



Nexus comprehensive methodological framework

The MENA Region Initiative as a model of Nexus Approach and
Renewable Energy Technologies (MINARET)



INTERNATIONAL UNION FOR CONSERVATION OF NATURE



الجمعية العلمية الملكية
Royal Scientific Society



Horizons
For Green Development

Nexus comprehensive methodological framework

The MENA Region Initiative as a model of Nexus Approach and
Renewable Energy Technologies (MINARET)

The designation of geographical entities in this book, and the presentation of the material, do not imply the expression of any opinion whatsoever on the part of IUCN or other partnering organisations concerning the legal status of any country, territory, or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The views expressed in this publication do not necessarily reflect those of IUCN or other partnering organisations.

This publication has been made possible in part by funding from the Swedish International Development Cooperation Agency

Published by: IUCN Regional Office for West Asia, Amman, Jordan

Copyright: © 2019 International Union for Conservation of Nature and Natural Resources

Reproduction of this publication for educational or other non-commercial purposes is authorised without prior written permission from the copyright holder provided the source is fully acknowledged.

Reproduction of this publication for resale or other commercial purposes is prohibited without prior written permission of the copyright holder.

Citation: IUCN ROWA (2019). Nexus comprehensive methodological framework: the MENA Region Initiative as a model of Nexus Approach and Renewable Energy Technologies (MINARET). Amman, Jordan: IUCN.

Author: Dr. Soud AlQuran - Expert of Risks & Crises Management- Resilient Cities
Eng. Ali Hayajneh - Programme Manager (Water & Climate Change Programme)
Dr. Hany ElShaer - IUCN-ROWA Regional Director

Project team: Mrs. Anwar Abu Sakieneh - Regional Officer of Communication & Documentation
Eng. Faizah Slehat - Projects Officer (Water & Climate Change Programme)

Cover photo: 142601641 - shutterstock.com

Layout by: Mohamad Abu Tarboush

Available from: IUCN, International Union for Conservation of Nature
Regional Office for West Asia
Sweifiyeh, Abdel Latif Salah Street, #29
Amman, Jordan
Tel +962 (6) 554 6912/3/4
Fax +962 (6) 554 6915
Email: westasia@iucn.org
www.iucn.org/resources/publications

Table of content

Executive summary	iv
1. INTRODUCTION	1
1.1 What is WEF Nexus?	1
1.2 WEF Nexus in the Arab Region	2
1.3. Nexus Opportunities in the Arab Region	2
2. WEF-NEXUS METHODOLOGICAL FRAMEWORK (THE MODEL)	4
2.1 The Model: WEF Nexus contributes to achieving Sustainable Development Goals	5
2.2. The Model: WEF Nexus contributes to security, risk and resilience	7
2.3 The Model: WEF Nexus contributes to human wellbeing	8
2.4. The Model: WEF Nexus contributes to better resources management	10
3. PROPOSED WEF NEXUS	11
3.1 Political impact on WEF Nexus	11
3.2. Impact of science, technology and innovation on WEF Nexus	11
3.3. Impact of governance and the role institutions on WEF Nexus	12
3.4. Impact of policies and legal framework on WEF Nexus	14
3.5. Impact of environment - climate change on WEF Nexus	15
3.6. Impact of social change on WEF Nexus	15
4. THE MODEL: CATALYSTS FOR IMPLEMENTATIONMETHODOLOGICAL FRAMEWORK	16
4.1. Cooperative advantage of resources	16
4.2. The role of engaging stakeholders	16
4.3. Enhancing regional cooperation	16
4.4. The role of increased awareness	17
4.5. Private-public partnership	18
5. RECOMMENDATIONS FOR IMPLEMENTATION OF THE WEF NEXUS APPROACH IMPACTS	19
6. CASE STUDY – GUIDELINES FOR GREEN PROCUREMENT AT	20
6.1 Introduction	20
6.2 Why Green Procurement?	22
6.3 Benefits of Green Procurement	23
6.4 How does a municipality implement Green Procurement	23
6.5 Solutions to potential challenges	25
6.6 Procurement in Sustainable Energy Action Plans (SEAPs) and Covenant of Mayors	27
References	28

Executive Summary

Reviewing the NEXUS literature over the last years reveals the lack of a well-developed Comprehensive NEXUS Methodological Framework that can be easily understood and implemented by linking and making up of the structure, configuration, organization, arrangement, composition or skeleton of a collection of elements or entities.

The literature features different conceptualizations of the Nexus which vary in their scope, goals, and understanding of drivers and pressures. This proposed Comprehensive NEXUS Methodological Framework seeks to suggest an Approach that outlines explicitly how the NEXUS Concept should be performed. Specifically, how the Water-Energy-Food Nexus (WEF Nexus) could be implemented (targeting mainly the Arab Region). The WEF Nexus Approach seeks to help with providing the structure, configuration, organization and composition of methods and procedures to be used for implementing relevant projects, activities, initiatives and interventions.

With the aim of adopting a qualitative approach that is based on analysing several variations and contexts to make conceptual distinctions and organize ideas regarding the implementation of Water-Energy-Food nexus, the study reviewed the most relevant concepts of the WEF Nexus, evaluated the current status of the WEF in the Arab Region, defined the ultimate goal of the framework, prioritized the main inputs of the framework, identified the most relevant drivers and links between different sectors, and developed the framework based on close consultation with key stakeholders.





1. INTRODUCTION

1.1. What is WEF Nexus?

The Water-Energy-Food Nexus is a useful concept to describe and address the complex and interrelated nature of the global resource systems, on which we depend to achieve and sustain various social, economic and environmental goals. In practical terms, it presents a conceptual approach to better understand and systematically analyse the interactions between the environment and human activities, and to work towards a more coordinated management and use of natural resources across sectors and scales. This can help to identify and manage trade-offs and to build synergies through responses, allowing for more integrated and cost-effective planning, decision-making, implementation, monitoring and evaluation (FAO, 2014).

There are several critical challenges across the WEF Nexus (Nexus hotspot), each with its own focal point, scale and stakeholders. Some focus on food security on a national scale, while others seek to address renewable energy deployment in a specific region, so it is a challenge to find a one-size-fits all model capable of capturing these resource interactions and trade-offs.

Water, energy, and food are complex sectors on their own, but they become even more complex upon studying their interactions. Rather than viewing the inter-relatedness of the water, energy and food security sectors as a hindrance, their relationships should be used as an opportunity to tackle development issues with a multi-sectoral approach. The WEF Nexus Approach aims to understand how each of these three sectors relates to the other two and how this understanding can be used to make policy decisions that promote sustainable development and poverty reduction (Bizikova et, Roy, Swanson, Venema, & McCandless, 2013).

The connection between water, energy and food security may seem apparent in some cases, for example, agriculture is a main consumer of water and energy, and water can be used as an energy source to power food production processes. In other cases, the link between the sectors may more discrete, for example, does an increase in the production of biofuels affect a country's food security? (Bizikova et, Roy, Swanson, Venema, & McCandless, 2013). Similarly, advances in one sector may lead to degradation of the others. The inefficient use of water for agriculture can lead to the over withdrawal of groundwater, which may lead to food insecurity in the future. The Nexus Approach involves more than technological advances; it requires collaboration across ministries, different levels of government and international cooperation. Reliable and effective governance is critical to the Nexus Approach. A crucial aspect of effective governance is the engagement of participatory approaches. Participatory approaches, including stakeholder involvement, and monitoring and evaluation of community responses, are critical to ensuring that the priorities of those affected by policies are being met.

1.2. WEF Nexus in the Arab Region

Water security, energy security and food security are inextricably linked in the Arab region, perhaps more so 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.

This strong interdependency between water, energy, food and climate change in the Arab region calls for robust interventions; i.e. an approach that integrates management and governance across sectors, and where conventional policy and decision-making in 'silos' gives way to an approach that reduces trade-offs and builds synergies across sectors in line with the global UN Sustainable Development Goals (SDGs) and the COP21 Paris climate change commitments in 2015.

Fortunately, this has been recently well-recognized in the Arab Strategic Framework for Sustainable Development (ASFSD), adopted by the League of Arab States in 2013, aiming at addressing the key challenges faced by the Arab States in achieving sustainable development during the period 2015-2030. This new development has created unprecedented opportunities for fundamental policy changes in various economic, institutional, technological, and social systems, as well as boosting resource efficiency and productivity by addressing externalities across sectors.

