periodic outreach networking events that include investment prizes.
- Workshops on dedicated societal challenges on HEU and other programs.
- Promoting local sourcing of food as an attempt to reduce transportation costs and emissions, while supporting local farmers.
- Capitalizing success stories of NDOLLs as catalyst tools.

OUTCOMES

- Missions and workshops to explain opportunities, and guiding end users on potential vouchers to employ at NDOLLs.
- Incorporation of innovative technologies in NDOLLs and WEF projects.

ASSOCIATED KPIs

- Yearly reports or policy briefs published regarding the implementation progress of the NEXUS Joint Action Plan. This supports the assessment of the proposed strategy and corresponding priorities, reinforces the legitimacy of all the strategic processes, and motivates the continuous participation of stakeholders.
- The focus on research and innovation ecosystems targeting WEF NEXUS priorities. Optimize public resources implementation by coordinating between sectoral strategies, national research priorities, and smart specialization strategies at the government levels.

P7 Strategies

RECOMMENDATIONS

- Increasing the effective mechanisms for empowering and engaging young scholars and SMEs owners in policy planning.
- Enhancing political support for establishing scientific Hubs.
- Foster trust among all the stakeholders of the NDOLLs.

ACTIONS

- Capitalizing relevant youth success for visibility and replication.
- Dedicating calls and funds for youth.
- Forcing a dedicated say for youth in policy setting.
- Establishing regional smart specialization strategies addressing WEF Nexus.
- Organizing competitions or rankings among NDOLLS.
- Engaging policy makers in outreach practices.
- Periodic specific LLs open days just for politics.
- Replicating and stocktaking communities and practices that were found successful.
- Encourage and capitalize on success stories.
- Implement a thorough follow-up process to gain a deep understanding of innovations generated within Living Labs.
- Ensure inclusivity by allowing all age categories (students, youth, younger generation) to benefit from the Living Lab, thereby expanding stakeholder engagement.

OUTCOMES

- Valorized youth success through improved outreach and visibility.
- Replicated success stories and a sustainable policy maker an stakeholders engagement.

ASSOCIATED KPIs

- The focus on research and innovation ecosystems targeting WEF NEXUS priorities. Optimize public resources implementation by coordinating between sectoral strategies, national research priorities, and smart specialization strategies at the government levels.
- The number of replicated NDOLLs at a regional level. The implementation of the living labs concept should solicit collaborative implementation and cross-checking of innovative technologies testing, under different scenarios.

P8 Database

RECOMMENDATIONS

- Distributing infrastructure and equipment among research centers and universities.
- Intensifying multidisciplinary databases.

ACTIONS

- Mapping and disseminating findings to limit duplications.
- Establishing central repository per region not country.
- Dedicating teams for knowledge transfer and succession.
- Gathering of private investments.
- Providing periodic funding calls for equipment upgrade according to identified strategies policies.
- Ensure the database is regularly updated and accessible to all stakeholders.
- Clearly explain the data and provide recommendations and analyses based on the information.

OUTCOMES

- Accessible multidisciplinary central databases.

ASSOCIATED KPIs

- The capacity for cross-regional mobility. Facilitate flow of academics, researchers, and scientists between countries in joint cross-regional PPP (public/private/partnerships), as mobility restriction hinders participatory and inclusive cooperation.
- Availability of effective cluster cooperation, agreements, and partnership to increase knowledge sharing with foreign institutions and OLL networks (e.g., ENOLLs).

STRATEGIC ORIENTATION AND PRIORITIZATION

To lay the foundation for the way forward, discussions sessions were held to prioritize the recommendations, and lead the path towards a successful implementation and replication of NDOLLs. A set of criteria was developed to represent the issues relevant to the appraisal of the options. Such criteria had to verify the relevance of the actions to the vision and proposed priorities. The criteria related to the effectiveness to address future NEXUS challenges through the proposed NDOLLs replication, the importance of the challenges being addressed, the market potentials, relevance for policy making, sustainability criteria, feasibility. In this sense, the criteria selected by for the process of prioritisation were as follows:

1. Value of the strategic recommendation: How valuable is the strategic priority in contributing to facing future NEXUS challenges in the region?
2. Effectiveness of the proposed recommendation: How effective are the proposed recommendation is in achieving strategic priorities?
3. Importance of the proposed recommendation: How important are the proposed recommendations in the replication of NDOLLS to address future NEXUS challenges?
4. Contribution of the proposed recommendation to innovation: Do the proposed recommendations improve the innovative capacity of NDOLLS replication across the MPC regions?
5. Feasibility of the proposed recommendation: How feasible are the proposed recommendations?

Partners ranked the recommendations based on five criteria defined earlier. Scores were then designated based on the knowledge and background of experts and researchers in the WEF nexus field, and LLs management. Scores 1,2,3, and 4 were respectively assigned to indicate that the proposed activity does not meet the criteria, poorly meets the criteria, meets much of the criteria, or fully meets the criteria.

Figure 5 below elucidates the performance of recommendations in terms of the identified criteria, accordingly, distributing their corresponding priorities based on the total scores. In terms of value, Clusters, Human Resources, and Technology Transfer, recorded the highest scores. The assigned recommendations, enlarging the valorization of regional innovation and existing clusters, developing national technology platforms, expanding business clusters, and connecting WEF networks, were found of highest value for achieving the intended cluster priority. This indicates that the identified recommendations are more valuable for the cluster priority in facing the WEF Nexus challenges in the region. The situation in terms of effectiveness mimicked that of the value criteria. Clusters and Human Resources priorities equally achieved the highest parity in scores, while Technology Transfer followed closely in ranking. Valorizing regional innovation clusters, developing national technology platforms, connecting WEF networks, leveraging young researchers and experts abroad, and limiting brain drainages, were found to be of utmost effectiveness in addressing the Clusters and Human resources priorities. Regarding the importance of the assigned recommendation in achieving the priority, Clusters also ranked first in this criterion, while others were found to have approximately equal scores,

indicating similar importance in replicating NDOLLs. Findings of the contribution criterion was also in line with the other scores, where recommendations for Clusters were found to be the highest followed by Technology Transfer and Human Resources. Considering the feasibility criteria, the scores indicate that all the identified recommendations are approximately equal in terms of the ease of implementation, and capacity to translate theoretical findings into practice. This is primarily attributed to the countries' socioeconomic situation, readiness to absorb and effectively pursue previous successful experiences, political stability, vulnerability to climate change, and cooperation of policy makers and stakeholders.

As such, the assigned criteria favored the recommendations realized for establishing the clusters priority as the first to be addressed and implemented. This would facilitate and accelerate efforts to achieve the NDOLLs, ensure their replication, establish WEF nexus, and accordingly foster a hospitable environment pivotal for the sustainability of WEF projects and outputs.

The latter was reflected in the ranking of priorities showcased in figure below. It indicates that the scores assigned to each priority as per the criteria identified. The priorities were ranked by all partners and experts in the following consecutive order, clusters, human resources, technology transfer, funding, PPPs, database, IPR, and strategies. The priorities were ranked based on their total scores of criteria, with the one having the highest total ranked first, and the one with the least total positioned last. The findings were found to be realistic and aligned with the timeline and projections of the actions assigned previously for each recommendation. In this context, the first three priorities, Clusters, Human Resources and Technology Transfer, should be realized as primary pillars to be tackled at earlier stages. These are sought to be observed as building blocks for the implementation of NDOLLs in any country, creating a concrete foundation for the WEF nexus. On top of that, addressing funding, platforms, databases, property rights and strategies, would then establish a holistic approach that ensures the replication of existing initiatives and living labs, and enhances their efficiency and extension.

