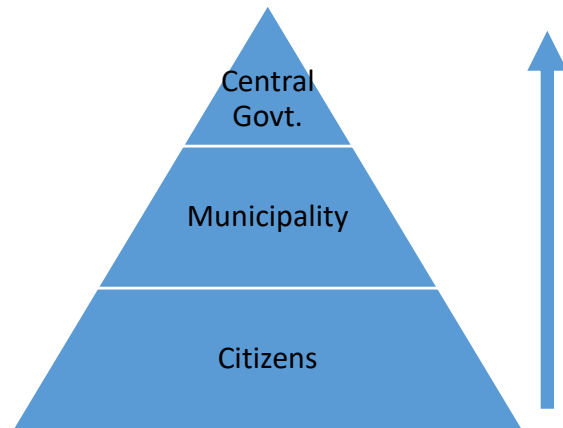


APPLYING NEXUS IN MUNICIPALITIES - MINARET RESPONSE PLAN

Purpose of Project

The MENA Region Initiative as a Model of NEXUS Approach and Renewable Energy Technologies (MINARET) aims to come out with a NEXUS model that can be applied at municipal level in the MENA region countries.

It is the **first Project in the region** that utilizes a nexus approach to find sustainable solutions to the unique water, energy and food security challenges that face each of the countries from a local municipal level. Stakeholders from all around the region discuss and plan together how to overcome the increasing constraints their countries and the region faces through fundamentally rethinking how we produce and consume energy in relation to the water and food sectors.



Finally, **on an international scale**, the Project timely and exciting and is drawing the attention of experts, stakeholders and decision makers worldwide. This is because it tackles many of the world's priority challenges (the Project addresses six of the UN Sustainable Development Goals:



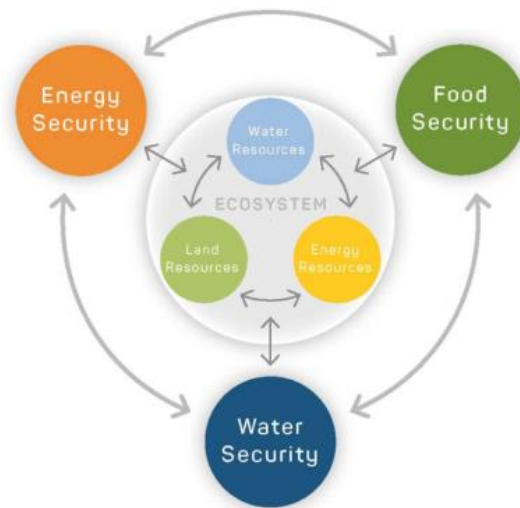
Defining NEXUS

The definition, purpose and guiding principles of NEXUS outlined below are derived from the series of meetings held by the Project team, desktop research and the Input Paper presented by Prof. Holger Hoff on the MINARET Project.

According to the Input Paper prepared by Prof. Hoff, while there are numerous interpretations and definitions of “the NEXUS”, a key common **core principle of the term NEXUS** is derived from its Latin meaning: “**interlinkages**”. NEXUS hence is “*a set of context-specific critical interlinkages between two or more natural resources used as inputs into systems providing essential services to humans, such as water, energy, and food*”.

The Input Paper proposes that the **purpose behind using a NEXUS approach** is always, at every level, about better management of scarce resources through the integrated management of these resources including water, energy, land, and natural resources in general for the purpose of increasing the overall benefits retrieved from the resources.

Figure 1 illustrates schematically these interlinkages between the natural resources and the dependence of human (water, energy and food) securities on these resources and their interlinkages.



From the core principle of NEXUS as interlinkages, a few other **guiding sub-principles** emerge:

- 1) **NEXUS is inherently present in the relationship between water, energy and food. It does not need to be created; it needs to be observed and optimized.** In other words, we do not need to “create” the link between those resources in NEXUS. Rather we need to recognize the links and make decisions that optimize the production and consumption of each natural resource. Water, energy and food are deeply intertwined and interconnected. The production of one requires the consumption of the other(s) and vice versa. As examples:

- Tremendous amounts of water are used in the generation of both electricity and liquid fuel – even oil requires [40](#) liters of [water for every liter of oil produced](#).

- Water-free sources of energy like photovoltaics and wind power still require large amounts of water in their manufacturing phase.

- 2) **Water, energy and food enter into almost every sector of the economy and every segment of consumption. Therefore, defining and implementing “Water, Energy, and Food NEXUS” must not be limited to these three sectors.** According to Prof. Hoff, NEXUS emphasizes synergies and co-benefits, aiming at reducing the negative externalities and negotiating tradeoffs. As such, NEXUS must not be strictly interpreted as Water-Food-Energy only, but it can be extended to all relevant dimensions and critical interlinkages in the respective context.

Natural resources encompass energy, water, land, minerals and biodiversity as well as natural capital or ecosystems and their services. Depending on the respective context, there are different critical interlinkages between some or all of these resources that need to be addressed in management and governance, for improved water-, energy- and food-security. The nexus approach also provides an innovative response to the challenges of climate change, by enabling better integration of the typically rather separate climate adaptation and mitigation measures.