1.3. Nexus Opportunities in the Arab Region

The connections between the water, energy and food security sectors are overwhelming. Agriculture is the single largest user of water in the region, yet it suffers from one of the lowest efficiency rates at only 40% (Gelil et, Al-Ashry, & Saab, 2013). Irrigation has been linked to higher cereal yields, yet only 27% of cultivated land in the Arab Region is irrigated (Sadik, 2013). Irrigation should be expanded but it must be done correctly and efficiently in order to save water and energy (Siddiqi & Anadon, 2011). Raising irrigation efficiency to 70% could save enough water to produce an additional 35 million tons of cereal by 2030 (Sadik, 2013). The opportunities for utilizing a Nexus Approach are particularly apparent when observing the interactions between the water and energy sectors. It is estimated that the water cycle, from abstraction to treatment post-use, may use up to 15% of national electricity consumption in most Arab countries (Gelil et, Al-Ashry, & Saab, 2013; Siddiqi & Anadon, 2011).

The Arab Region is currently home to 50% of the world's desalination capacity. Desalination is a highly energy-intensive process, using an average 3.5 kwh of energy per cubic meter of water (Mofor, 2013; Moawad, 2011). By 2050, desalination and wastewater are estimated to provide 28% and 15% of the region's water, respectively (Sadik, 2013). Energy demand for desalination will increase with the increased capacity and the Arab region must consider how it will power these plants in the future. These links become even more critical when the impact these changes in water and energy use will have on agriculture and food systems is considered.

The benefits of conservation are also tremendous for the Arab Region. Reducing energy losses to only 10%, from the current 19.4%, would save the region US\$ 5.5 billion. Furthermore, transitioning to compact fluorescent lighting could reduce carbon emissions by 2.56% (Gelil et, Al-Ashry, & Saab, 2013). Expanding the water cycle could also bring immense benefits to the region.

Agriculture policies that reduce the production of water-intensive crops and consider virtual water trade should also be considered as a conservation tool for the water and energy sectors (Gelil et, Al-Ashry, & Saab, 2013). The Arab Region must also consider the effects of climate change as it moves forward. Studies estimate a 3° to 7° C temperature increase by the end of the century. This temperature increase could reduce groundwater supplies by 40% (FAO NENA, 2012). Climate change may also reduce crop productivity and agriculture yields.

A Nexus Approach helps us to better understand the complex and dynamic relationship between water, energy and food, so that we can manage our limited resources sustainably, taking into account different economic, social and environmental goals. A Nexus perspective helps us understand how the impacts of a decision made in one sector don't apply to that sector alone but to multiple sectors and drivers. Based on this, we can identify trade-offs and synergies and we can design, appraise and prioritize response options and interventions.

Any intervention can have diverse and multiple impacts greater than the sum of individual initiatives. Often decisions on how to intervene are made without cross-sectoral coordination, targeting sector-specific optima and, thereby, resulting in risks and uncertainties across sectors and scales.

Interventions are likely to have an impact on drivers, such as the structure of the population, the state of natural resources or financial flows. This can substantially alter the initial conditions confronting decision-makers and their ability to achieve sectoral goals. In order to ensure the optimal management of trade-offs and maximization of overall benefits, interventions need to be reflective and to consider the dynamic nature of complex systems.

A recurring criticism of the Water-Energy-Food Nexus is that it relatively adds so little to already existing integrated approaches to resources management, such as the integrated landscape approach (FAO, 2012c) or integrated water resources management (IWRM). For instance, the conceptual framework articulated as Integrated Water Resource Management (IWRM) arguably pursues the integrated and coordinated management of water and land as a means of balancing resource protection, while meeting social and ecological needs and promoting economic development.

2. WEF-NEXUS METHODOLOGICAL FRAMEWORK (THE MODEL)

The proposed Nexus methodological framework (The Model), as shown in Figure-1, depicts the presentation of water, energy and food in the Arab Region. The Model shows that water represents oceans, surface water (rivers and reservoirs) and precipitations (snow fall and rain fall). Energy represents nuclear, geothermal, hydropower, solar, wind, biofuel and fossil fuel (coal, gas, oil and oil shale), while Food represents agriculture (crops and forests), livestock, poultry, fishery and aquaculture.

The next step identifies the benefits (positive impacts) of having the WEF Nexus model and interlinkages. These benefits include better resources management, achieving human wellbeing, insuring resilience and security and support sustainability. For a better understanding of this framework, we discussed the possible two-ways linkages between the WEF Nexus in the Arab Region. This included:

Water for Energy: Water linked to energy generation (thermoelectric, hydropower and tidal power), power plant cooling and transport of energy.

Energy for Water: Energy linked to water abstraction, desalination, filtering, water pumping and distribution, drainage, wastewater and sewage treatment and water transporting.

- **Water for Food:** Water linked to food irrigation, forest production, urban farming (orchards), virtual water, water quality, livestock, poultry, fishery, rainwater harvesting and subsidies.
- **Food for Water:** Food linked to water table, over-pumping, mulching (cover crops), landscape management (runoff capture), water quality (siltation, contamination) and biofuel.
- **Energy for Food:** Energy linked to pumping and irrigation efficiency, harvesting, tillage, processing, storage, production of fertilizers, pollution, food process and production and food transport.
- **Food for Energy:** Food linked to biofuel.

Finally, the external factors that may impact and influence these linkages were discussed. The external factors include climate change, governance and role of institutions, policies and legal frameworks, political influence, science, technology and innovation and social changes. It is also important to introduce catalyst-like elements that could enhance and support the implementation of the Model, including raising awareness, regional cooperation, sharing experience for best practices (scale up and replicate success stories), cooperative advantages of resources, engagement of all concerned stakeholders and private-public partnership (PPP).

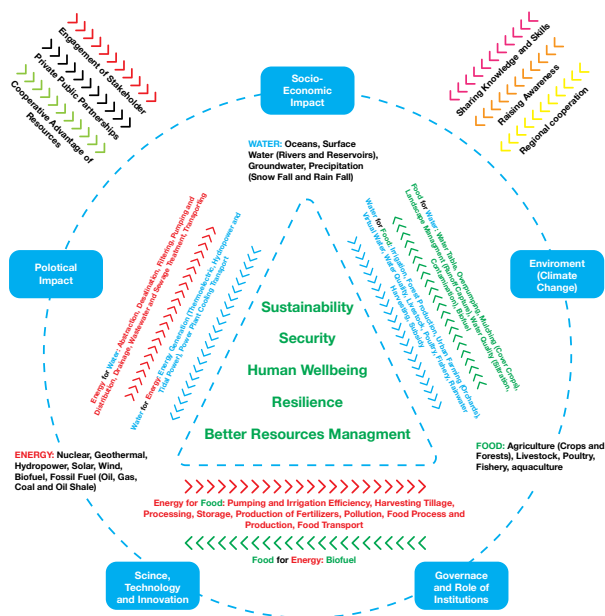


Figure1. Proposed Methodological Framework for the Arab Region

2.1. The Model: WEF Nexus Contributes to Achieving Sustainable Development Goals

In August 2015, the 193 member states of the United Nations reached consensus on the outcome document of the new agenda 'Transforming our World: The 2030 Agenda for Sustainable Development.' These Sustainable Development Goals are the result of a long negotiation process that involved the 193 UN member states and also unprecedented participation of civil society and other stakeholders.

Though the 2030 Agenda did not adopt a Nexus Approach to achieving the SDGs, it did, however, strongly declare that the “SDGs and targets are integrated and indivisible,” and that the “interlinkages and integrated nature of the Sustainable Development Goals are of crucial importance in ensuring that the purpose of the new agenda is realized.”

The integrated nature of the SDGs matches well a Nexus Approach that specifically considers the numerous links between sectors. A systems approach that aims to reduce trade-offs and build synergies by considering interactions and dependencies at all stages, it enhances the efficiency of the entire system rather than increasing productivity of a specific sector, often at the expense of others. An example of this is the climate change goal, SDG 13, which looks to combat climate change and its effects.

Climate change is a cross-sectoral stressor and a key driver of water and food systems, with the energy system driving climate change and in return being affected by it. Projections by RICCAR, the regional initiative assessing the impact of climate change on water resources and socioeconomic vulnerability, indicate the Arab region will be affected by a general rise in temperature, more hot summer days and decreasing average monthly rainfall.