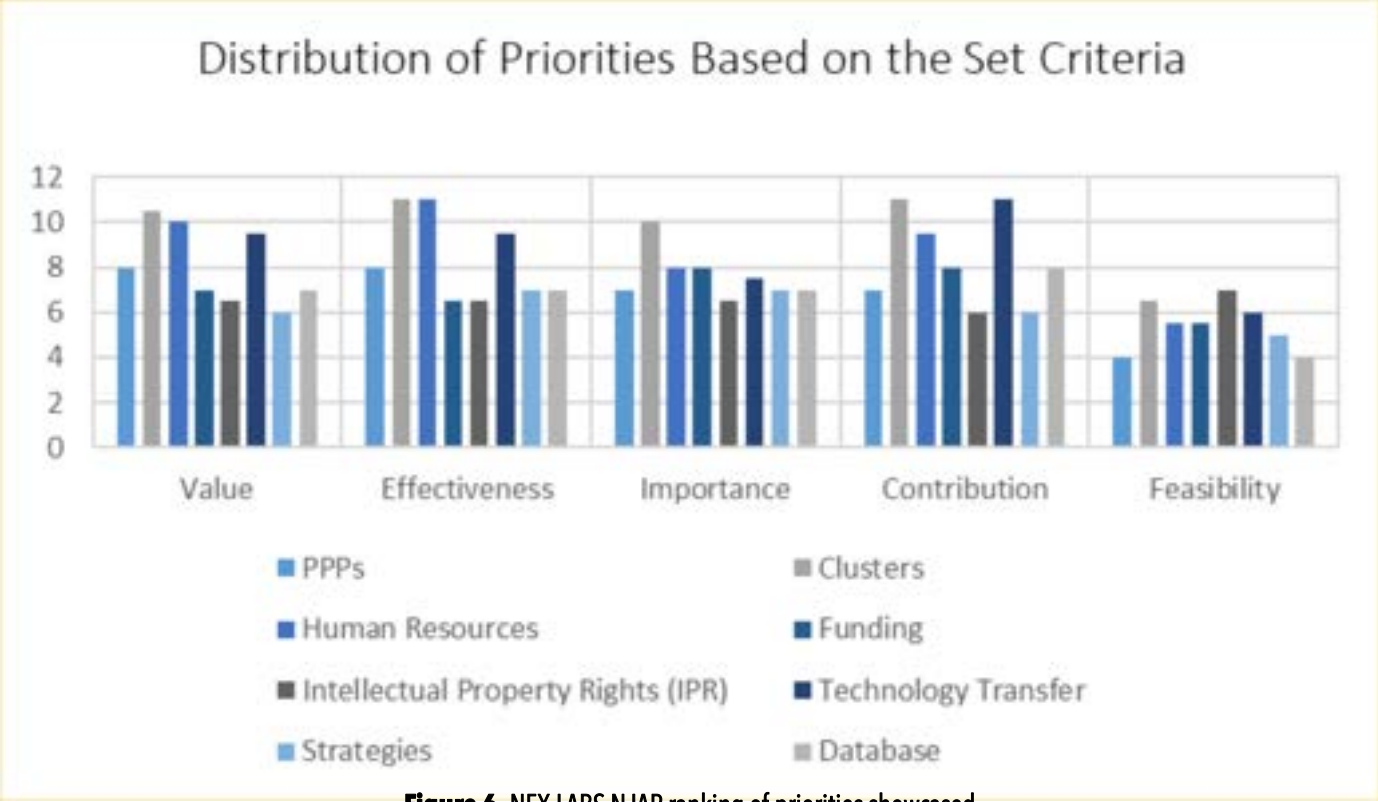


Figure 6. NEX-LABS NJAP ranking of priorities showcased

PRIORITIES	RECOMMENDATIONS	VALUE	EFFECTIVENESS
PPS	Increase engagement of existing public private partnerships and technology alliances	4	4
	Support and strengthen the existing regional PPPs	4	4
CLUSTERS	Enlarge the valorization of regional innovation and existing clusters	3	3
	Develop national technology platforms and innovate business clusters	3.5	4
	Connect WEF networks	4	4
HUMMAN RESOURCES	Favor missions abroad for scientists, academics, and SMEs to stay updated	3	3
	Leverage young researchers and experts abroad with high scientific capabilities and industrial experience	3	4
	Limit brain drains, and migration of local talents, experts, and companies	4	4
FUNDING	Redirect and capitalize existing funding	3	3
	Utilize EU funding for WEF Challenges	4	3.5
INTELLECTUAL PROPERTY RIGHTS	Increase the utilization of IPR in universities and research centers	2.5	3
	Support the availability of communication and dissemination channels	4	3.5
TECHNOLOGY TRANSFER	Motivate farmers and local communities to adopt and commit to new technologies	2.5	2.5
	Invest in renewable energy and transportation, and integrate within the agricultural and agri-food sectors	4	3
	Use feedback to enhance the incorporation of products/technologies and optimize the incentive system	3	4
STRATEGIES	Increase the effective mechanisms for empowering and engaging young scholars and SMEs owners in policy planning	3	3
	Enhance political support for establishing scientific hubs	3	4
DATABASE	Distribute infrastructure and equipment among research centers and universities	3	3
	Create and intensify multidisciplinary databases	4	4

IMPORTANCE	CONTRIBUTION	FEASIBILITY	TOTAL RECOMMENDATION	TOTAL PRIORITY	RANK
3	4	1	16	34	5TH
4	3	3	18		
2.5	4	2	14.5	49	1ST
3.5	3	2	16		
4	4	2.5	18.5		
2	3.5	2	13.5	44	2ND
3	3	2	15		
3	3	1.5	15.5		
4	4	3	17	35	4TH
4	4	2.5	18		
3	3	3	14.5	32,5	7TH
3.5	3	4	18		
1.5	3	1	10.5	43,5	3RD
2.5	4	2.5	16		
3.5	4	2.5	17		
4	4	4	18	31	8TH
3	2	1	13		
3	4	1.5	14.5	31	6TH
4	4	2.5	18.5		

FLOW OF RECOMMENDATIONS & TIMELINE

The implementation of the ranked actions in a timeframe strategic process and outlook is often a key for success in politics. In this regard, the timescales involved for the NJAP implementation will be very different depending on each country's economic situation, political strategies and priorities, administrative tools to allocate funding, evolution of the research systems, research activities themselves, or the delay between knowledge creation and their impacts in the socio-economic life. As depicted in next figure, partners, researchers, and experts in the WEF fields and NDOLLs management developed a timeline for the identified recommendations, upon several focus group discussion sessions.

The translation of detected societal and political priorities into scientific and innovation programs to support NDOLLs approach replication is mostly discussed yearly, depending on the always-moving scientific frontier and the countries' available average skills. Therefore, the positioning of the proposed recommended priorities and actions in a long-term strategic process with a clear outlook is required as a key for success in politics implementation. Knowing that the actions previously identified to accomplish the recommendations and priorities vary in terms of implementation years, figure 6 reflects the overall timeline for each general recommendation.