- 3) Since these natural resources are interconnected and since they are vitally present in every other economic sector, then **collective thinking about, planning and management of these resources is required to optimize their production, consumption.** According to Prof. Hoff, the interlinkages in the NEXUS occur “horizontally” as well as “vertically”:

- a. Horizontally: across sectors, disciplines, resources and human securities;
- b. Vertically: across levels and scales (i.e. between the local, municipal, governorate and national levels).

- 4) **NEXUS is not an end in and of itself. It is rather an approach, a tool, a means to an end.** Hoff proposes that the aim of NEXUS is to improve resource management and governance, and with that resource use efficiency, for improved livelihoods and development, at reduced resource use and reduced environmental pressures (“more with less” or “decoupling” as in the Green Economy”. **Therefore, at every instance when using NEXUS, success is measured by its ability to: observe and optimize interlinkages between resources for the purposes of:**

- a. **Achieving resource use efficiency**
- b. **Supporting in the achievements of SDGs**

- 5) NEXUS is not about utilizing and/or maximizing all three in every case necessarily; **NEXUS is rather about understanding the key priorities of the region / country / municipality and then applying NEXUS thinking and finding solution(s) that ensures that these “priorities” are met.**

- 6) NEXUS is about observing and optimizing interlinkages through collective thinking about, planning and management of resources based on key priorities to achieve resource use efficiency and support the achievements of SDGs; therefore, and through this Project, we will study Energy, Food & Water

based on the identified needs and opportunities within each country, municipality and community, and yet **expand the definition of NEXUS to include other resources within an “eco-system approach”** and within a holistic response plan. As such it could mean that we **provide support in areas other than Energy, Water & Food which are necessary for the Pilot Projects and Socio-economic Projects to succeed.**

- 7) As an approach, NEXUS is a new and different way of thinking and working than the traditional / conventional approaches and paradigms which focus on specialization within silos. **NEXUS requires innovation and “thinking out of the box”.**
- 8) According to Prof. Hoff, **NEXUS as a tool is an analytical tool. It provides concrete & scientific evidence for improved policy & decision making**

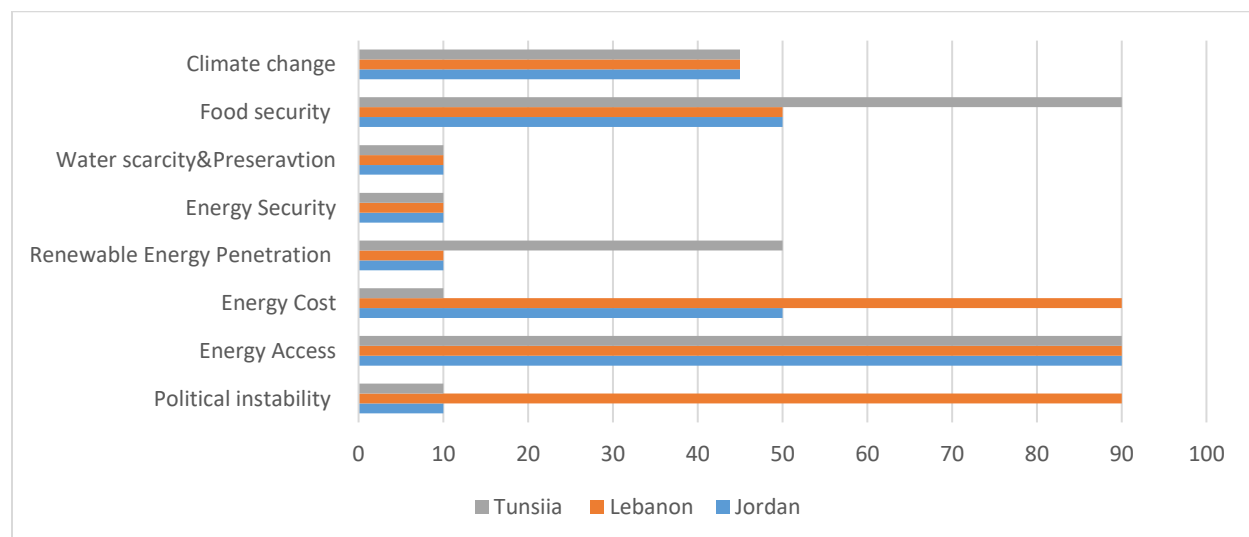
NEXUS in a Snapshot

Situation of Energy, Water, Food & Agriculture

Water, energy and food security are inextricably linked in the Arab Region, perhaps more than in any other region in the world. Generally, the region is known to be energy intensive, water scarce, food deficient, and one of the world's most economically and environmentally vulnerable regions to Climate Change.

Over 85% of the region’s water use is dedicated to agriculture. Domestic and industrial water demands are 7.8% and 7% of total demand, respectively, while water sector utilizes about 15% of total electricity consumption. The region is highly dependent on traditional energy sources that has tremendous impact on greenhouse gases.