At the core of the water-energy-food security Nexus, Goals 2, 6 and 7 are easily identified. Goal 2 seeks to end hunger, achieve food security and improved nutrition, and promote sustainable agriculture, and has five associated targets and three means of implementation. Goal 6 aims to ensure availability and sustainable management of water and sanitation for all and has six associated targets and two implementation means. Goal 7 aims to ensure access to affordable, reliable, sustainable and modern energy for all, with five targets and two implementation means.

A closer look at the SDGs and their targets reveals several connections. For example, target 6.4, increasing water use efficiency across all sectors, is linked to targets 2.3 and 2.4 that call for better agricultural productivity and resilient agricultural practices, which is connected to target 7.3 related to improvement in energy efficiency. Connections are not limited to these three core goals of the Nexus, but are present in others too, such as health target 3.9 that calls for the reduction in the number of deaths and illnesses caused by hazardous chemicals and air, water and soil pollution and contamination, which is closely connected to target 6.1 to achieve universal access to safe drinking water for all.

Examining the SDGs as a system through a Nexus lens helps identify these connections, and guide decision makers along the long-term path of sustainable development. Governing bodies must ensure that the interdependencies among SDGs and sectors are accounted for in strategy and policy formulation. The water-energy-food Nexus Approach may also provide a cross-check on how progress in some thematic targets affects others.

The integrated nature of the 2030 Agenda was echoed in the key messages from the Arab Forum for Sustainable Development, to the follow-up high-level political forum on sustainable development. They signalled the links among goals relating to environment, natural resources, climate change and economic and social objectives, and called for increased cooperation across the region given the cross-border nature of water, energy, agriculture and food security challenges. The messages also stressed that human rights, including the right to development, and gender equality and women's empowerment, are the foundation of the agenda, and are in harmony with ESCWA's proposed water-energy-food security Nexus.

SDG-2: End Hunger, Achieve Food Security and Improved Nutrition and Promote Sustainable Agriculture.

SDG-5: Achieve Gender Equality and Empower All Women and Girls.

SDG-6: Ensure Availability and Sustainable Management of Water and Sanitation for All.

SDG-7: Ensure Access to Affordable, Reliable, Sustainable and Modern Energy for All.

SDG-13: Take Urgent Action to Combat Climate Change and its Impacts



2.2. The Model: WEF Nexus contributes to security, risk and resilience

Water, energy and food security are variously defined. This study uses definitions as provided by international organizations involved in the fields of water, energy and food. These definitions have been discussed and agreed upon by many stakeholders from the international development community.

The International Energy Agency defines energy security as: “the uninterrupted availability of energy sources at an affordable price.” While there is no single definition of the concept of energy security, it has evolved from a narrow link to the stable supply of oil products to integrate other energy sources, as well as the essential dimension of sustainability.

A working definition of water security by the United Nations is stated as: “the capacity of population to safeguard sustainable access to adequate quantities of and acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability.” (UNU, 2013)

The Food and Agriculture Organization of the United Nations defines food security as existing “when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.” (FAO, 2002) The identified elements of the WEF security in the Arab region (which is also the case globally) include the following:

- **Water Security:** Water accessibility, water safety and water affordability.
- **Energy Security:** Continuity of energy supplies relative to demand, physical availability of supplies and supply sufficient to satisfy demand at a given price.
- **Food Security:** Food availability (influenced by production, distribution and exchange of food), access to food (including affordability, allocation and preference), utilization (nutritional value, social value and food safety) and food stability over time.

Water security elements; access, safety and affordability are affected by the energy and food sectors, for example, access to water can be affected by limited or intermittent supply of electricity or liquid fuel for critical needs such as pumping, conveying and distributing water. It can also be limited due to competing uses of water for producing, distributing and processing food. The quality of water for consumption can be affected by other sectors as well. Extraction and processing of fossil fuels, such as oil sand extraction and hydraulic fracturing for natural gas and oil, are known to cause pollution of groundwater with hydrocarbons and heavy metals (Water in the West, 2013). The expansion of intensive agriculture practices, such as the use of chemical fertilizers and concentrated animal farming, has led to the pollution of groundwater and surface waters with nutrients and pesticides (FAO, 2008b). Volatile energy prices can alter the affordability of water supplies that are dependent on energy intensive infrastructure.

Energy security components; the continuity of energy supply relative to demand, the physical availability of supply, and affordability all are affected by the water and food sectors. Achieving the key objective of any electricity system operator and meeting energy demand with reliable supply is imperilled when decreased water flows or increased water temperatures limit production at thermal, nuclear or hydro power plants. Physical energy supply can be limited when competing needs for water, such as agriculture and domestic use, place a limit on the amount of water that can be dedicated to fuel extraction and energy production. These constraints and trade-off with water availability can limit energy production and put price pressures on energy supply.

Energy and water supply and demand have an impact on food security elements: the physical availability of food, access (including affordability), utilization (nutrient content and food safety) and the stability of these elements over time. For example, the physical availability of food can be threatened when water is allocated for other competing needs, when irrigation infrastructure is inefficient, or when the energy supply is unreliable and unavailable to power mechanized farming and food processing practices.

Water-related risks to energy security include the shifts in water availability and quality, resulting in reduced reliability of supply and increase in energy demand for water production, treatment and distribution. This is in addition to potentially destabilizing impacts on the energy system. Energy-related risks to water security include limited or unreliable access to affordable energy necessary to extract water, allocation of water resources towards energy production leading to water security risks in other sectors and risks of water contamination from energy extraction processes.

Water-related risks to food security include increased variability in water availability, particularly due to climate change impacts, regional concentration of food production and consumption and impact of water contamination on food production and consumption. Food-related risks to water security include impact of agricultural activities on water resources, poorly regulated agricultural foreign direct investments in agriculture and over-utilization of water resources due to food security ambitions

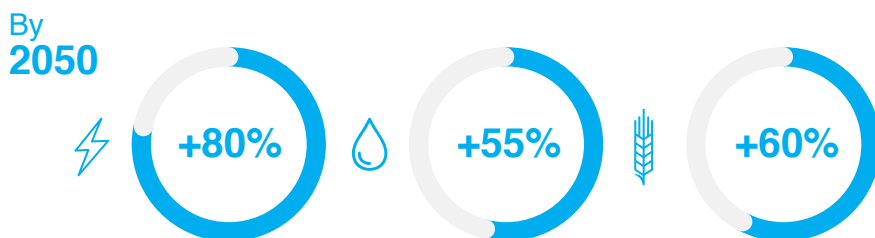
Energy-related risks to food security include dependence on fossil fuels, which increases volatility of food prices and affects economic access to food, potential trade-offs between food security and bioenergy production and risks of energy production on food availability. Food sector-related risks to energy security include overall increases in food demand, raises in energy inputs required in the food supply chain and the strains that puts on energy systems, and the dependence of quality and affordability of energy supply on bioenergy feedstock availability.

2.3. The Model: WEF Nexus Contributes to Human Wellbeing

“Wellbeing is a positive physical, social and mental state; it is not just the absence of pain, discomfort and incapacity. It requires that basic needs are met, that individuals have a sense of purpose, and that they feel able to achieve important personal goals and participate in society. It is enhanced by conditions that include supportive personal relationships, strong and inclusive communities, good health, financial and personal security, rewarding employment, and a healthy and attractive environment.

Government's role is to enable people to have a fair access now and in the future to the social, economic and environmental resources needed to achieve wellbeing. An understanding of the effect of policies on the way people experience their lives is important for designing and prioritizing them.” (Defra, 2007).

Water, energy and food are essential for human well-being, poverty reduction and sustainable development. Global projections indicate that demand for freshwater, energy and food will increase significantly over the next decades under the pressure of population growth and mobility, economic development, international trade, urbanization, diversifying diets, cultural and technological changes, and climate change (Hoff 2011).



SOURCE: OECD-FAO, 2012

Figure-2. Estimated increase in water, energy and food demand by 2050 (OECD-FAO, 2012)

Agriculture accounts for 70 percent of total global freshwater withdrawals, making it the largest user of water. Water is used for agricultural production, forestry and fishery, along the entire agri-food supply chain, and it is used to produce or transport energy in different forms (FAO 2011a). At the same time, food production and supply chain consume about 30 percent of total energy consumed globally (FAO 2011b). Energy is required to produce, transport and distribute food as well as to extract, pump, lift, collect, transport and treat water. Cities, industry and other users, too, claim increasingly more water, energy and land resources, and at the same time, face problems of environmental degradation and in some cases, resources scarcity.