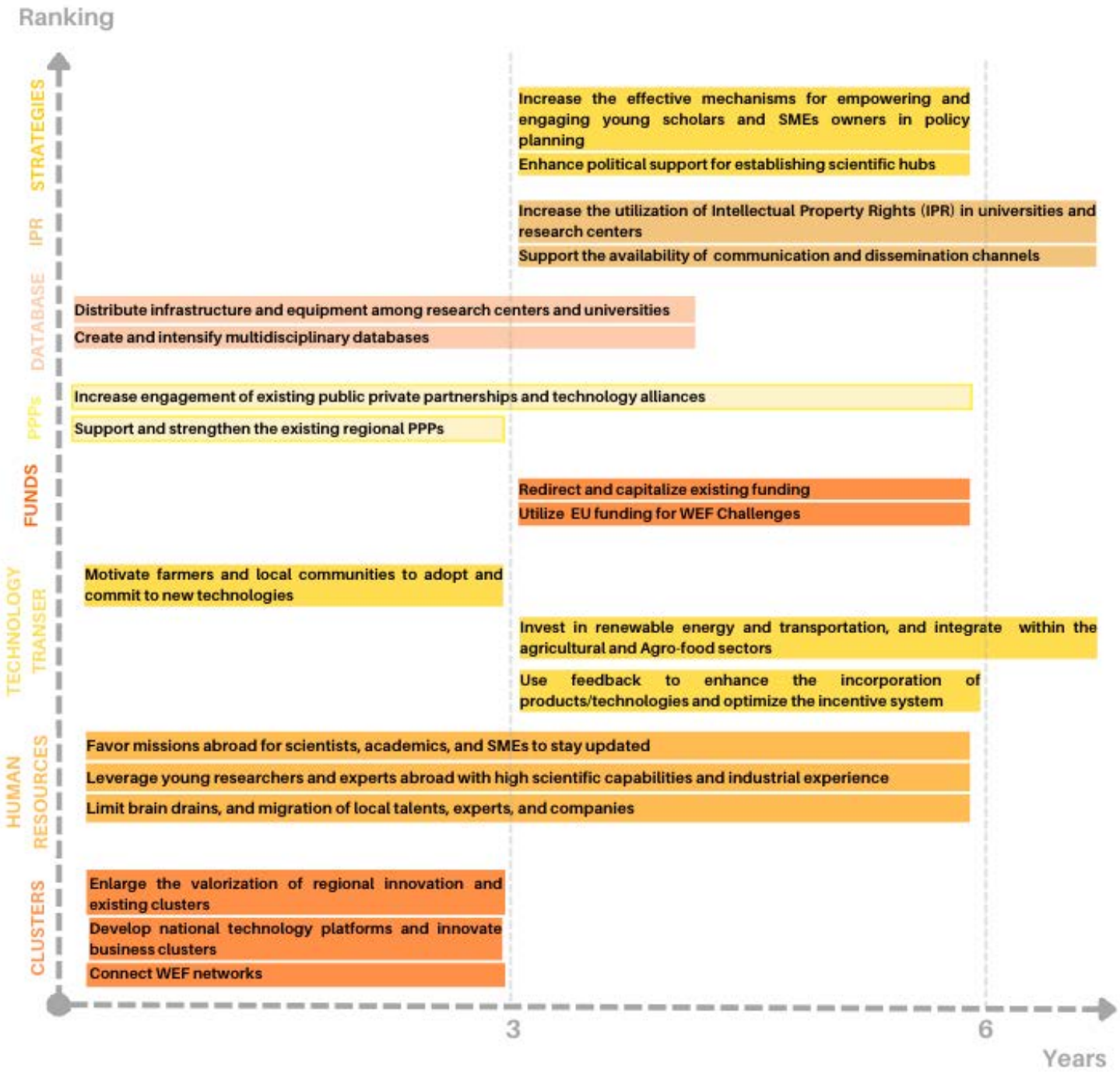


Figure 7. NEX-LABS NJAP proposed timeline for priorities and recommendations implementation.

KEY PERFORMANCE INDICATORS

Yearly reports or policy briefs published regarding the implementation progress of the NEXUS Joint Action Plan. This supports the assessment of the proposed strategy and corresponding priorities, reinforces the legitimacy of all the strategic processes, and motivates the continuous participation of stakeholders. These reports should assess the strategy towards a set of pre-defined KPIs.

Policies that incentivize collaboration between stakeholders and funding institutes in WEF NEXUS challenges. National legislation (e.g., development of hybrid governance systems) should direct efforts towards strengthening the regulatory framework which encourages skilled human resources and dedicated institutional strategies and achieves win-win joint ventures within stakeholders.

The focus on research and innovation ecosystems targeting WEF NEXUS priorities. Optimize public resources implementation by coordinating between sectoral strategies, national research priorities, and smart specialization strategies at the government levels.

Policies that incentivize individual involvement from different stakeholders. Government should enact consolidated policy changes that help increase joint initiatives between the private sector and individuals from different stakeholders to face industrial applied innovations and WEF NEXUS challenges using the NDOLLs ecosystem.

The capacity for cross-regional mobility. Facilitate flow of academics, researchers, and scientists between countries in joint cross-regional PPP (public/private/ partnerships), as mobility restriction hinders participatory and inclusive cooperation.

Availability of effective cluster cooperation, agreements, and partnership to increase knowledge sharing with foreign institutions and OLL networks (e.g., ENOLLs)**.**

Conservation of resources. Sustainable innovative technologies and concepts in conservation of resources should be successfully demonstrated through the NDOLLs (saving/use and efficiency/ productivity).

Deliverables and sustainable practices in the MPC context. Support Nexus-driven research which can translated into deliverables, as well as increase know-how, infrastructure, and manpower through collaboration with clustering partners.

The number of replicated NDOLLs at a regional level. The implementation of the living labs concept should solicit collaborative implementation and cross-checking of innovative technologies testing, under different scenarios.

Established ecosystem frameworks for innovation management. Foster the conversion of ideas into concepts, products, or services which will decrease the knowledge gap and reinforce the absorption and use of knowledge that surpasses the limit of human development.

Effective dissemination of WEF Nexus projects and NDOLLs results. Success stories and best practices are widely disseminated to a network of national and regional stakeholders, multipliers, media, etc.

The sustainability and impact level of implemented WEF projects, and collaborations between actors through WEF pillars and indices.

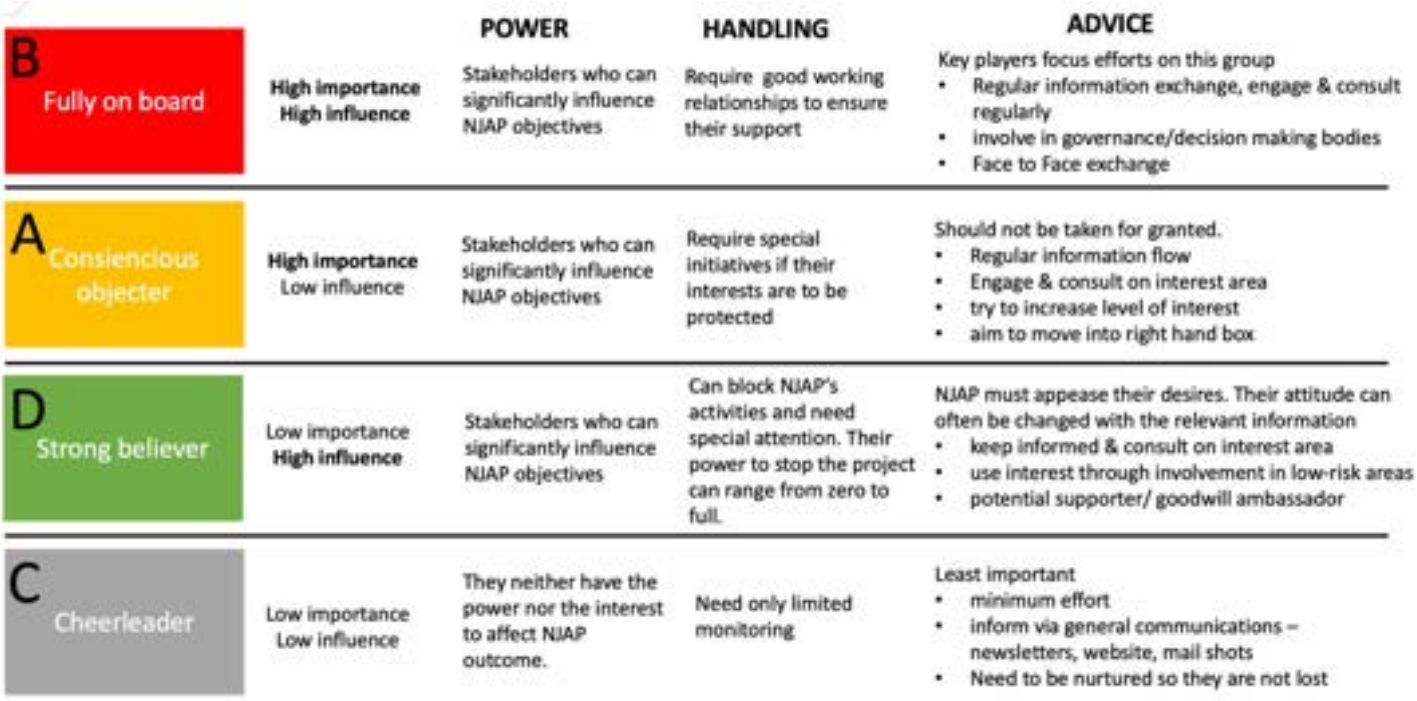
TARGET STAKEHOLDERS

As a result of the analysis of the gathered information, it was possible to identify key stakeholders that should be targeted during the implementation of the NJAP and include them through the checking and validation of the content of the developed strategies, derived actions, impacts and external factors. An extensive list of stakeholders found in different EU-MPCs is summarized in Annex 1. The validation was addressed through different opportunities including public events, interviews, and formal exchange of information. The suggested stakeholders included:

An effective tool for prioritizing stakeholder groups is Mendelow's matrix (figure below). This system analyses stakeholders according to 2 main characteristics: their interest in the NJAP and their influence on the NJAP outcomes. As a result, 4 different priority groups will emerge: (B) Key stakeholder; (D) Influencer; (A) Interested stakeholder; and (C) Passive stakeholder. The key stakeholders are individuals with high interest and high influence. Influencers are those who have low interest but high influence. The two remaining groups are the interested (high interest/ low influence) and passive stakeholders (low interest/low influence). Once the stakeholders have been categorized into priority groups, the matrix enables the definition of the purpose and the degree of the interaction with each stakeholder group. Special attention must be paid to those individuals who belong to the first 2 groups.