Jordan, Lebanon and Tunisia’s current situation, challenges, and practices with regards to water, energy and food are extremely similar. They are multiple, complex and systemic in nature. Naming a few of the key commonalities between the three countries with regards to the resources:



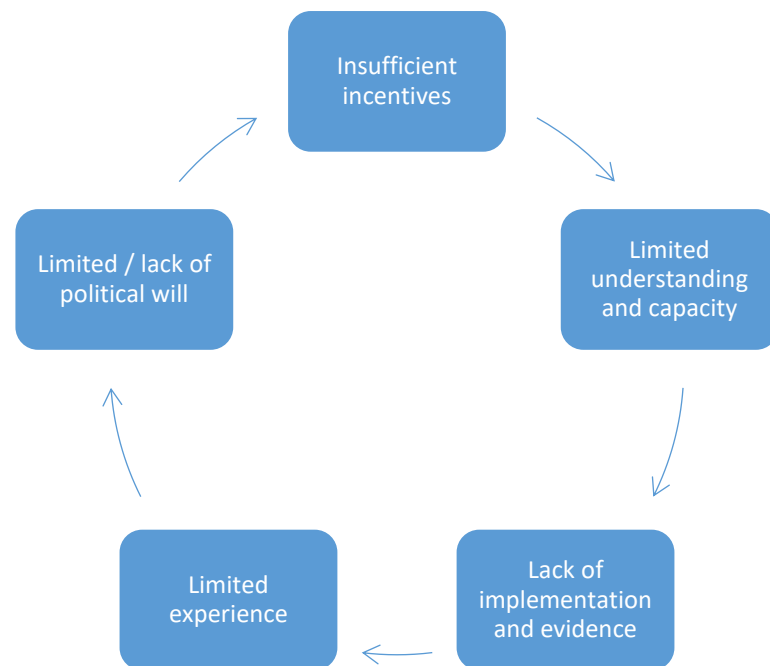
Countries Are Stuck in a Vicious Cycle

NEXUS is an extremely effective approach that must be used in addressing the challenges of the MENA region such as limited resources, unemployment, and political instability. MENA countries however have made little progress in adopting and implementing the nexus approach.

Why?

There are several obstacles and constraints responsible for this such as insufficient incentives for integrated policy planning, lack of economic incentives for developing integrated business solutions, and limited vision, knowledge and experience with the nexus. The crucial point to understand here however is that those challenges are not only a laundry list of individual challenges, but rather work together and cause countries to be stuck in vicious cycles where the problems grow in size and impact and are further entrenched.

As an example:



Municipalities Are Stuck in a Vicious Cycle

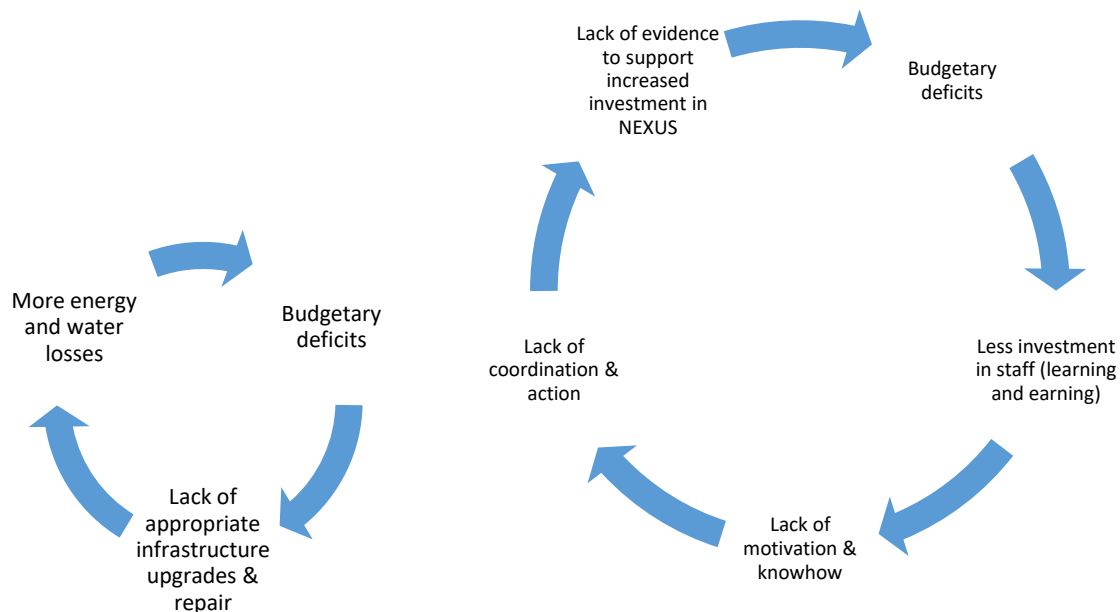
All three municipalities have scarce water and energy resources and are situated countries that are markedly energy and water insecure. This insecurity in some cases is not felt by citizens as water and energy accessibility in each of those municipalities is extremely high and reaches almost every citizen. In other cases this scarcity of resources is felt such as in the case of Jordan where water is rationed and residents have to depend on water tanks and/or ration their water use or in the case of Lebanon where electricity is rationed and residents depend on standby generators to supplement their remaining

electricity needs. This scarcity of energy and water resources is further aggravated by the marked increase in population which is placing an added strain on these resources.

The infrastructure for energy and water is weak and old. The poor economy of the pilot countries of the project, where budget deficits prevent timely and needed repairs and upgrades on the infrastructure. This causes undue technical losses, adding to the dire challenge of resource scarcity.