This situation is expected to be exacerbated in the near future as 60 percent more food will need to be produced in order to feed the world population in 2050. Global energy consumption is projected to grow by up to 50 percent by 2035 (IEA 2010). Total global water withdrawals for irrigation are projected to increase by 10 percent by 2050 (FAO 2011a).

The resource Nexus is crucial for societal well-being and prosperity, and the global Nexus thinking is shifting towards sustainable futures; human well-being, resilient ecosystems and co-existence within planetary boundaries. Access to resources has not been equitable, and a significant portion of the global population still lacks access to electricity (1.2 billion people), clean water (783 million people) and nutrition (842 million people suffer from chronic hunger, according to FAO, 2013a). In addition to meeting growing demands from those who already have access, the water, energy and food systems will need to overcome this access deficit.

2.4. The Model: WEF Nexus Contributes to Better Resources Management

All Nexus conceptions share general perceptions of present and future crises and offer solutions for more efficient management of resources within a green economy, thereby specifically calling for integrated solutions with regard to water, energy and food. The Nexus Approach identifies water, energy and food as the central sectors and advocates for better physical as well as policy and governance integration. It is an approach that integrates management and governance across sectors and scales. The value of the Nexus conceptual framework lies in its focus on interdependencies across a range of sectors and the incorporation of sustainable natural resources management.

The interdependency between the water, energy and food resources in the region is intricate; an integrated or Nexus Approach to resources management and cooperation appears to be the evident way forward.

A core problem, when it comes to addressing the increasing scarcity of resources in a sustainable way that adapts to climate change, lies in the low level of capacity in the institutions and authorities responsible, and in the lack of integration in management and governance of natural resources.

3. PROPOSED WEF NEXUS METHODOLOGICAL FRAMEWORK IMPACTS

3.1 Political Impact on WEF Nexus

Although the connections between water, energy and food security are obvious, there is still no corresponding “Nexus” of capacities to address and manage the resulting challenges at the international political level. Water security is argued to be ‘at the heart of social, economic and political issues’ such as agriculture, energy production and human livelihoods (WEF 3, 2011). The probable consequences – water scarcity, and food and energy crises – could endanger human health and destabilize political systems both within countries and beyond national borders.

In the case of regional conflicts, cross-border collaboration in monitoring supply risks can create transparency and build up trust. Conflicts might be easier to deal with if the benefits from the cooperation were shared rather than the water being divided between the parties. The case of the conflict between, on one hand, Jordan, Palestine, Syria and Lebanon, and other hand Israel, on water resources and the Syrian refugee’s crisis are examples of how politics are heavily contributing to the WEF security.

The relevant national, regional and international institutions should cooperate more closely and increase their focus on cross-sector and cross-border collaboration in the WEF Nexus.

3.2. Impact of Science, Technology and Innovation on WEF Nexus

The introduction of new and appropriate technologies can improve resource efficiency in the water, energy, food sectors, and contribute to their security and sustainability. Introducing renewable energy and improving energy efficiency, modern and precision agriculture, water recycling, and wastewater reuse are just few examples of such driving force between the three components of the Nexus and technology.

When introducing a single sector efficiency measure, an economic efficiency evaluation should be made within the WEF Nexus framework, otherwise it may backfire and may lead to unintended consequences and spill-over effects on other sectors if not appropriately designed.

Technological and innovative solutions within the WEF Nexus, where the three components of the Nexus are integrated as inputs to each other, not only enhance resource efficiency, but also expand the available natural resource base and thus have even more contribution to the sustainability and security of the three resources.

Under the current constraining conditions in the Arab region, such technological and innovative solutions may lend themselves as one of the most important drivers for the WEF Nexus Approach adoption by various stakeholders. Such WEF Nexus technological and innovative solutions are at their early stages in the Arab region, this is understandably due to the need for large capital investments, extensive dedicated collaborative (R&D), immature private sector, lack an environment that enables innovation, and many other required factors.

Recommendations for Enhancement

To enhance the role of technological innovation in the sustainability and security of the water, energy, and food sectors, it is recommended to undertake the following measures and actions:

- Encourage collaborative and focused applied R&D on the Nexus by forming regional research teams and alliances to promote innovation and technology transfer;
- Scale up, replicate and fund on-going projects related to the Nexus including integrated seawater energy and agricultural system, renewable energy for wastewater treatment and reuse, and solar desalination;
- Support and provide incentives for strategic partnerships and cooperation between research centres and the private sector; and
- Build capacity for policy makers and institutionalize regional knowledge management systems to share best practices on the WEF Nexus.

3.3. Impact of Governance and the Role Institutions on WEF Nexus

The institutional framework governing the elements of the WEF Nexus in Arab countries is mostly fragmented, which has in the past and continues today to delay the comprehensive and inclusive management of these interlinked three priorities. This fragmented institutional framework has also led to a sectoral approach to policy planning, and consequently fragmented policies.

In view of the recent global commitments of the SDGs 2030 and the new mandate to have a lower carbon economy of the Paris Climate Summit in December 2015, the current institutional framework in many countries will probably need to be reviewed. It is increasingly evident that development strategies and national policies can no longer be formulated for individual sectors alone. To assure proper adoption of the WEF Nexus, policies and plans must be developed using a multi-stakeholder approach that cuts across the different sectors to address the arising challenges and adequately identify synergies and manage trade-offs.

There is need for a clear determination of national priorities in light of the WEF Nexus that identifies and sets the roles of each ministry while abiding with its mandate (this might be the role of Ministry of Planning in some countries). These national priorities could be related through a national strategy for water, energy and food security.

Managing the Nexus at the local and national level does not require major institutional restructuring, but rather appropriate changes to protocols, procedures and processes that improve interactions among the relevant ruling entities. Another approach to ensure proper coordination is through periodic consultative planning meetings of the undersecretary generals of the key ministries. Enabling existing institutions could be more important and appropriate than establishing new institutions to achieve the targets for both the Sustainable Development Goals (SDGs 2016-2030) and the mandates of the Paris COP21 climate change Summit in 2015.

Coordination and collaboration mechanisms among and between institutions is a vital factor in adopting an “integrated Nexus Approach” to resource management in a new era of diminishing resource base and escalating risks and threats that relate to climate change risks. This situation could be the driver for institutional reform and policy integration of the Nexus in the region. The institutional framework governing the elements of the WEF Nexus in the region needs strengthening mechanisms for effective resource management. There is an inherent need to develop and implement systematic approaches where all stakeholders have a sense of ownership and willingness to cooperate.

There are several options for mainstreaming the WEF Nexus Approach. One option is, however, more favourable than others as it does not aim to develop new entities with the specific mandate of managing the WEF Nexus. Instead, one body already active in elaborating and implementing strategies that are related to the WEF sectors can be the focal point for preparing a comprehensive WEF Nexus strategy for the country. This is possible through policy dialogues and evaluation of policies for the WEF Nexus in a periodic manner. Also, the Nexus Approach may be mainstreamed as part of a sustainability reporting mechanism. Other models that are effective in mainstreaming the Nexus include:

- Shared governance. All the units involved have representatives to a body that will be empowered and entrusted to govern the Nexus.
- High level governance unit. Establishing an independent body with representation of all stakeholders involved in the Nexus that will have resources and authority to implement.
- Private-Public Partnership (PPP). The implementation of the Nexus Approach is expected to conserve resources which may be reflected in the form of financial savings. However, for such a partnership to start up, there is need for initial financing (seed funding).

Recommendations for Enhancement

Governance and institutional structures in the Arab region can be enhanced and strengthened for more effective and integrated resources management through:

- Analyse current national institutional arrangement for better understanding of the weaknesses and gaps that hinder implementing the WEF Nexus Approach in each Arab country.
- Empower and strengthen existing institutions already active in developing and implementing strategies/policies related to WEF sectors to develop a comprehensive WEF Nexus national strategy; a key element of which is data homogenization and sharing.
- Enhance coordinating and collaborating mechanisms amongst institutions as a key for mainstreaming the WEF Nexus Approach at local, national and Arab regional levels, and not necessarily establishing new institutions for the WEF Nexus.

3.4. Impact of Policies and Legal Framework on WEF Nexus

The Arab region is amongst the first regions to develop a regional strategy for Sustainable Consumption and Production (SCP), it is noticeable that implementation of such strategy at the national level is sub-optimal as the vast majority of SCP policies that exist in the Arab region are predominantly supply oriented. Examples of these are: improving efficiency of power generation and water networks, building of new desalination plants, and improving agriculture productivity.