The categorization of the identified stakeholders has provided NEX-LABS enough information to properly define the future actions to be launched for their engagement according within the NJAP to the importance to succeed on their engagement and the stakeholders

Policy makers responsible for EU and MPC cooperation addressing NEXUS challenges.	National and Regional Agencies in charge of resources management.	Trade Unions, end users' associations, Chambers of Commerce, or Industry.
Intermediary organizations providing innovation support services and innovation clusters.	Media providers and monitoring observatories.	Major sponsors active in the region to successfully implement solutions addressed to mitigate NEXUS challenges.
Non-governmental institutions.	Scientific communities at EU and MPC, includingresearch centers, science parks and universities addressing NEXUS challenges.	Entrepreneurs, associations, foundations.



		POWER	HANDLING	ADVICE
B Fully on board	**High importance High influence**	Stakeholders who can significantly influence NJAP objectives	Require good working relationships to ensure their support	Key players focus efforts on this group • Regular information exchange, engage & consult regularly • involve in governance/decision making bodies • Face to Face exchange
A Consiencious objecter	**High importance** Low influence	Stakeholders who can significantly influence NJAP objectives	Require special initiatives if their interests are to be protected	Should not be taken for granted. • Regular information flow • Engage & consult on interest area • try to increase level of interest • aim to move into right hand box
D Strong believer	Low importance **High influence**	Stakeholders who can significantly influence NJAP objectives	Can block NJAP's activities and need special attention. Their power to stop the project can range from zero to full.	NJAP must appease their desires. Their attitude can often be changed with the relevant information • keep informed & consult on interest area • use interest through involvement in low-risk areas • potential supporter/ goodwill ambassador
C Cheerleader	Low importance Low influence	They neither have the power nor the interest to affect NJAP outcome.	Need only limited monitoring	Least important • minimum effort • inform via general communications – newsletters, website, mail shots • Need to be nurtured so they are not lost

level of commitment to the future project actions, according to the following figure. Stakeholder of the Boxes A, B and D belongs to those stakeholders who can significantly influence NJAP objectives and therefore should have high priority. Stakeholders of box C are only of low priority because they neither have the power nor the interest to affect NJAP outcome. Besides, for each of the categories, the definition of the stakeholders' power, the suggestion for their handling and the advice for their engagement is provided within following figures.

For such categorization it was required to proceed with a series of evaluations for each type of stakeholder' category to ensure suitable matching. The Stakeholder Influence Grid proposed by Dragan Milosevic is a matrix map of the stakeholder's level of commitment against the importance of their support. Such matrix is intended to facilitate the categorization process. In a stakeholder attitude and knowledge map, also known as a stakeholder knowledge base chart, the knowledge, and attitudes of stakeholders for a given project is visually mapped out. In this sense it can be classified as:

- Cheerleader: Neither important nor committed (neutral)
- Unaware: These stakeholders are unaware of the project and its potential impacts on them.
- Resistant: These stakeholders are aware of the project but are opposed to it.
- Neutral: These stakeholders are neither for nor against the project.
- Supportive: These stakeholders are in favor of the project and want it to succeed.
- Leading: These stakeholders are actively engaged in ensuring the project's success.

A series of stakeholders were assigned, as per the context of partner countries, to tackle the priorities essential to implement NDOLLs and facilitate processes. The following criteria were taken onto account while assigning the stakeholders:

B: Key stakeholders (fully on-board) having high influence and high importance.

Objective: To collaborate and manage this group. Engage at the earliest possibility. Continuous communication built by sending project updates, consulting their opinions, inviting them to events, etc.

A: Interested stakeholders (conscious objective) having Low influence but high importance.

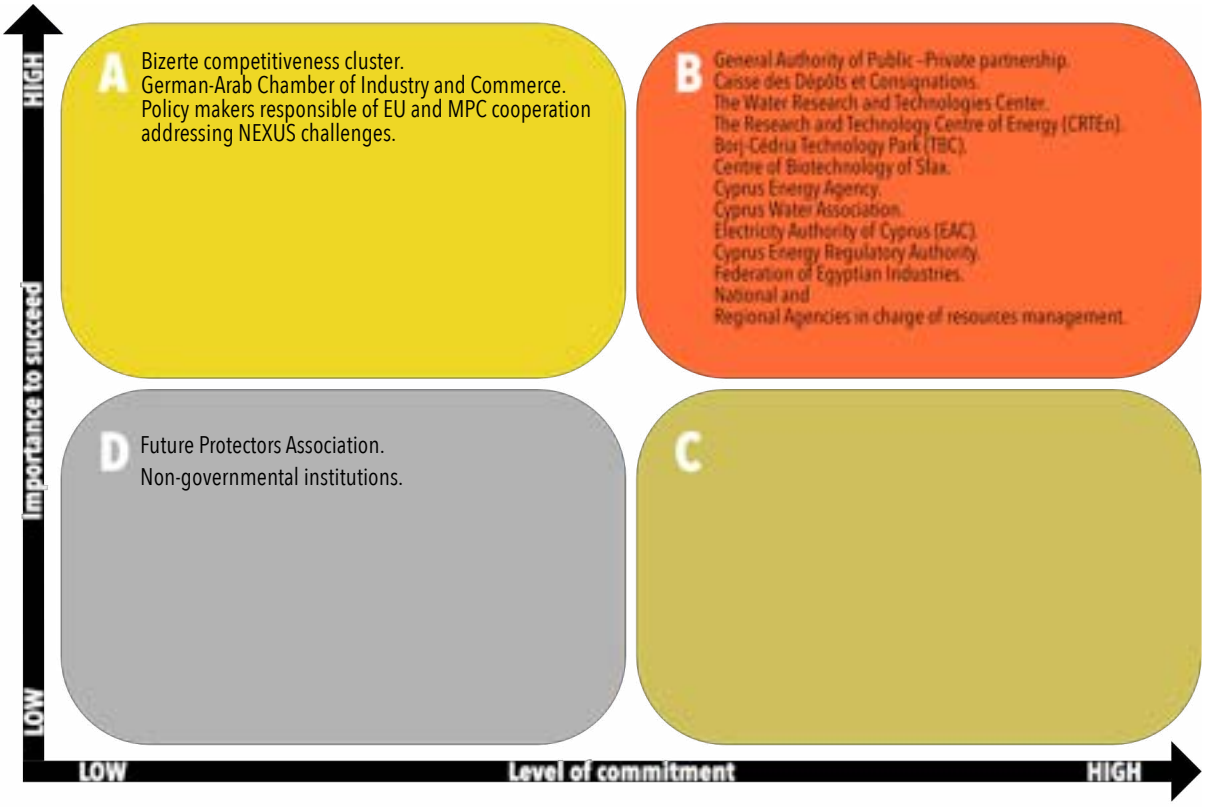
Objective: To keep this group informed. Continuous communication to inform them about project progress, actions, and results. Potential consultation regarding areas of stakeholder interest (especially regarding specific questions or uncertainties that NEX-LABS faces).

D: Influencers (Strong believe) having high influence but low importance.