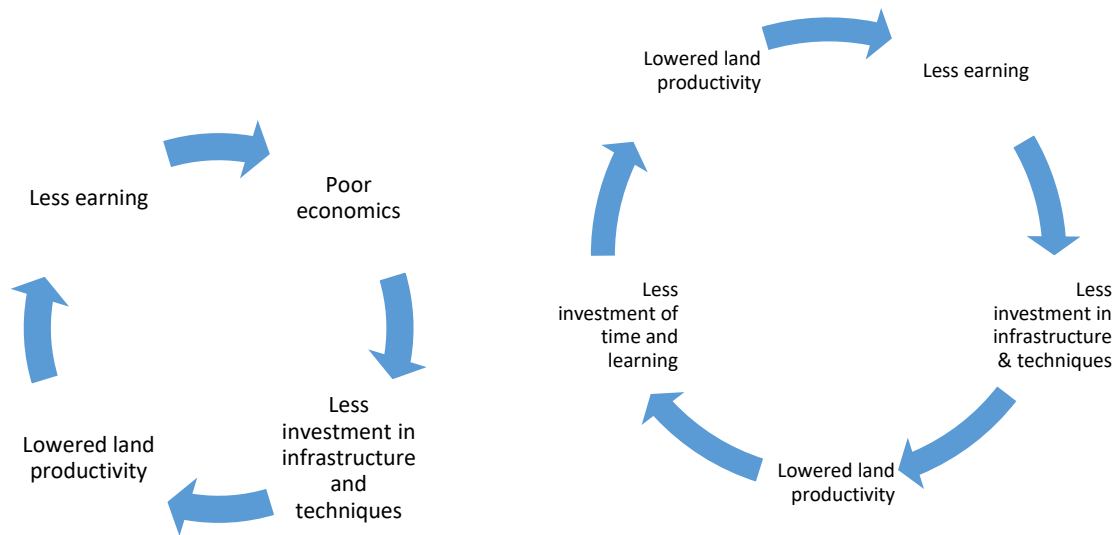
Poverty is not only felt at a national level, but trickles down to citizens in these municipalities. A combination of poor economics, a lack of clear knowledge on the benefits of making investments in clean energy and water technologies, and the relatively high subsidies on water and energy contribute to poor energy and water saving practices. This is most noticeable in the agricultural sector where the water intense practices in agriculture and the low penetration of clean energy solutions in the field of agriculture are an additional strain on these resources. This overuse / abuse of water and energy as important agricultural inputs is not enhancing the economic standing of farmers and people who work directly and indirectly in agriculture and food. Rather, their actions unknowingly fail to combat the effects of Climate Change and the resource deficits, leading them to make nominal income from agriculture and food, depending on it only secondarily and therefore not making the investments needed to transform their thinking and practices or abandoning their farms all together.

There are many vicious cycles municipalities are stuck within:



Citizens Are Stuck in a Vicious Cycle

Citizens themselves are stuck within a vicious cycle which contributes to the continued mismanagement and loss of scarce resources:

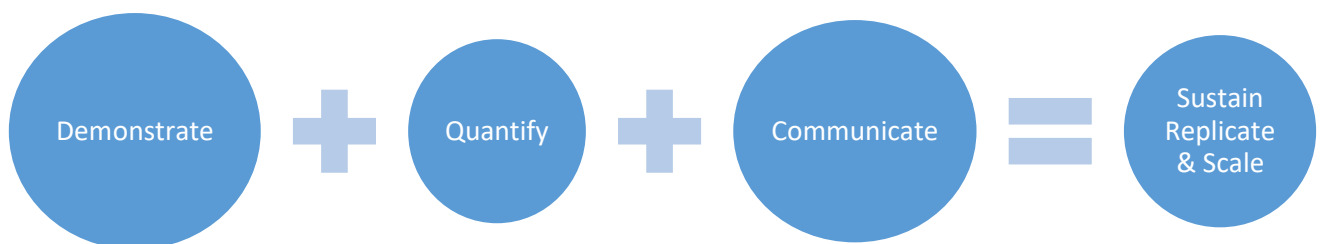


The Alternative

In order to break this vicious circle, **pilot projects are required which demonstrate benefits and added value of the nexus approach**. That way the **current vicious circles can be turned into virtuous circles**. This is the great opportunity for MINARET project: to develop and implement convincing pilot projects (“seeing is believing”), which trigger a broader nexus implementation and nexus governance and eventually a transformation towards a green economy.

It is however insufficient to implement pilot projects on the municipality level and/or on the level of the community if a scientific NEXUS approach is not used where **the benefits and co-benefits are quantified**.

Also, for a pilot project to become scalable and replicable, it must be communicated properly. It must be **communicated horizontally** with others for the purpose of replicating it. It also must be **communicated vertically** for the purpose of making the necessary policy changes / incentives to expand and scale it. Therefore, to be successful, we must



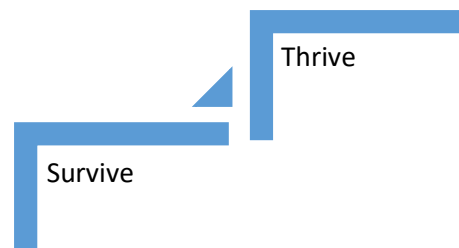
Role of Municipalities

Over the past century, cities have become the driving force of the global economy. With more than half the world's population presently living in cities¹, much of the demand on Energy, Water & Food demand occurs in cities.