Demand-side policies curbing and influencing consumer demand, for example using economic instruments or rationalizing subsidies are rarely used. It is also remarkable that though the Arab SCP strategy identified energy, water, and food as regional priorities, yet the Nexus concept was not mature enough.

In most of the Arab countries, energy, water, and food policies are developed within each sector with little horizontal coordination. Additionally, climate change is still being addressed as an add-on policy issue rather than a core for development challenges in the region. There is a need for an institutional setup that enhances coordination, builds synergies, and reduces trade-offs across the three sectors, this does not mean creating new institutions, or new hard structures.

The newly established climate change institutions and different forms of multi-stakeholder bodies such as national climate change committees (already formulated in many Arab countries) could serve as a catalyst to mainstream the Nexus Approach at all levels of policy development. Arab Policymakers need to revisit their current and future development strategies and plans with a new Nexus lens. Water, food and energy form a complex web of inter-linkages, and due to their strong interdependence, policies and subsidies in one sector strongly influence the other two sectors. For example, changes in energy policies and subsidies influence water use for food production.

The subsidy system implemented in many Arab countries is an across-the-board subsidy system, or universal, which in fact works in favour of the rich rather than the poor. Thus, the issue of pricing of water, energy and food has always been politically sensitive and thus requires careful consideration. Rethinking pricing schemes of the three resources needs to be undertaken in holistic approach taking into considerations the complexities of inter-linkages. Furthermore, to achieve social justice, universal subsidies should give way to target subsidies for the needy segments of the Arab society. The most important policy reform to be considered is to revise the current pricing policies in these three sectors, and redesign them to reflect the real value of the resources and to contribute to their sustainability. These pricing policies should aim to ensure that basic human needs are met, incentivize conservation of resources, and recover the cost of their service provision without impacting the poor groups of the society.

In order to achieve both the mandate and targets of the SDGs and the Paris 2015 Climate agreement, Arab policy makers need to mainstream the WEF Nexus Approach in their sustainable development strategies, plans, and programs. The League of Arab States needs to revise its current institutional framework of sustainable development to foster the WEF Nexus Approach, system thinking and institutional learning. National and regional efforts to address the climate change challenge offer an unprecedented opportunity for a needed institutional reform in order to mainstream the Nexus thinking in policy development and implementation.

3.5. Impact of Environment - Climate Change on WEF Nexus

Climate change with its most severe impacts in the Arab region is acting as a threat multiplier across all the above resources and human security issues. Climate change adds pressure to ecosystems and natural resources and to human securities as well, e.g. by reducing water availability and/or the reliability of water systems (with knock-on effects for energy systems for example). This increases risks of droughts and floods (also risks related to water and energy infrastructure), land degradation and desertification, loss of agricultural productivity, loss of hydropower production potential, higher temperatures and more heat waves, increasing energy demand for cooling, reduced agricultural yields, etc. (World Bank Group 2014).

The Arab Plan of Action to deal with Climate Change (APACC, 2012) suggests that these climate change impacts “may have social consequences due to the flow and migration of people from the affected areas to others within the same country, neighbouring countries or other countries (environmental refugees), which would result in increased pressure on the environment and resources.” The Arab Strategy for Disaster Risk Reduction also highlights that the region is highly vulnerable to extreme events and natural disasters.

Water security, energy security 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. This strong interdependency between water, energy, food and climate change in the Arab region calls for the Nexus Approach and thinking when addressing the management of these three vital sectors in light of the global UN Sustainable Development Goals (SDGs) and the COP21 Paris climate change commitments in 2015.

Fortunately, this has been recently well recognized in the Arab Strategic Framework for Sustainable Development (ASFSD), adopted by the League of Arab States in 2013, aiming at addressing the key challenges faced by the Arab States in achieving sustainable development during the period 2015-2030. This new development has created unprecedented opportunities for fundamental policy changes in various economic, institutional, technological, and social systems, as well as boosting resource efficiency and productivity by addressing externalities across sectors.

3.6. Impact of Social Change on WEF Nexus

The Arab region experiences new and continuously growing challenges due to socioeconomic transitions related to population growth, urbanization, socio-economic development and political instability, as well as to land degradation and climate change, among others. The region faces an arid and extremely variable climate with increasing pressure on water resources, both natural and human-induced, and is highly dependent on food imports, while at the same time energy – fossil as well as renewable – is abundant. Efficiency of resource use remains low, and under-population and economic development, demands for water, energy and food, and the pressure on natural resources for ensuring human securities all increase rapidly. Climate change aggravates this situation, acting as a threat multiplier.

4. THE MODEL: CATALYSTS FOR IMPLEMENTATION

4.1. Cooperative Advantage of Resources

Having a regional outlook on water, energy and food resources in the MENA, with its wide inter-variability in richness and scarcity, represents an opportunity to make use of the comparative advantage of nations.

The potential for renewable energy in the region is high in most countries, especially in North African countries without fossil energy sources; these countries are already implementing large scale solar power projects. According to the Pan-Arab Strategy for the Development of Renewable Energy Applications 2010 – 2030, the Arab region enjoys a rich endowment of renewable energy resources, particularly solar and wind energies. The potential for some countries such as Sudan and Iraq, rich in water and land, to act as the breadbasket for the region is high. On the other hand, improving transboundary water management could open a window to improved water security.

As the WEF Nexus Approach aims to support decision makers in managing resource trade-offs across different economic sectors and actors, adopting such an approach from a regional perspective taking into consideration comparative advantages could help in securing water, energy and food at national levels.

4.2. The Role of Engaging Stakeholders

It is increasingly evident that development strategies and national policies can no longer be formulated for individual sectors alone but must cut across the different sectors to better manage trade-off. Some argue that managing the Nexus at the local or national level does not require a major institutional restructuring, but rather appropriate changes to protocols, procedures and processes that improve interactions among the relevant governance entities. Others, on the contrary, affirm that lack of co-ordination among institutions (silo decision making) could be a key cause of the Nexus pressures that are being experienced today.

4.3. Enhancing Regional Cooperation

Several ways could be envisaged to strengthen cooperation, on different levels being bilateral or multilateral, in the WEF security Nexus. This is vital not only in view of the need to reduce scarcities and improve levels of access to affordable food, water and energy to the population of Arab region, but could also have positive spin-offs for reducing tensions in the region.

Water, energy and food resources in the Arab region are in a critical situation in general but with interregional variations. Additional stressors are projected to aggravate the WEF insecurities, most prominently climate change impacts, population trends, conflict and refugees. Given that these resources are closely interlinked and interdependent, many countries in the region could benefit from enhanced cooperation to deal with these challenges in a Nexus Approach. The regional landscape presents opportunities

for enhancing cooperation on the WEF security Nexus, such opportunities could take account of the existing institutional and governance landscape and differences of interest in that landscape that hinder cooperation, the resulting policy on the regional level, the wide variability in economic prosperity versus scarcity of resources and the increased level of awareness among policy makers regarding the importance of WEF security.

New initiatives are needed to drive this process. These include confidence building measures, working towards a shared and improved knowledge base, technology transfer and innovation, mobilizing finance, information sharing, capacity and institutional building, encouraging private sector participation and a paradigm shift in donor funding and support.

At the regional level, institutional arrangements and initiatives, under the umbrella of the regional bodies of the League of Arab States, the United Nations Economic and Social Commission for Western Asia (UN ESCWA), and the Gulf Cooperation Council (GCC), are mandated to collaborate and coordinate among countries in the Arab region on the different elements of the WEF. Examples include the Arab Ministerial Water Council (AMWC), the Arab Ministerial Council for Electricity (AMCE), the General Assembly of Arab Ministers for Agriculture (GAAMA), the Council of Arab Ministers Responsible for the Environment (CAMRE), and the Joint Committee on Environment and Development in the Arab Region (JCEDAR).

Other institutions include the Regional centre for Renewable Energy and Energy Efficiency (RCREEE) which was created in 2008 to enable and increase adoption of renewable energy and energy efficiency in 17 Arab states. Even though the regional institutional landscape remains mostly sectoral in structure, the WEF Nexus Approach may represent an opportunity for enhancing cooperation at the regional level. Enhancing coordination and collaboration mechanisms amongst institutions is key for mainstreaming the WEF Nexus Approach at local, national and Arab regional levels, not necessarily establishing new institutions.