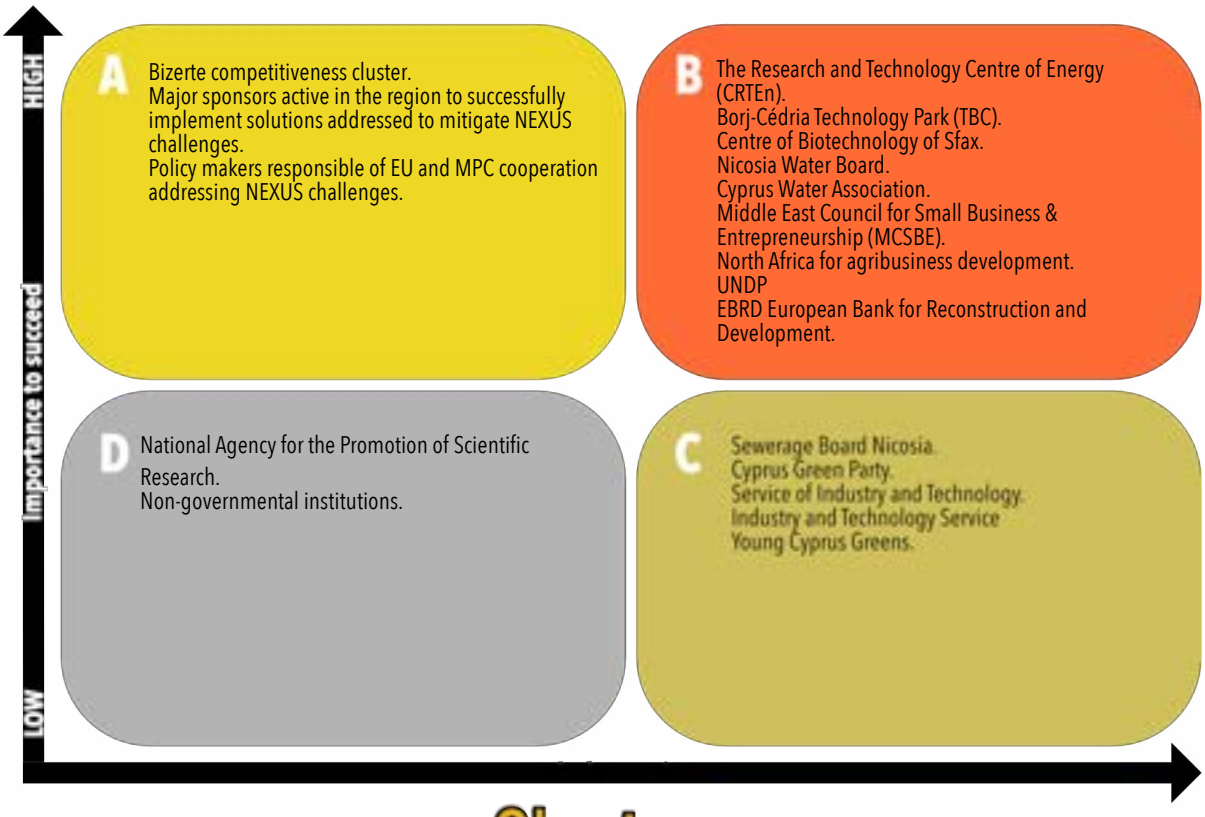
Objective: To keep this group's needs satisfied. Efforts need to be made to ensure that they are key stakeholders. Communication actions stressing NEX-LABS's benefits and raising curiosity.

C: Passive stakeholders (cheerleaders) having low influence and low importance.

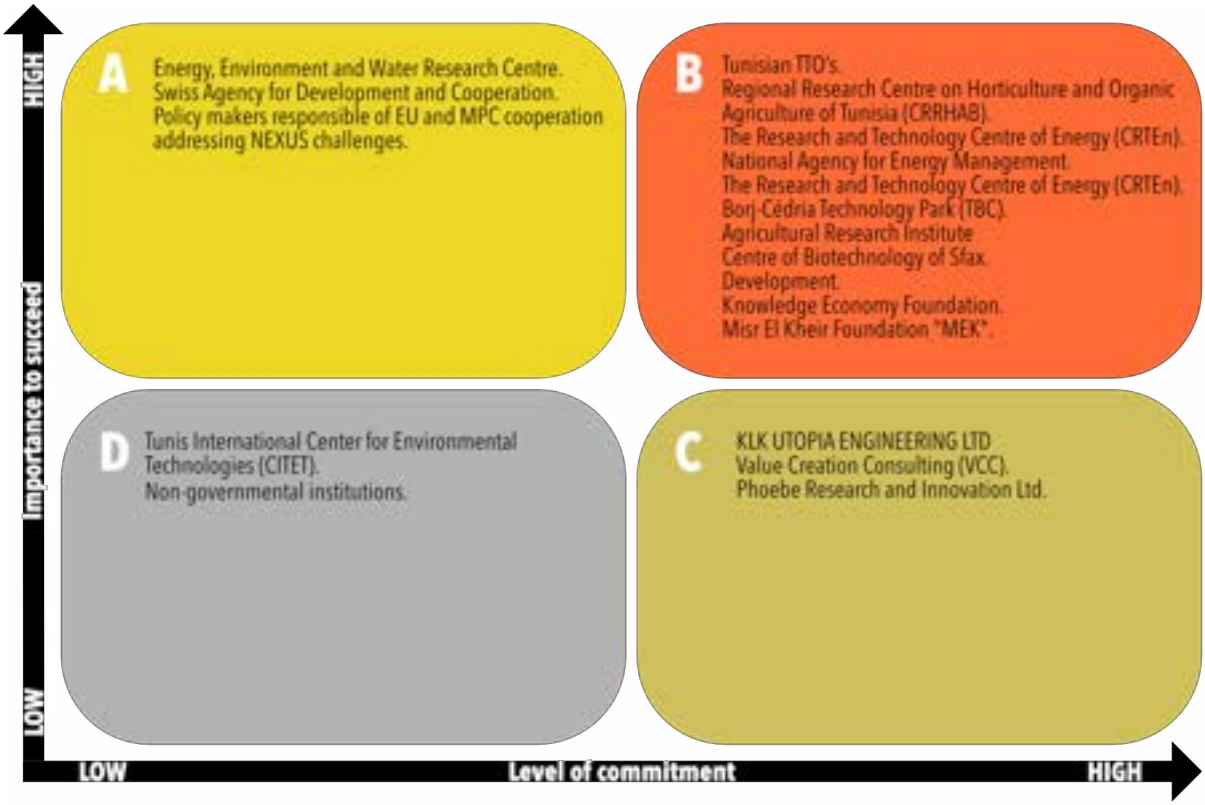
Objective: To monitor this group with minimum effort. No specific actions need to be taken to address this group. Might be informed through general communication actions of NEX-LABS (e.g., website, newsletter).