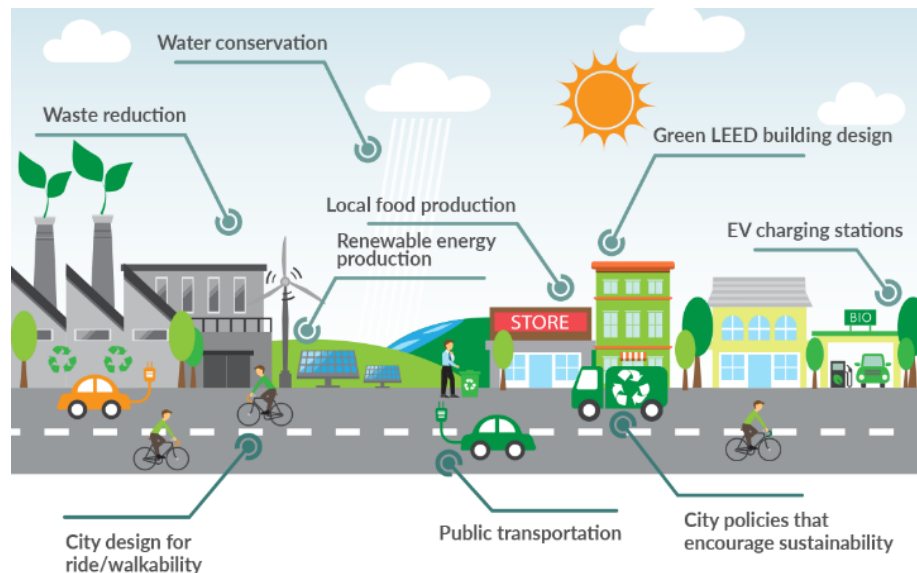
Therefore, cities are concerned about energy, food, and municipal water supply risks that affect the entire community —homes, businesses and industries².

Achieving a sustainable livelihood is where a household achieves “well-being”; this means:

1. **Survival:** households have secure access to basic services (e.g., food, water, and energy) to sustain their primary needs.
2. **Well-being:** The next step for households to secure access to additional important (e.g. job access) that improve their lives and make them less vulnerable to sudden shocks (e.g., economic, climate change)³.



Achieving synergy between water, energy and agriculture / food is a crucial element that should to be considered at a local level to reduce energy consumption, energy demand, heat output of cities (heat island), air pollution, while using water more efficiently, and/or to avoid the harmful consequences of the use of fertilizers and pesticides on water.



¹ UN 2015

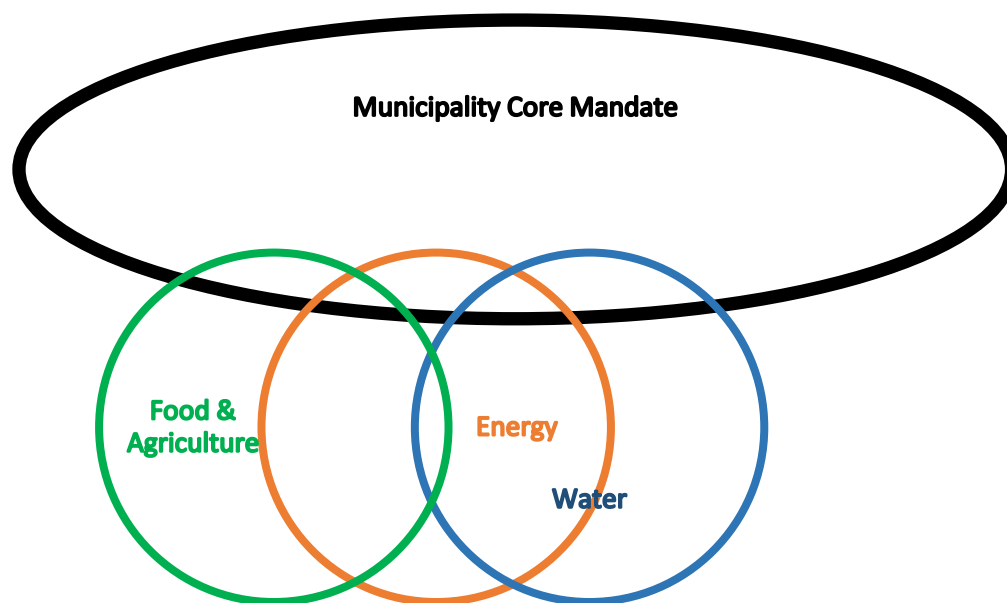
² DVRPC 2011, Denver's Climate Resiliency Committee 2014

³ UNDP, 2004

For all countries (Jordan, Lebanon and Tunisia) under MINARET Project, water, energy and even agriculture/food are considered national security issues. They are centrally managed/governed by relevant national institutions for all regions in the country. Municipalities currently do not play a core role in the management and governance of water, food / agriculture and energy. Their role is restricted to providing services to their communities such as transportation, waste collection, licensing buildings, managing public parks, street lighting... etc..