4.4. The Role of Increased Awareness

The Arab region is becoming more aware of the Water-Energy-Food Nexus concept and this, to some extent, has created a favourable environment for cooperation within a Nexus Approach. For instance; the Adaptation to Climate Change in the Water Sector in the MENA Region Program in collaboration with several academic partners developed in 2016 a series of policy briefs on the Water, Energy and Food Nexus in the MENA region, which was presented to the League of Arab states on its request. Together with other emerging multilateral cooperation, this suggests an increased level of awareness of the importance of the Nexus Approach in Arab states among policy makers, which in turn presents itself as an opportunity for regional cooperation.

In order to build on this growing awareness, further initiatives could act as drivers to enhance future intersectoral cooperation, such as developing a solid knowledge base for bridging the existing knowledge gap of the WEF Nexus at the national and regional levels by understanding and quantifying the interlinkages between water, energy and food. This is a key starting point, to be followed by focusing on the food supply chain

with its significant losses of food, water and energy, and information sharing within and between nations for improved management and planning, taking the comparative advantage of different countries into consideration. Additionally, the private sector must be encouraged to participate by reducing capital risks with public co-financing, data collection on the economic benefits of sustainability and collection of success stories of private sector investment in sustainability. This will enable policy makers to develop sustainability policies and WEF-related success stories in the region, which should be studied and disseminated with an eye towards up-scaling.

4.5. Private-Public Partnership

The implementation of the Nexus Approach is expected to conserve resources, which may be reflected in the form of financial savings. However, for such a partnership to start up, there is the need for an initial financing (seed funding). This is also of great importance in countries where the government has privatized some sectors, such as drinking water companies (as is the case in Jordan).

5. RECOMMENDATIONS FOR IMPLEMENTATION OF THE WEF NEXUS APPROACH

- Enhance and strengthen governance and institutional structures for more effective and integrated resources management through analysing current national institutional arrangement for better understanding of the weaknesses and gaps that hinder implementing the WEF Nexus Approach.
- Harness existing multi-stakeholder platforms to improve policy coherence, institutional and social learning and leadership. Multi-stakeholder platforms are needed in order to develop and explore science-policy-society linkages and opportunities to share knowledge, including public sector (legislators, politicians, utilities, among others), private sector (utilities, supply chain, agricultural and industrial sector, etc.), civil society and foreign aid agencies.
- Involve civil society in the Nexus governance. This can be an important asset in generating better dialogues and bringing legitimacy and accountability to governing institutions.
- Support and provide incentives for strategic partnerships and cooperation between research centres and the private sector.
- Establish a network of leading experts in the region to create more synergy in the technical knowledge as well as in transboundary issues, international conventions and legal and institutional aspects.
- Enhance coordinating and collaborating mechanisms amongst institutions as a key for mainstreaming the WEF Nexus Approach at local, national and Arab regional levels, and not necessarily establishing new institutions for the WEF Nexus.
- Introduce inclusive and fair rules, institutions and practices governing social interactions to improve outreach to the vulnerable, such as poor men and women, and the younger and older generations.
- Integrate gender issues and participatory approaches into local and regional businesses.
- Ensure that women are equal partners with men in decision-making over development, technology choice, financing and other aspects of water management, food and energy security, and climate change adaptation.
- Carry out reforms at the local level to effectively integrate gender-aware and participatory approaches into local and regional businesses, especially to empower women.
- Apply appropriate policy, legislative and economic tools to ensure that basic human needs for the three resources are met at a low, subsidized price, while excessive use is priced at a tariff that reflects cost.
- Mainstream the Nexus mental models, concepts, and tools in policy and development plans.
- Ensure that the environmental and social needs of future generations are reflected in current policies and practices.

6. CASE STUDY – GUIDELINES FOR GREEN PROCUREMENT AT MUNICIPALITIES: A REGIONAL EXPERIENCE

6.1. Introduction

Governments are among the largest consumers in an economy. The public sector on average spends 45%-65% of their budgets on procurement (www.iisd.org/markets/procurement/ Sustainable Public Procurement in South Africa). Given this substantial purchasing power, governments have enormous leverage to stimulate and drive markets for sustainable production and consumption when they make a determined effort to purchase 'green' products and services. Adopting such an approach is a smart form of procuring goods and service – it not only improves the efficiency of public procurement but also uses the public market power to bring about significant environmental and socio-economic benefits. (Green procurement: a guide for local government, Urban SEED, Vol-2, 2012).

Green Public Procurement (GPP) is a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their lifecycle when compared to goods, services and works with the same primary function that would otherwise be procured. By using environmental criteria, public authorities can buy electricity, transport services, office IT equipment, food and catering services and many other goods and services that contribute to the reduction of environmental impacts.

The concept of GPP has been widely recognized in recent years as a useful tool for driving the market for greener products and services and reducing the environmental impacts of public authorities' activities.

Green procurement is the purchasing of supplies and services that have a smaller negative impact, or even a positive impact, on the environment and human health when compared with competing products or services that serve the same purpose.

Environment + Price + Performance = Green Purchasing

To determine whether a product or service is "green," one needs to consider the environmental impact throughout its life cycle – beginning from the extraction of raw materials to manufacturing of the product, packaging, distribution, re-use and disposal.

Cost also needs consideration, but lifetime costs, rather than up-front capital costs (i.e. initial purchase price) - which ignore usage costs associated with electricity and water consumption, maintenance expenses and disposal costs at the end of the product's life - should determine purchasing policies. An example is energy efficient light bulbs/lamps, which cost more to buy than inefficient incandescent light bulbs but cost less in the long run due to the electricity saved during their lifetime and last ten times longer.

Green Procurement may initially appear to compete with developmental priorities and financial prudence (e.g. the least-cost approach set out by the Municipal Financial Management Act). Fortunately, development, financial prudence and green procurement complement each other more often than not. A municipality can meet its “green” goals, while still addressing developmental concerns and savings costs. The concept of looking at the entire lifecycle of a product or service is particularly important. In the case of goods, this will normally involve the production process and well as the use period and end-of-life disposal. For services, it will involve the systems and materials used to provide the services - for example cleaning or catering. While the range of environmental impacts addressed by GPP is very wide, some examples are shown below (Table-1).

Table-1. Environmental Impacts of Certain Public Contracts

Type of Public Contract	Environmental Impacts Addressed by GPP
IT equipment (computers, printers, servers)	Energy consumption, use of hazardous substances, recyclability of parts, ability to upgrade components, take-back schemes.
Vehicles and Transport	Emissions of greenhouse gases and particulate matter (PM), fuel consumption, noise and use of raw materials.
Construction	Energy and water consumption, materials used, waste from the construction process, air quality, noise and traffic.
Food and catering services	Sustainable use of land and water, use of pesticides and fertilizers, food waste, packaging.

GPP does not necessarily mean spending more on procurement. In some cases, green goods and services will cost less overall, particularly if they save energy or are more durable. One way of determining whether this is true is by applying life cycle costing (LCC) - a technique which is discussed in Guidelines published by the Project in 2016. In some cases, the savings from GPP can be large. For example, the City of Vienna saved €44.4 million and over 100,000 tonnes of CO2 between 2004 and 2007 through its “Eco-Buy Programme.”

In other cases, there may be a cost premium associated with GPP, in which case the contracting authority must weigh this against the environmental or other benefits associated with greener products. Market research carried out in advance of tendering can help to determine both the availability and cost of green products in the relevant sector.

6.2. Why Green Procurement?

There are many compelling reasons to make the shift to green procurement. Here are a few that can be used in any document that seeks to motivate the adoption of a green (or resource-efficient) procurement programme:

1.1. The resource-efficient purchasing option (energy, water and resource-efficient products and services) is often the financially efficient (money-saving) option, especially if the “life-cycle cost” of the product or service is considered, i.e. the total purchase and running costs. The procurement of environmentally preferable products can reduce waste management fees and reduce spending on pollution prevention.

1.2. Even when the cost of a green product or service is not the best for the municipality, it is often the best for the community. This can be measured by taking into account all the ‘external costs,’ which include the human and monetary cost of sourcing raw materials, manufacturing, packaging, distribution and disposal. In the case of local government, this can be a very compelling reason for “buying green.”

1.3. Green procurement seeks to reduce resource usage. In a world with diminishing resources per capita, this is an important consideration.

1.4. International or national action to mitigate climate change may impose regulatory penalties for inefficient resource use, e.g. carbon tax. The foresight of switching to green procurement now will be a financial boon to municipalities in future. Staying ahead of legislation is likely to be more resourceful than having to quickly respond once it is in place.

