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Challenges of Water-Energy-Food nexus in developing countries: decision support framework for Algiers city

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Backround

Urban growth and cities' transformation process are both increasingly recognized as inevitable and complex. Their impacts on the natural, social and economic environment raise the question of urban territories capacity to absorb population growth without causing irreversible damages, particularly on resources.

By 2030, Algiers undergo environmental and climate pressures: temperature +2°, level of sea +16 cm, rain - 15%, drought and erosion.

The city of Algiers covers an area of 809 km² with almost 4 million inhabitants, it has multiple strength and potentialities, however its perimeter is urbanized at more than 90%. Under constant demographic and environmental pressure, the city consumes agricultural land which increase food insecurity.

24 % of goods and services production activities cannot develop due to lack of water and energy.

Agricultural area represents 0.43% of the total cultivable area of the country.

Also, she is confronted with the prospect of water stress and energy crisis by 2030 and shows growing demand of drinking water and energy. Algiers territory requires the establishment of intersectoral management to improve its resilience and meet the challenges of food, energy and water security.

WEF Nexus for Algiers city

Considerable attention is recently paid to Water-Energy-Food (WEF) Nexus as a tool able to focus on the synergies and trade-offs between the water, energy, and food sectors, in order to achieve an efficient use of resources.

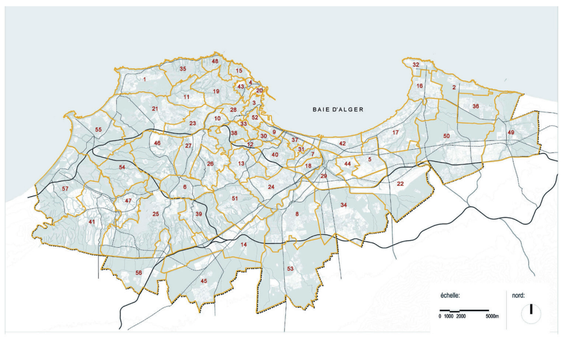
99 % energy from fossil resources

30 % leakage of drinking water in network

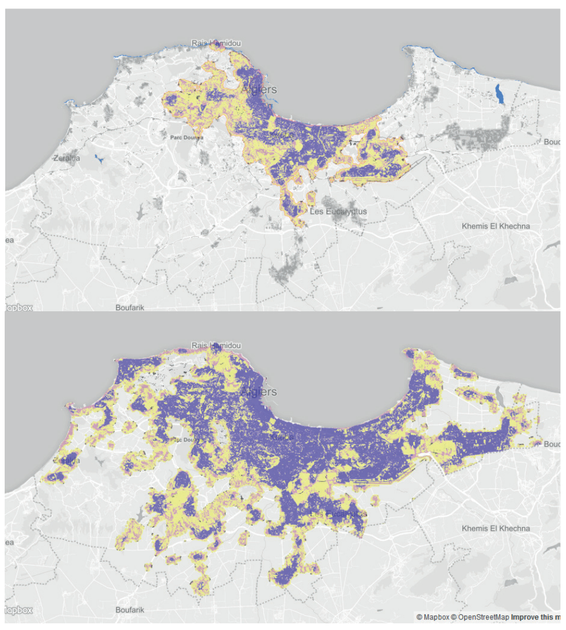
6000 Ha of loss of agricultural land in 10 years

With growing populations especially in developing countries like Algeria, global demand for water, energy and food is increasing due to demographic growth, economic development, urbanization, productivity, rising standard of living and infrastructure development.

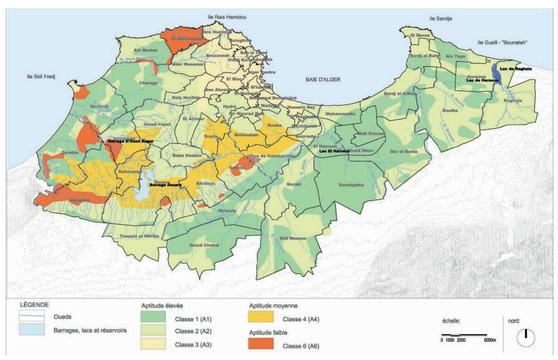
This rising demand will pose a huge pressure on existing WEF systems, which have already been constrained due to limited resources and potential impacts of climate change.