Public Private Partnerships

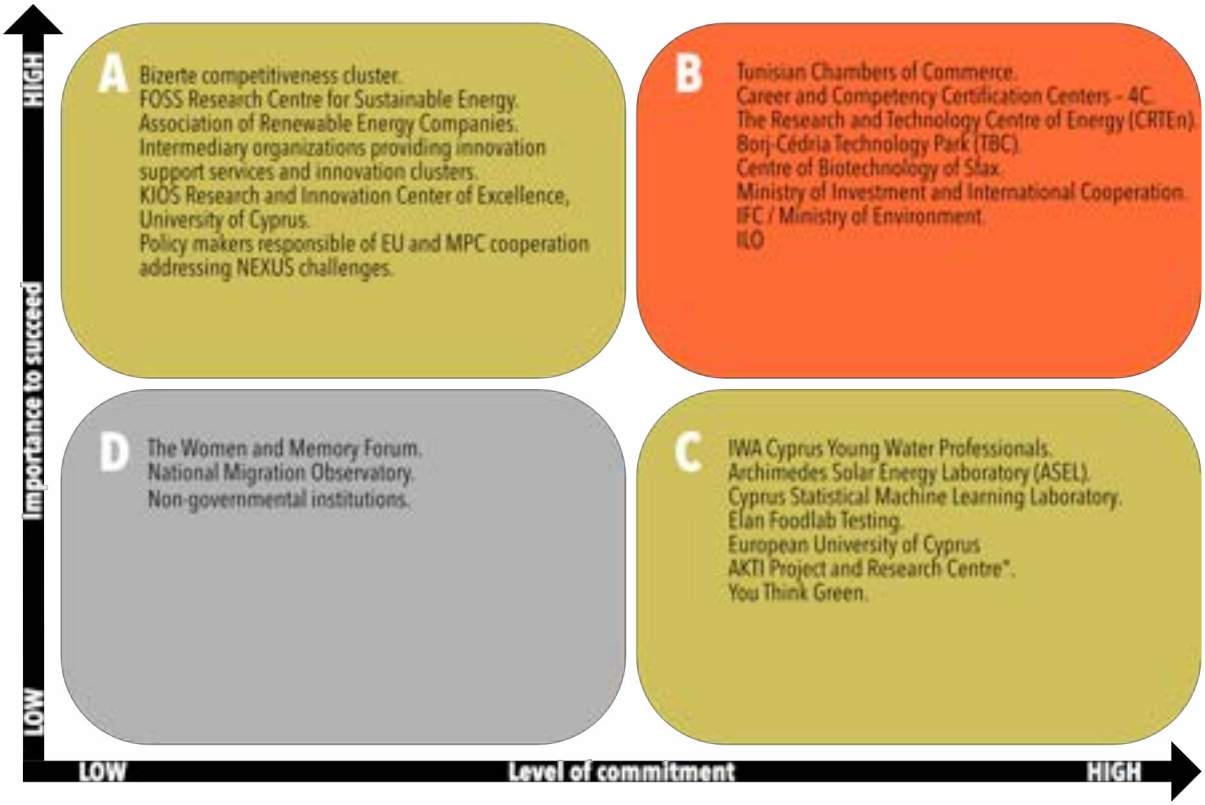


Clusters

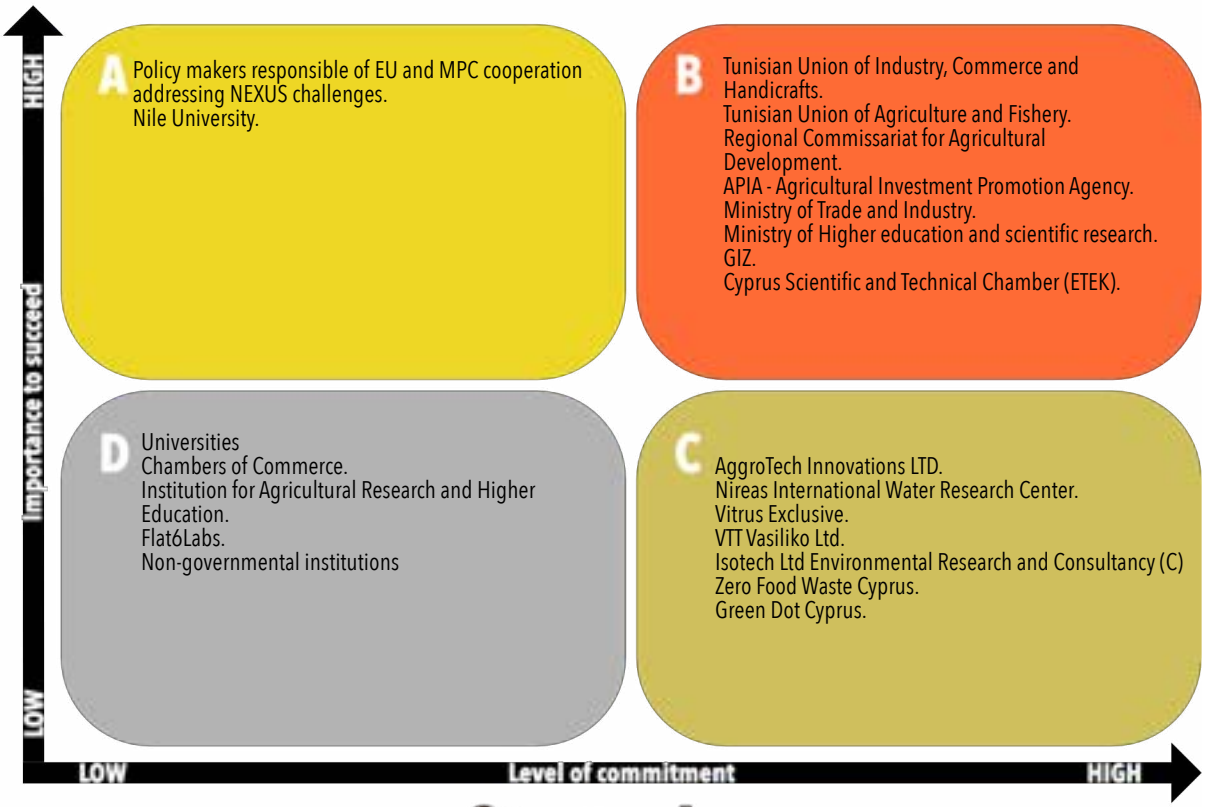


Technology transfer

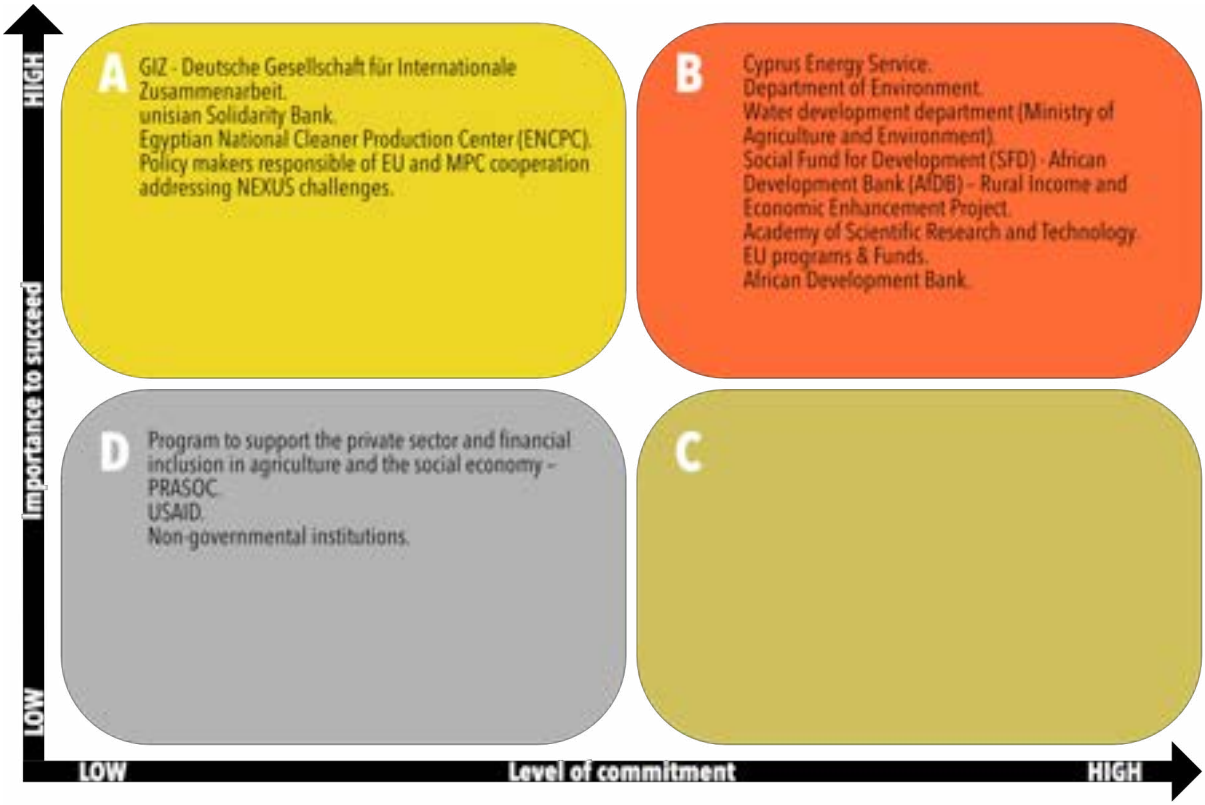
Intellectual Property Rights



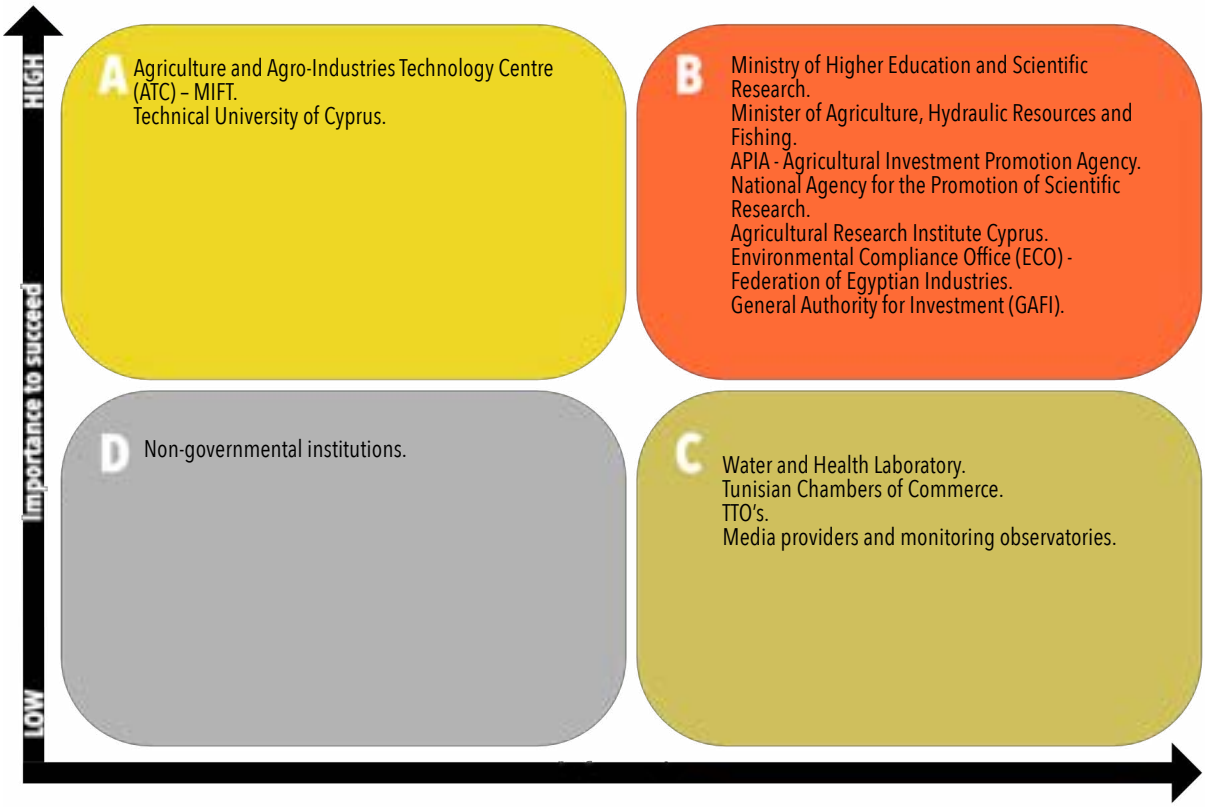
Human resources



Strategies



Funding



Database

EXTERNAL FACTORS HINDERING THE IMPLEMENTATION

As a result of the different sources of information gathered so far by the activities developed under NEX-LABs, a series of potential factors were defined that may hinder the feasible implementation of the previously summarized strategic priorities. Such external factors are summarized below.

POLICY & GOVERNANCE

- The continuous political changes or inter-ministerial competitions induce the corresponding budget cuts or program changes and effective implementation of medium-, long-term planned strategies.
- Mismatch in government priorities that do not seek to reduce and remove regional disparities in economic and social well-being due to the actual economic situation; therefore, reducing willingness to develop supportive and inclusive mechanisms to engage all the value chain stakeholders of the Nexus value chain.
- The opportunity to consolidate regional efforts, to address Nexus challenges, and to respond to international cooperation as a region is not taken by MPC's. Excellence centers are mainly focusing on local or national needs addressing a single research focus (water or energy or food) preventing international cooperation that address Nexus challenges.
- Lack of the necessary development for follow-up and evaluation through evidence-based tools (indicators, bibliometrics) that brings the ministries from an everyday-life management level to a strategic pilot level when managing the recommended priorities and actions.
- The volatility of research budgets due to unstable political and economic situation of the countries in the region.

LEGISLATION & REGULATIONS

- Legislation that endangers the knowledge transfer and distribution of IPR, that hinders the intensity of interactions between researchers and non-academic institutions, thus, increasing the collaboration with the private sector.
- Institutional regulations and governance that induce a lack of alignment with existing or newly developed funding programs. The latter hinders accessing conditions to institutions in MPCs, thus ensuring long-term sustainability.

RESEARCH & INNOVATION

- MPC research performance is not improved along with the reduced opportunities for researchers. This would therefore be counterproductive to deal with Nexus challenges.
- The clustering approach is not enough for the appropriate implementation to scales of the required living labs that achieves a macro-regional strategy as efficient as possible.
- EU and MPC did not stimulate young people to embark on a research career, reducing future employability and chances of promotion.
- The issue of brain drains and the diaspora of MPC researchers is considered impossible to be solved by MPC actors.
- Fragmentation of research and innovation system (PASRI Report)

TECHNOLOGY TRANSFER

- Lack of real engagement of human resources at the TTOs linked to NDOLLs.
- The provisioned incentives to academics discourage the establishment of a competitive environment for invention, commercialization, or implementation of supportive knowledge transfer instruments.
- False established procedures through TTOs for the valorization of IPR discourages researchers, to commercialize innovations and increases the costs of transactions.
- The low absorption capacity of the industrial sector and the cognitive distance between the research community and industry are too high, especially if the limited size of the countries is taken into consideration.
- In addition to the different culture and focus, national companies are not interested in resource management, S&T and innovation addressing Nexus challenges. Such cultural roadblocks result in infrequent interaction and overlook the understanding of what the involved stakeholders could share.

COMMUNICATION

- Difficulties are found in communication, based on the availability and free flow of information between organizations and disciplines, at and between the local, national, and international levels.