1.5. Resource-efficient procurement often supports local and smaller suppliers, because it implies the purchase of local products that do not incur high transport (fuel) use. Local suppliers can also be monitored more easily for good resource-efficient and human labour manufacturing practice. Local purchasing will lead to significant job creation and the improvement in the wellbeing of local communities.

1.6. Insisting on green services and supplies is likely to lead to increased competition and drive innovation amongst suppliers, which will speed up the general transition to a more sustainable business environment in the municipal area. There is an increasing trend where cities use a “green” business environment as a marketing tool. Engaging with regular local suppliers to encourage environmentally innovative approaches, and providing potential markets for such products, can support these suppliers by giving them a competitive advantage nationally and internationally.

1.7. Revisiting the current procurement practice can unearth better purchasing choices. For instance, motivating a supplier to adopt more resource-efficient practices themselves or getting council employees to start thinking “green” in their own behaviour.

6.3. Benefits of Green Procurement

If the public sector does better at buying green, it could solve several problems at once. It would be improving the climate and environment at the same time as creating growth and jobs at enterprises which develop green technology. In other words, green procurement is one of the keys to transforming the world to a green economy

Environmental:

- Allows public authorities to achieve environmental targets.
- Raises awareness of environmental issues.
- Reduce greenhouse gas emissions; purchase low carbon products.
- Save energy and water; purchase energy/water saving products.
- Reduce waste; purchase products with recycled content.
- Improve indoor air quality; purchase non-toxic products.

Local Community and Economies:

- Provides incentives for industry to innovate.
- Promotes green products and environmental technologies.
- Saves money when the lifecycle cost of products is considered.
- Develop and support markets; for local green suppliers.
- Contribute to green jobs by supporting sustainable industries.
- Support local communities; groups, schools and businesses that are buying green products.
- Improve quality of life both directly and indirectly.
- Helps establish high environmental performance standards for products and services.

Political and for Organization:

- It is an effective way to demonstrate a public authority's commitment to environmental protection and sustainable consumption and production.
- Demonstrate leadership; 'walk the talk' on sustainability.
- Meet expectations of staff, community and suppliers; for improved environmental performance.
- Reduce costs and improve efficiency; on energy, water and waste.

6.4. How Does a Municipality Implement Green Procurement?

Now that we have a good idea of what we are trying to achieve by introducing a Green Procurement Policy (GPP) and set of procedures, how does a municipality go about it? In all that follows, the key factor that will influence success or failure in the integration of GPP with the existing procurement framework is "buy-in."

There is a need for buy-in and understanding, particularly from politicians (political mandate) and top management (financial officers and supply chain management), from procurement personnel, from suppliers, from the internal customers who use central procurement, from those responsible for decentralized procurement, from marketing and public relations and probably a few more.

Thorough implementation of green procurement principles is dependent on all personnel within an organization understanding and practicing the principles of green procurement. There will be opposition, change always generates that, so be on the look-out for it and try to be pro-active to limit its impact.

STEP 1: Form a green procurement team

First, identify staff/departmental champions that will make up the implementation team and drive the process within various departments. Ensure that the team is adequately trained for the job. Staff would need to have a thorough understanding of resource-efficient procurement principles, including understanding why what they are doing is important and their responsibility to create the change that is needed.

STEP 2: Decide on an implementation approach

A decision must be taken as to whether to take a “big-bang” approach or to identify some pilot projects that are likely to succeed. The latter is the recommended approach, although your particular situation might require the former. GPP is likely to be successful in most situations if gradually phased in, rather than implemented overnight. Characteristics of successful pilots include products or services where:

- A large amount of information is available on how to measure the “greenness” of the product.
- There are existing suppliers who are promoting their products as green.
- Prices are relatively low with no major differences across suppliers.
- The price of green products is not significantly different to that of traditional products.
- Quantities are large and the product is ordered by a large range of internal customers.
- The product currently purchased is negatively impacting the environment.
- The impact of the change will be highly visible to all.

Examples of products that meet these requirements are printer/Photostat paper, paint, cleaning products and efficient lightbulbs.

STEP 3: Review the Current Situation

Review the current procurement policy, process and procedures to include green procurement. Keep in mind the following guiding questions to inform the review:

Challenges: Why hasn’t green procurement developed naturally? What has stopped it from taking root? How can we identify and resolve these challenges?

Opportunities: Where do we already have resource-efficient procurement in place? How did it happen without a major intervention? What lessons can we draw from this to increase our chances of success?

STEP 4: Market the Project

A project launch will raise the project profile and increase awareness, understanding and support of the municipality's efforts. Internal and external communication campaigns will increase buy-in and action, internally and externally. If documents have a logo on them that categorize them as part of the pilot, this will help both suppliers and local authority employees to understand what is happening. Slogans such as "Avoid, Reduce, and Recycle" can be displayed around the organization.

STEP 5: Market Analysis

Since the procurement department may not be very familiar with the sourcing of green products, market analysis will be useful. Various useful websites are available evaluating products in terms of their environmental impact.

STEP 6: Engage Suppliers

Once the market has been better understood, responses can be requested from suppliers after a choice has been made on the products and services required. This is best done as an interactive process, where suppliers are able to communicate with procurement to establish realistic standards, discuss possible development projects to produce better products, and suggest alternative solutions. Meanwhile, the team would be researching solutions and technical standards that can be used in product and service evaluation.

STEP 7: Decide on Monitoring Approach – what is to be measured and how

It is very important to demonstrate project success or lessons learnt through monitoring. Establish the indicators that determine whether the pilot has been a success and make sure they can be measured, and that the necessary measurement plans are in place

STEP 8: Formalize Procurement

Ensure the tender/bid specifications or contract reflects the new product or service criteria. These should include specific and easily understandable criteria in addition to general criteria. The legal department can assist in drawing up a sound contract that meets the municipality's standards.

STEP 9: Pilot Wrap-Up

It is important that the pilot has an end-date and is evaluated. Often these projects fail due to lack of a pre-determined end date and set of measurements to be evaluated. An objective, neutral group of people (preferably from senior management) should receive the results. Once the pilots have been implemented, it should be possible to build on them by expanding the range of products and services that are subject to the Green Procurement Policy.

6.5. Solutions to Potential Challenges

Following is a list of solutions to the most likely challenges to be faced in the implementation of green procurement:

Challenge: Price.

There is a perception that resource-efficient products and services are more expensive.

Solution:

Challenge these perceptions and find products for the pilot where this is not the case.

- Full life costing needs to be considered over short-term thinking. 'Value for money' principle of procurement takes into account the full cost of the product over its entire life, not its cost over only one year. Budgetary mechanisms need to be put in place by Municipal Finance Departments to encourage whole life costing.
- Resources need to be dedicated to developing the business case for environmentally preferable goods and services.
- Find and demonstrate examples of where this is already happening in your city, e.g. the City of Cape Town's Electricity Department uses transformer stations that are expensive, but last much longer than cheaper ones.

Challenge: Insufficient knowledge.

Many local authorities are unfamiliar with the concept of resource-efficient procurement or with the options available to them.

Solution:

- Train the driving team – particularly the Supply Chain Management (SCM) staff and line managers. This should be integrated with existing training, e.g. when Accounting Officers SCM system is undergoing its annual review.
- Provide support: environmental departments would need to provide support to develop criteria for relevant (department-specific) products and services.
- Broad awareness raising sessions will be required for common understanding among all officials involved in procurement activities of what green procurement is and highlight elements of green procurement already being practiced.
- A phased approach to implementation will help set up the necessary expertise to develop relevant environmental procurement criteria.

Challenge: Availability.**Solution:**

- Alert your suppliers and enter into discussions with them - working with your regular local suppliers to encourage environmentally innovative approaches, and providing potential markets for such products, can help to give these suppliers a competitive advantage nationally and internationally.
- Choose viable pilot projects.
- Implementation of any green procurement policy should be phased in accordance with product availability or potential availability.

Challenge: No acceptable alternative to present product.**Solution:**

- Run a pilot on products and/or services that do have acceptable alternatives.

Challenge: No ‘green’ specifications provided by supplier.

Solution:

- It is important that suppliers be asked to provide the environmental specifications of the products they are offering. Choose a pilot where specifications are reasonably available, either from existing suppliers or as standards provided by an independent local or international organization.
- National, provincial and municipal supplier database could be extended to include environmental information.

Challenge: Purchasing habits.

Solution:

- Work with central procurement for your pilot, where existing relationships are better understood and may be managed.