Challenges to applying NEXUS in municipalities:

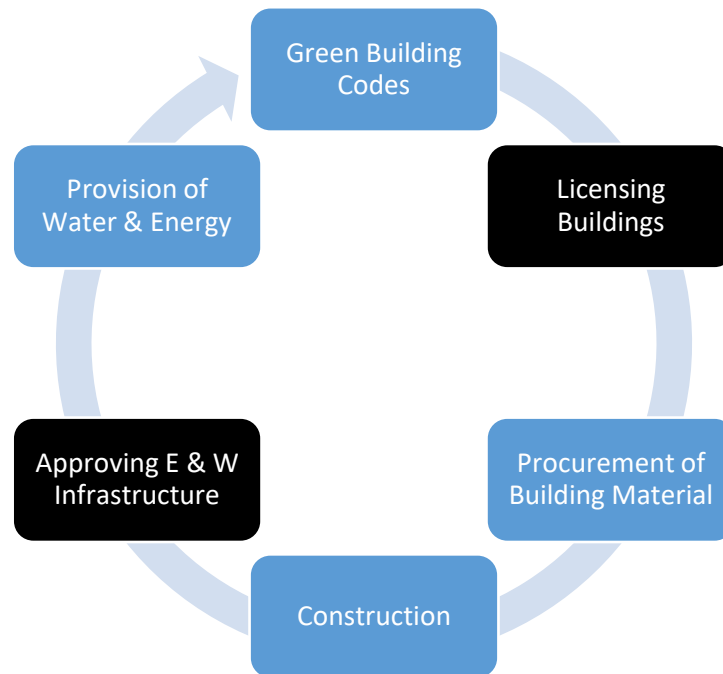
1. Catalyzing NEXUS adoption in cities across the region is that the mandate of water, energy and food is not part of the core mandate of municipalities.



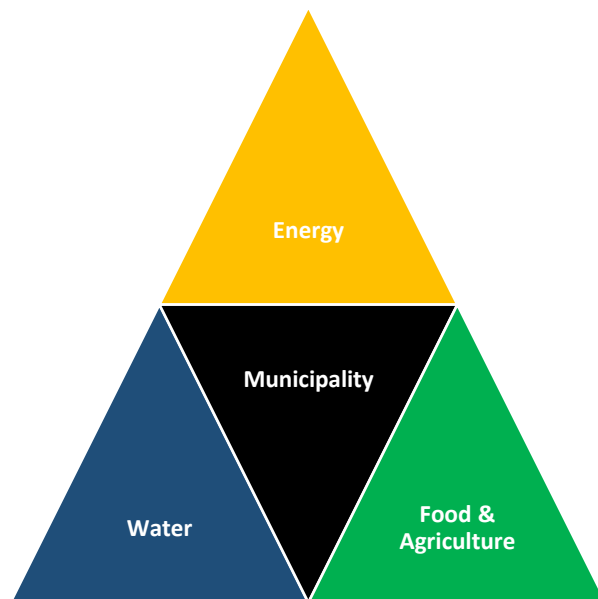
2. Municipalities are burdened and suffer from financial difficulties, capacity challenges and other challenges which makes generating interest within municipalities for NEXUS adoption and scaling very difficult.

Opportunities to applying NEXUS in municipalities:

1. Even though water, energy, and food & agriculture are not within the municipalities' core mandate and responsibilities, they do have responsibilities to manage within parts of the entire cycle of water, energy, food & agriculture;



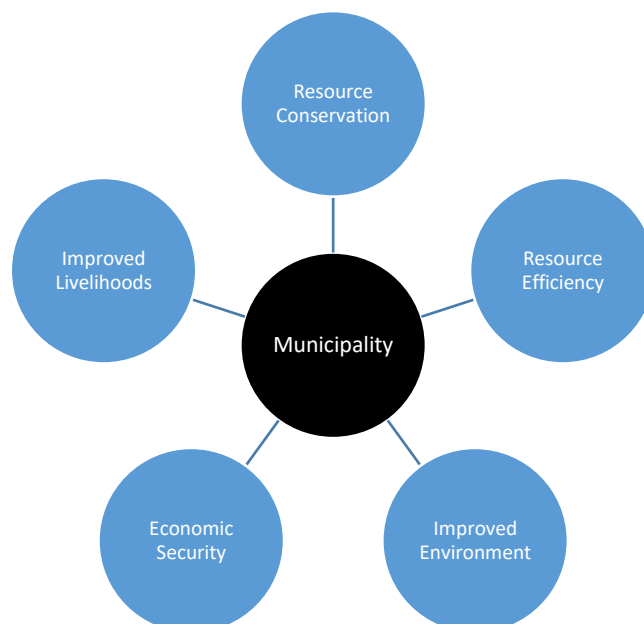
2. Municipalities have a developmental role which they can play and through that implement NEXUS projects in their relevant cities;
3. Municipalities have the financial and administrative autonomy to attract investors, donors and funds, initiate projects, and engage directly with communities in focusing projects to address actual community needs, thereby directly and positively impacting the resilience of communities and improving the livelihoods of the people within those communities.