- Lack of communication and coordination between involved policy stakeholders, key functionaries at different ministries and agencies.
- Political instability and regional conflicts may endanger the implementation of governmental priorities and capitalize regional efforts.

DISSEMINATION PLAN

This section specifically presents a plan for disseminating and/or valorizing the NJAP. It is coordinated with the principles of the NEX-LABs dissemination activities and dissemination plan. The overall goal of dissemination for the NJAP is to support the impact of the NJAP and NEX-LABs in general. The sub goals are to:

1. Raise awareness of the NJAP in Nexus stakeholder groups (c.f. target groups below).
2. Support implementation of actions.

The responsibility for the communication during the NEX-LABs is with the consortium as planned in the project dissemination plan. The final responsibility for dissemination is with the project coordinator. However, as the NJAP is a document that is meant to continue as a platform for collaboration for the Nexus ecosystem in the EU-MPC region, communication is passed to a post-NEX-LABs collaboration and other projects capitalization.

The NEX-LABs partners and later the post-NEX-LABs collaborators share a responsibility for dissemination of the NJAP to their own stakeholders through their networks, especially in their own regions. However, international appearances should be coordinated to avoid unnecessary competition on presentation slots and enable stronger unified message delivery.

The principles for communicating the NJAP include tailoring the delivery of the message to the audience and situation. The NJAP is delivered in this report as a one-size-fits-all solution. However, to support the implementation of the NJAP, the message needs to be tailored for the audience in terms of their interests, knowledge and, as far as possible, personal style of decision making. The key to effective presentation is adapting the substantive content to the knowledge level of the audience as well as the emotive content to suit the situation and 'room temperature'. Another aspect of tailoring the presentation to an audience is choosing who delivers the message to which audience.

In the context of NJAP, the NEX-LABs partners as industry associations and policy stakeholders are a natural choice to mediate and facilitate. However, especially when it comes to legitimizing the NJAP and the associated goals, policy stakeholders and leading figures delivering the address are much more effective than industry association workers. The following questions should be considered when preparing:

1. What does the audience know?
2. Why are they in the room?
3. Predispositions about your topic?
4. What are they feeling, what do you want them to feel?
5. What are their values and cultural background?
6. How can you help your audience to reach their goals?
7. Who should be talking?

Personal tailoring is possible in practice only on one-to-one or small group meetings. For larger audiences and presentations, tailoring the content becomes more difficult and the question becomes whether the presentation should be addressed to a generic or average person in the room, or if there is a possibility to identify the key decision makers who are expected to attend the presentation and address their decision-making style.

To target the message for audiences, it is important to identify gate keepers and decision makers in the audience and deliver the message to their needs. In personal communication and small groups, it is important to recognize that decision makers have a different preference in terms of risk taking, facts and emotive content. Thus, it is important to recognize that different techniques are needed to target a range of audiences. For risk-averse decision makers, providing examples and analogies of successful leaders that have made similar decisions in the past, paves the way for charismatic decision makers. A lucrative and emotive pitch is the key, especially for analytical decision makers, solid facts and a good business case makes all the difference.