Green procurement offers huge potential in meeting sustainable development objectives of local government. It is in fact a strategic opportunity waiting to be seized but requires determined and focused action and drive to facilitate the necessary behavioural changes across all spheres of government. Local government (including the rest of the public sector) need to promptly become aware of the enormous power of its spending as a tool towards delivering on its developmental priorities in a sustainable manner into the future.

Given that a municipality can measure the “greenness” of the product or service it is intending to procure, does it now suddenly make “greenness” the single determining factor as to which alternative it procures? Of course not, all the traditional factors such as price, performance, availability, safety and service must be part of the equation. But what shouldn’t happen is that “greenness” gets added on as an afterthought at the end of the list of all the other factors.

What needs to happen is that whatever the current formula is for weighting the different factors, this must be adjusted to also include “greenness.” That is a major strategic decision which needs wide discussion, not only within the procurement division, but throughout the institution. What is likely to happen through this conversation is that the institution itself will need to indulge in introspection as to just how committed it is to a sustainable environment, how resource-efficient its own services and products are, and to what extent it is prepared to alter its traditional yardsticks to move towards the sort of organization it wants to be.

6.6. Green Procurement in Sustainable Energy Action Plans (SEAPs) and Covenant of Mayors

The Covenant of Mayors is the mainstream European movement involving local and regional authorities, who voluntarily commit to increasing energy efficiency and using renewable energy sources on their territories. Through their commitment, Covenant signatories aim to meet and exceed the European Union objective of a 20% reduction in CO₂ by 2020.

The Sustainable Energy Action Plan (SEAP) is a key document outlining how the Covenant signatory intends to fulfil its commitment by 2020. It uses the results of

the Baseline Emission Inventory to identify the best fields of action and opportunities for reaching the local authority's CO₂ reduction target. It defines concrete reduction measures, together with time frames and assigned responsibilities, which translate the long-term strategy into action. In the main target sectors of a SEAP – buildings, equipment/facilities and urban transport – green procurement plays a central role. Signatories commit to submitting their SEAPs within the year following adhesion. The Covenant signatories could follow the structure of the SEAP template when preparing their Sustainable Energy Action Plan. The suggested content is:

1. SEAP Executive Summary.
2. Overall strategy.
3. Baseline Emission Inventory.
4. Planned actions and measures for the full duration of the plan (2020).

Green Public Procurement in Sustainable Energy Action Plans

GPP can make a substantial contribution to the EU's 20-20-20 goals. Considering that public procurement accounts for around 18% of GDP in the EU, GPP could provide strong impetus for a reduction in EU greenhouse gas emissions, raise the share of EU energy consumption produced from renewable resources and improve the EU's energy efficiency.

(SEAPs) have become a powerful tool for cities and regions to plan, implement, monitor and evaluate climate and energy policies, and in doing so contribute to global mitigation and adaptation achievements. Through SEAPs, cities can implement measures in a structured and integrated manner, allowing them to systematically monitor their efforts in going beyond national legislation in these fields. A SEAP is also an instrument for cities to communicate to stakeholders – both locally and beyond – the importance of energy and climate change mitigation, and to encourage citizens and other relevant actors to subscribe to the city's ambitions.

Energy efficiency plans provide systematic ground for sustainable procurement. Public procurement and the way procurement processes are shaped, and priorities set in the procurement decisions offer a significant opportunity for local authorities to improve their overall energy consumption performance. SEAPs enable municipalities to gain political support for GPP, organize structures, set GPP targets, implement GPP and monitor success.

A SEAP can help disseminate the benefits of GPP as it can:

- Lead to savings in energy, water, and materials as well as in the associated operation.
- Reduce polluting substances and greenhouse gas emissions.
- Improve services to the public and thus enhance quality of life, meet higher quality standards and deliver better performance for public authorities and ultimately citizens.
- Create incentives for industry to develop 'green' technologies and products and promote them in the marketplace (influence the marketplace and encourage new entrants in the field of environmental technologies and products).
- Often lead to savings – for public authorities making the purchases and for society in general when the life cycle costs of the product are considered.
- Help new products and services that have been developed to meet the requirements of GPP to also become popular with private consumers.

GPP should form part of the municipality's long-term strategy. Green purchasing practices can contribute significantly to the strategic objectives of public authorities.

Both the long-term vision and the detailed measures are integral parts of the SEAP. For example, as a long-term strategy, the local authority could decide that all cars purchased for the municipal fleet should be electric. Of course, the municipality cannot vote on the budget for all cars that will be purchased up until 2020, but they can include this measure in the plan and evaluate its impact up until 2020 by reviewing the estimated future purchases of cars by the municipality.

When considering a GPP policy, it is important to define what the main objectives of the policy should be. For example, the contracting authority may already have other policies or decrees in place (political decisions already reached regarding the avoidance of certain products, local procurement handbooks, Environmental Impact Assessments, etc.) which cover some of the aspects of the proposed new GPP policy. By identifying any such policies and analysing their content, you will be able to ensure that your proposed policy does not conflict with the contracting authority's other objectives. Once you have identified synergies with any other policies, your main objectives can be defined more accurately.

References:

Bizikova, L., Roy, D., Swanson, D., Venema, H. D., & McCandless, M. (2013). The Water-energy-food Security Nexus: Towards a Practical Planning and Decision-support Framework for Landscape Investment and Risk Management. International Institute for Sustainable Development. Retrieved from http://www.iisd.org/sites/default/files/pdf/2013/wef_Nexus_2013.pdf

Gelil, I. A., El-Ashry, M., & Saab, N. (2013). Arab environment 6: sustainable energy prospects, challenges and opportunities. Beirut, Lebanon: Arab Forum for Environment and Development [AFED].

Sadik, A. (2013). Food security and agricultural sustainability. Kuwait: Kuwait Fund for Arab Economic Development.

Siddiqi, A., & Anadon, L. D. (2011). The water–energy Nexus in Middle East and North Africa. Energy Policy, 39(8), 4529–4540.

Mofo, L. (2013, September). Nexus Assessment in the MENA Countries. Presented at the World Water Week in Stockholm, Stockholm, Sweden.

Moawad, A. (2011, November). Future of desalination in Egypt. Presented at the Second Arab Water Forum, Cairo, Egypt

Food security and nutrition in the Arab region: key challenges and policy options. (2012). Cairo, Egypt: Food and Agriculture Organization of the United Nations.

FAO, (2002). Analytical Framework: Sustainable Livelihoods. Food and Agriculture Organization of the United Nations Accessed at <http://fao.org/docrep/007/j2602e02.html>

FAO, (2008). The Livelihood Assessment Tool-Kit: Analyzing and Responding to the Impact of Disasters on the Livelihoods of People. Food and Agriculture Organization of the United Nations, Rome

FAO. (2011)a. The state of the world's land and water resources for food and agriculture (SOLAW) – Managing systems at risk. Rome: Food and Agriculture Organization of the United Nations and London, Earthscan.

FAO. (2011b). Energy-smart food for people and climate. Issue Paper. Rome: Food and Agriculture Organization of the United Nations.

FAO. (2011)c. Climate change, water and food security. FAO Water Reports No. 36. Rome: Food and Agriculture Organization of the United Nations.

FAO. (2013). A common vision and approach to sustainable food and agriculture. Working Draft. Rome: Food and Agriculture Organization of the United Nations.

FAO (2014). The Water Energy Food Nexus – A new approach in support of food security and sustainable agriculture, Rome 2014

UNU (2013). Water Security and the Global Water Agenda. A UN-Water Analytical Brief, ISBN 978-92-808-6038-2, United Nations University, 2013. http://www.unwater.org/downloads/watersecurity_analyticalbrief.pdf

Water in the West. (2013). Water and Energy Nexus: A Literature Review. Stanford, CA: Stanford University

Department for Environment, Food and Rural Affairs Departmental Report (2007).

Hoff, H. (2011). *Understanding the Nexus*. Background Paper for the Bonn2011 Conference: The Water, Energy and Food Security Nexus. Stockholm, Sweden: Stockholm Environment Institute (SEI).

IEA. (2010). *Key world energy statistics*. International Energy Agency (IEA).

WEF (2011): *Water Security: The Water-Food-Energy-Climate Nexus*, Island Press.



INTERNATIONAL UNION FOR
CONSERVATION OF NATURE

Regional Office for West Asia
Abdel Latif Salah street, bldg. 29 ,
Sweifiyeh, Amman, Jordan
T. +962 6 554 6912
www.iucn.org/westasia