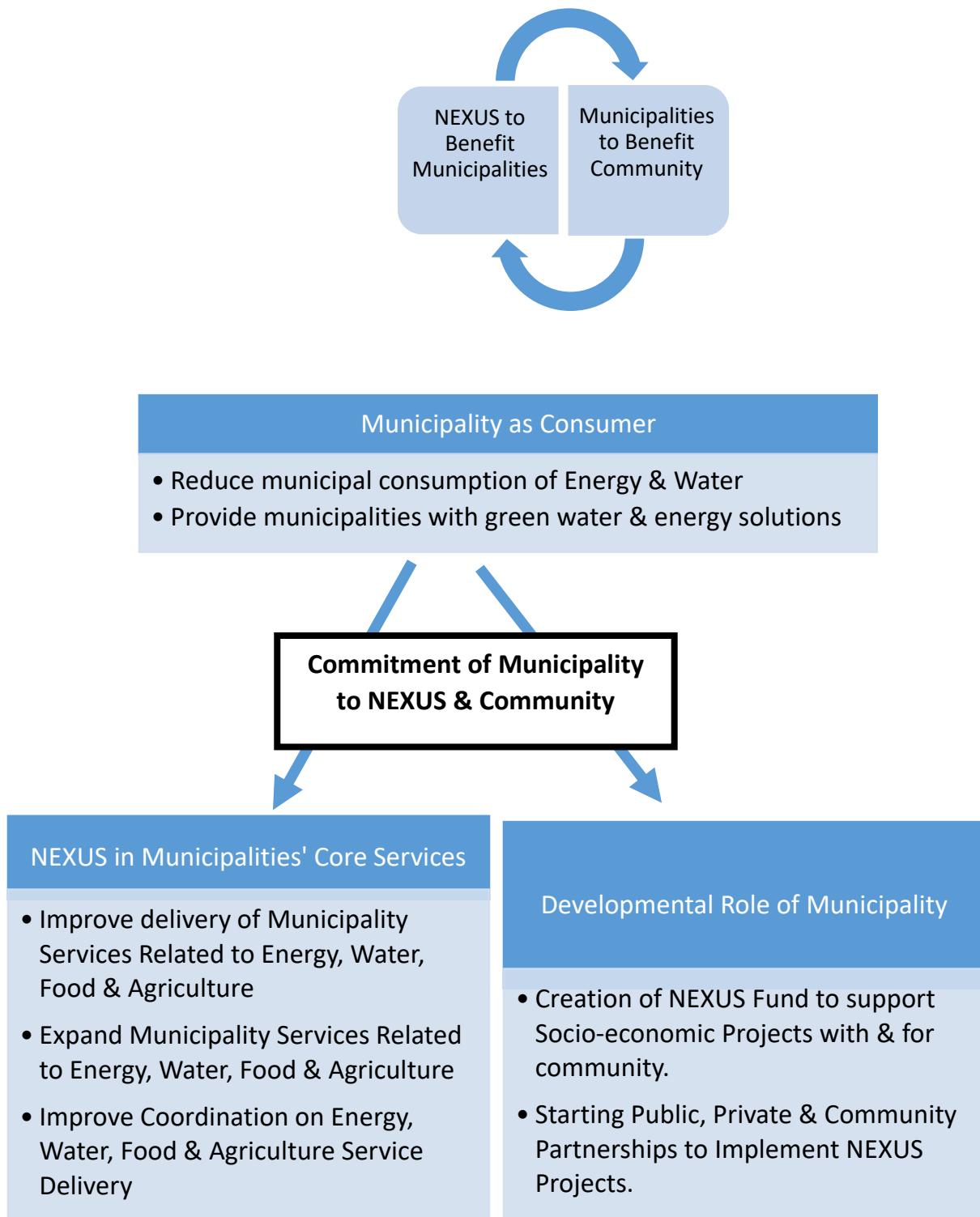
Therefore, to utilize NEXUS to be of maximum value to municipalities and to the communities within the municipality boundaries, *the Project must allow municipalities to apply NEXUS in three ways:*

- | | | |
|---------------------------|---|--|
| Consumer | : | Apply NEXUS thinking to benefit municipalities as consumers of energy, water and agriculture. |
| Core Mandate | : | Design and implement NEXUS initiatives that allow municipalities to perform on their role in energy, water, food & agriculture management and governance and coordinate with other players in the cycle. |
| Developmental Role | : | Design and implement NEXUS initiatives that fall under the developmental role of the municipalities and encourage municipalities to expand on this role through effective community engagement, attracting international donors & investors, and activating public private partnerships. |

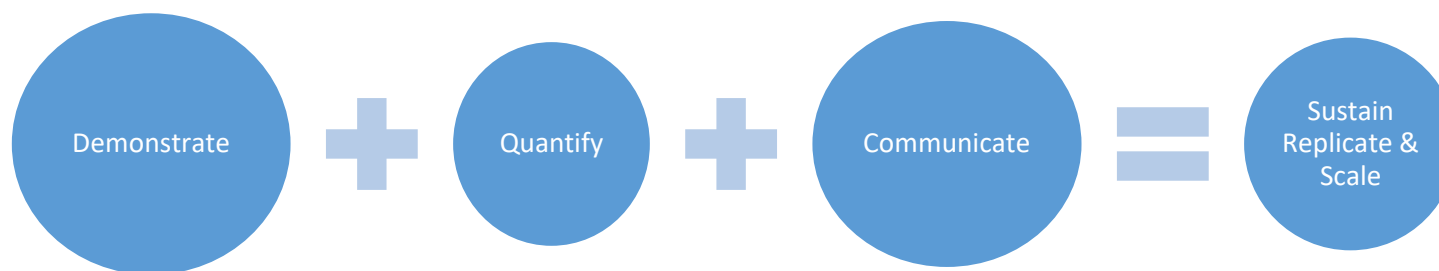
Why work with municipalities? *To catalyze municipalities to apply NEXUS thinking for in order to increase resource efficiency and improve the livelihood and resilience of citizens within municipalities.*




To do so:




To apply



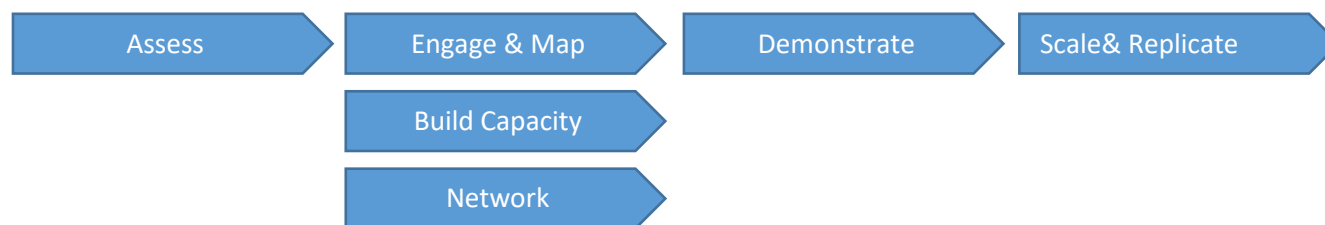
Effectively, the purpose, key design requirements and corresponding activities have to be clearly articulated and understood. See table below:

	Purpose	Key Design Requirements	Corresponding Activities
Demonstrate	Provide a tangible, clear-cut example which shows how applying NEXUS can benefit the municipality applying it, the community within the municipality, and can support relevant national government bodies achieve their targets	<ul style="list-style-type: none"> The success of the demonstration Project has to be quantifiable and the impact has to be clear and direct. 	<ul style="list-style-type: none"> Pilot Projects Socio-economic Projects Customized Municipality NEXUS Services On-the-Job Training Capacity Building Learning Workshops
Quantify		<ul style="list-style-type: none"> In order for that to happen: <ul style="list-style-type: none"> The demonstration Projects have to: <ul style="list-style-type: none"> Respond to actual need on a municipality level Result in improved livelihoods that can be sustained on the longterm: therefore, the Demonstration Projects have to be designed affectively from end to end. Buy-in of municipality & community to maintain Projects post MINARET Phase 1 Address & maximize the role of municipalities in the region & their challenges. 	<ul style="list-style-type: none"> Clearly quantifiable Communication Baseline Standard role of municipalities in the region. NEXUS Task Forces at Municipality Value Chain Mapping for Pilot Projects & Socio-economic Projects Detailed Capacity Development Plans Detailed Project Implementation & Monitoring Plans

		<ul style="list-style-type: none"> ▪ Respond to national & regional needs to be scalable & replicable ○ The municipality staff and relevant stakeholders have to have the capacities to implement the demonstration projects. 	
Communicate	<p>Utilize the success of the Demonstration in order to sustain, scale & replicate. Do so through communicating for the following purposes:</p> <ol style="list-style-type: none"> 1. Coordinate with relevant bodies; 2. Raise Awareness within community; 3. Advocate for needed changes in order to maximize potential for scalability & replication. 	<ul style="list-style-type: none"> • Buy-in on importance of Communication • In order for that to happen: <div style="text-align: center; margin: 10px 0;">  </div> • Engagement of key stakeholders as partners who communicate MINARET locally, nationally, regionally and internationally • Quantifiable benefit to municipalities & community resulting from improved communication <ul style="list-style-type: none"> ○ Communication Baseline: Quantifiably know where municipalities stand with regards to communication. ○ The municipality staff and relevant stakeholders have to have the capacities to communicate (coordinate, raise awareness, & advocate). <ul style="list-style-type: none"> ▪ Hands-on-Training in Development, Implementation & M&E of Communication Action Plan. ▪ Active platforms & customized relevant visits for content & experience sharing between municipalities. ▪ Exposure to relevant content. 	<ul style="list-style-type: none"> - Communication Baseline & Action Plans - Active Website & Platform - Relevant Content - Key Stakeholders Lead Design & Implementation of All Project Activities - Exchange Visits - Presentation on MINARET in Local, Regional & International Forums & Events

<p>Sustain, Replicate & Scale</p>	<p>Ensure that the Demonstration Projects are a success window that encourage the municipality, other municipalities & central governments to adopt NEXUS approach.</p>	<ul style="list-style-type: none"> • The key design requirements above have to be met. • A virtuous cycle where the municipality benefits and it in turn benefits the community have to be created • Projects which the municipality can implement have to be clearly identified. • Municipalities have to be connected with donors and investors who can fund future projects • Municipalities have to advocate for • A manual which allows any municipality to apply the model easily while learning from the lessons of MINARET has to be availed 	<ul style="list-style-type: none"> • <u>Availability of Long-term Action Plan:</u> SECAP plans • <u>Access to Finance:</u> <ul style="list-style-type: none"> ○ Municipality NEXUS Fund ○ Attraction of Donor Funding & Investments • <u>Advocacy:</u> <ul style="list-style-type: none"> ○ White Papers ○ Position Papers • <u>Knowledge Dissemination:</u> <ul style="list-style-type: none"> ○ Regional Conference ○ Final Event • <u>Availability of Roadmap:</u> NEXUS Manual
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To simplify the model and break it into the clear phases which need to happen for municipalities to activate their role in applying NEXUS for their benefit, the benefit of the community and for the benefit of the country, the model can be broken into the following key phases:



Customizing NEXUS Approach for Municipalities in MINARET Project