The delivered message ought to be relatable to the audience. In the context of the NJAP, there are two generic messages. First, is the content of the NJAP, including the individual actions and the overall rationale and 'story'. This message is aimed to persuade stakeholders to commit to the actions to advance NDOLLS replication and the general goals. This message can take two generic forms, either bottom up from the actions and their rationale that contributes to the bigger picture, or top down from commitment to the general goals and drawing the link to the actions and their contribution. This message of 'selling' the NJAP to the stakeholders is expected to be prevalent in the immediate term after the launch.

Second, is the message of the success stories of NEX-LABs through e.g. NTFGs derived actions and specifically NJAP-related activities. This message is aimed to reinforce commitment to the NJAP goals and actions, and the identification of Nexus stakeholders' ecosystem in general. The generic form of the message is disseminating projects and other activities that are related to, inspired by, or implementing the NJAP and specifically mentioning the NEX-LABs in NJAP as a part of that message. Delivering this message, creates a virtuous cycle by letting the stakeholders know that the NJAP is a portfolio that moves on and contributes to the Nexus involved penta- helix. It is expected that this second message will be more prevalent when the NJAP implementation starts taking off. The last general principle is integrating the communication to NEX-LABs partners' and later post-NEX-LABs collaborators' activities. First, insofar as the NJAP is a common portfolio of RDI for the Nexus UBC, it should be integrated as a core program by the partners. Additionally, especially during post-NEX-LABs collaboration, integrating the NJAP communication to the mainline of the activities makes it more sustainable as it eliminates the burden of addressing the NJAP separately.

TARGET GROUPS

As discussed in the introduction section, the main audiences of the NJAP include following the penta-helix logic include the following ones:

Citizens and civil society associations Dissemination to a non-specialized audience aims at enhancing awareness of NEX-LABs outputs as well as relevant environmental issues related to the main Nexus opportunities. Targeting this group will be an important activity that raises awareness of environmental and sustainability issues, communicates obstacles and solutions in EU and MPC, highlights the associated technical, health and economic issues, and the urgent need for society and governments to address sustainability problems.

Regional, EU and MPC media
Facilitates project's diffusion through TV, radio and internet, local, regional, and national newspapers and other printed media, and presenting main project developments to different audiences.

International scientific and innovators communities
Researchers active in the fields of water, energy, and agriculture in the EU and MPC regions (public and private research actors including universities, research centers, R&D units in private companies) in charge of developing clean, efficient, and sustainable water, energy and agriculture technologies, in order to inform on relevant knowledge developed by the research centers involved in the project, partners' networks and contacts that can be exploited by the civil society.

Technology parks, incubators, technology brokers; private investors, business innovators
Intermediary business support originations including risk capital organizations and networks (venture capitals and business angels' associations) .

Industrial actors as well as representatives of entrepreneurial stakeholders
In water, energy, and agriculture technologies management. Companies who have an interest in environmental-friendly water, energy, and agriculture technologies. This includes government bodies or agencies responsible of water, energy, and agriculture management. Based on the CDP, the Communication Panel will integrate Nexus approach opportunities to the detected problems in EU and MPC region.

Associations and Networks
Defined as stakeholders who could benefit from NEX-LABs' outcomes, such as Non-Governmental Organization, trade unions, professional engineering associations, regional chambers of commerce, business associations, relevant funding institutions who invest in water/energy/agriculture technologies and business incubation centers for new early-stage businesses and SMEs (e.g., European Federation of Waste Management and Environmental Services).

Project groups of past and on-going project, including INCO projects' representatives and other R2I projects Including EU and MPC networks active in the NEX-LABs target sectors. Concerning INCO and other R2I projects in the same field in MPC, target audiences to reinforce the S&T dialogue with target Mediterranean Partner Countries. Other transnational consortia at EU and MPC levels working in the selected fields will also be the target of the NEX-LABs CDP, some of which we already have contacts and collaborations.

Members of the main technological platforms concerned Such as EU technology platforms' representatives e.g. the European Agency for Energy Security, European Technology and Innovation Platform on Renewable Heating and Cooling, the European Photovoltaic Technology and Innovation Platform, European Wind Energy Technology and Innovation Platform and the European Technology and Innovation Platform for the Electricity Networks of the Future, Hydrogen & Fuel Cells Joint Undertaking, Water Supply and Sanitation Technology Platform (WSSTP), EIP on water, EIP Raw Materials, EIP on Agricultural Sustainability, etc.)

Policy makers and governmental bodies (including Ministry of Research of the countries taking part of the project) EU and MPC Public authorities such as national, local, and municipal authorities as well as governmental departments for water, energy and agriculture involved in the development of RTD and innovation strategies and policies.

Ambassador Representative of the countries taking part to the project and their scientific counsellor and the EU delegation.

COMMUNICATION CHANNELS AND MEDIA

The specific targets for communication are that the NJAP under NEX-LABs and post- NEX-LABs collaboration should be mentioned at least once in a major trade show. The NJAP in general should feature in all regional Nexus and WEF magazines at least once a year and all NJAP actions should be disseminated either in Nexus and WEF magazines or conferences at least once. NJAP should be mentioned when relevant in other communication the partners do in daily and periodical newspapers and magazines.
All communication should identify the NEX-LABs and the NJAP. Also, to make full use of the internet and search engines, all communication should include consistent keywords Nexus, WEF, NEX-LABs and Joint Action Plan in speech or writing. All communications should be linked to and/or cached to the NEX-LABs website and linked to other websites and blogs, as well as (searchable) social media posts that include the keywords.


OTBET

CONCLUSION

The action plan culminates the activities that are sought to be conducted regarding the implementation of NDOLLs approach. It has been formulated because of extensive research, focus group discussions, interviews, and analytical methodologies that extended throughout the duration of this project. The NJAP serves as a comprehensive roadmap to guide countries towards adopting the emerging WEF nexus approach. It is intended to pave the way for a smooth deployment of formulated recommendations, and an expedited implementation of LLs that embrace the WEF nexus.

Numerous workshops, events, LLs application trials, and voucher programs have been organized under the umbrella of NEX-LABs. This had a pivotal role in displaying the dire need to adopt the emerging WEF nexus approach. The steps followed allowed a wide engagement of different stakeholders, investors, and entrepreneurs, nurturing an enabling environment that reflects the essential synergies between experts and investors for the sake of developing WEF projects. This, in turn, responds to the crippling threat posed by anthropogenic activities, exhaustive consumption of resources, and drainage of human resources. It also paves the way for collaboration towards combatting the onset of climate change effects through developing adaptive and preparedness strategies and introducing technological and innovative advancements.

Moving forward, it is vital that the achieved milestone is upgraded further and escalated to new horizons. This entails empowering partnerships between key stakeholders and research or academic entities, within the public and private sectors, and expanding the outreach of awareness programs that present the benefits of the emerging WEF nexus NDOLLs approach. Also, it is critical to ensure the sustainability of existing funds and thrive towards attracting new opportunities that would preserve expertise and adopt latest technologies. Monitoring and evaluation processes, especially through the listed KPIs, are also essential to ensure the effectiveness of this project and are factors that would assess the implementation progress of NDOLLs in different contexts. The established NJAP along with the KPIs serve as a feedback mechanism that paves the way for identifying existing gaps, adjusting the action plan to specifically target the required recommendation to move forward, and accordingly elicit the intended objectives of the WEF project. As such, the NDOLLs approach is set to be a tool that would accelerate the chances of implementing sustainable WEF projects, unlocking multiple economic, social, and environmental advantages

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NEX-LABS

NEXUS DRIVEN OPEN LIVING LABS JOINT ACTON PLAN

B_A_2.1_0124. NEXUS-DRIVEN OPEN LABS FOR COMPETITIVE AND INCLUSIVE GROWTH IN THE MEDITERRANEAN. (NEX-LABS)

The NEX-LABS project is developed thanks to the financial support of the European Union under the ENI CBC Mediterranean Sea Basin Programme (www.enicbcmed.eu). With a total budget of €3.450.984,97, the project has received a contribution of €3.105.866,47 (90%). The contents are sole responsibility of NEX-LABs consortium and under no circumstances be regarded as reflecting the position of the European Union of the Programme management structures.