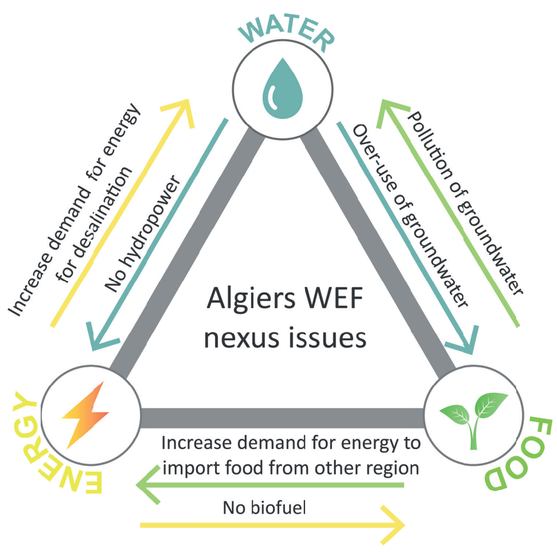
Perimeter of the city of Algiers (57 municipalities)



Evoultion of urbanization from 1987 to 2014 (openstreetmap)



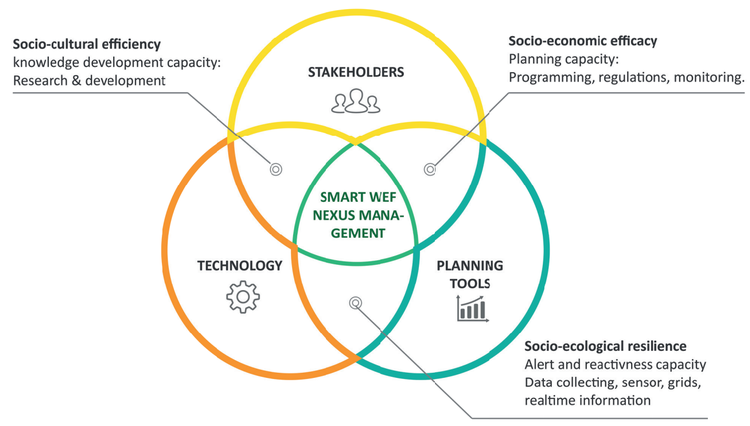
Map of agriculture land quality (Green is the best and it is almost urbanized), (PDAU,2015)



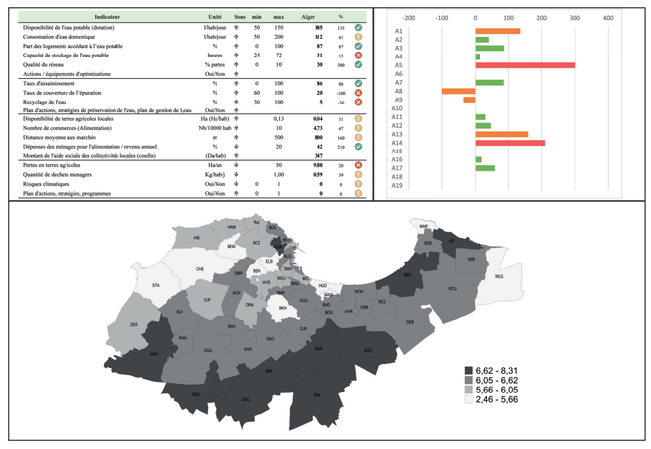
In this context, the challenge that decision makers of Algiers city are facing is how to maintain a certain degree of economic growth and social development while conserving resources and preserving environmental sustainability.

Decision support framework

Therefore to a better management system for the nexus, it should be based on 3 component that work in synergies : Planning tools, stakeholders and technologies.



As part of this system, we focus on the urban planning capacity. The outcome is a planning decision support framework for Algeirs city, built as a monitoring tool using a set of indicators that help the policy-makers to measure and monitor the WEF Nexus connections' balance.



The nexus approach in the context of developing countries is interesting for achievement sustainable development targets. As a tool integrated to the planning process, it can improve intersectorial managment and improve security of the WEF Resources.

References

Berezowska-azzag, E., Abdelatif, I., & Akrour, N. (2014). La recherche d'intercommunalité par l'évaluation des performances environnementales locales à Alger. Méditerranée, 123, p31–47.

Berezowska-Azzag, E., Abdelatif, I., Akrour, N., Bouallag-Azoui, O., & Srir, M. (2015). Baromètre des performances urbaines locales, Alger et ses communes. Alternatives Urbaines.

Khacheba, R., Cherfaoui, M., Hartani, T., & Drouiche, N. (2018). The nexus approach to water–energy–food security: An option for adaptation to climate change in Algeria. Desalination and Water Treatment, 131, p30–33

Naimi-Ait-Aoudia, M., & Berezowska-Azzag, E. (2014). Household water consumption in Algiers facing population growth. Proceedings of the 50Th Isocarp Congress: Urban Transformations: Cities and Water, 872–882.

MATE. (2010). Schéma directeur d'aménagement de l'aire métropolitaine d'Alger (SDAAM). Alger: Ministère de l'Aménagement du Territoire et de l'Environnement.

Wilaya d'Alger. (2011). Diagnostic prospectif, liverable 4. Alger: Master Plan, PDAU

Wilaya d'Alger. (2011). Stratégie et schéma d'aménagement des espaces naturels, agricoles et patrimoniaux remarquables, Liverable 10. Alger: Master plan, PDAU.