

How to become a Sustainable Smart City: the case of Al Quassim Eco-Neighborhood, Saudi Arabia

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1 ABSTRACT

Sustainability is a word we started to hear it lately a lot and think about it. The effect of the new approach of sustainability in architecture have been noticeable by everyone and how it will be beneficial for the environment and the next generations. Heading towards sustainability and solar energy systems in neighborhoods, cities, and apply them in a way that it will be acceptable by the Saudi Developments, especially on cities like Al Quassim. Merging the vernacular building material with the new smart techniques will allow residential modules to be self-efficient in terms of energy Consumption, taking in considerations similar experience from Hassan Fathy and contemporary projects in the Middle East. Accordingly, this paper is discussing assessment of renewable versus non-renewable resources adopted within Saudi settlements. The Discussion elaborates on material resources available and the potential creating a smart model to be adopted as a prototype in hot arid Climate around Saudi Cities.

2 INTRODUCTION

A home is a place that should provide to its inhabitants the feeling of comfort and security from the outside to the inside. What if the home turned into a neighborhood, and the neighborhood turned into an Eco-neighborhood providing you with all of you needs and your community needs. . The idea of taking care of our planet should be applied and obvious to everyone starting from our homes to everywhere. An Eco-neighborhood that provide a high level standard of living to the people with smart techniques that allow people to live in self-efficient home which comes in differnt housing units to serve the community needs. And having all the required facilities within a walkable shaded distance. The project have an objectives to be achieved which is: Improve people living, develop the social sustainability, enhance the living environment, improve our economy, develop the Social Sustainability, relations, and communication.

3 SOCIAL AND CULTURAL SUSTAINABILITY OF SAUDI TRADITIONAL HOUSES

Sustainability is the 21st century new approach of the vernacular architecture. Most of the architects around the world agreed that the vernacular architecture functioned more effectively than the modern building which was the result of what the people used before they built from what's in existing in their environment, and they used very smart techniques for the natural sun light and air ventilation. (Susilawati & Al-Surf, 2011). The kingdom of Saudi Arabia has many societies with different valuable traditions and each of those societies has special physical characteristics. (Al-Naim, 2008). Each society in the world has a unique standard to differentiate it from the rest of the world. Reaching the social and cultural sustainability has to be after a social study and meet the culture needs to have a great application of the housing design. (Al-Jamea, 2014).

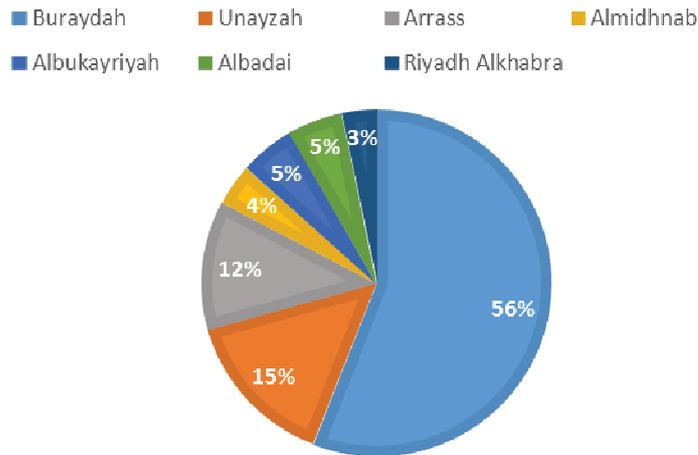
4 PRINCIPLES OF SOCIAL AND CULTURAL SUSTAINABILITY IN SAUDI ARABIA

Dr K. Galal worked in a research for the Sheikh Zayed Housing Program in United Arab Emirates which turned with 8 main principles for social and cultural sustainability, however in Saudi Arabia Privacy consider to be a main principle to be added to the previously mentioned. The 9 principles are as following: Responsiveness to social needs, responsiveness to cultural values, quality of life, adaptability, safety, security, participation, accessibility, and privacy

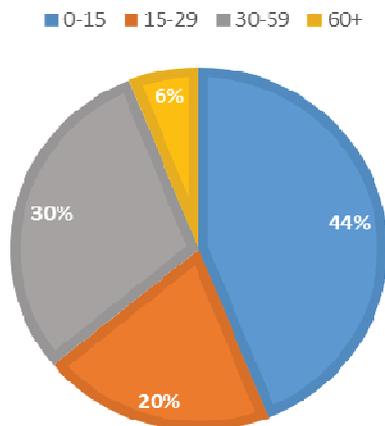
5 URBAN SETTLEMENTS AND DEMOGRAPHIC CHARACTERISTICS

The main objective of the proposed scheme Regional is to encourage the population to stay in the Qassim region by making it a place more attractive to live and work in it. This requires basically two things: expanding the employment base and improve the access of local people to facilities and services .. indicates the region's resource base analysis capabilities that provide these two requirements satisfactorily can be achieved by focusing development in urban centers of the seven main cities: Buraidah, Unaizah, Ar Rass, Almidhnab, Al Badayea, Albukayriyah, and Riyadh Al Khabra.

5.1 The population in the seven main cities of Qassim (conducted 2010)



5.2 Population by age (conducted 2010)

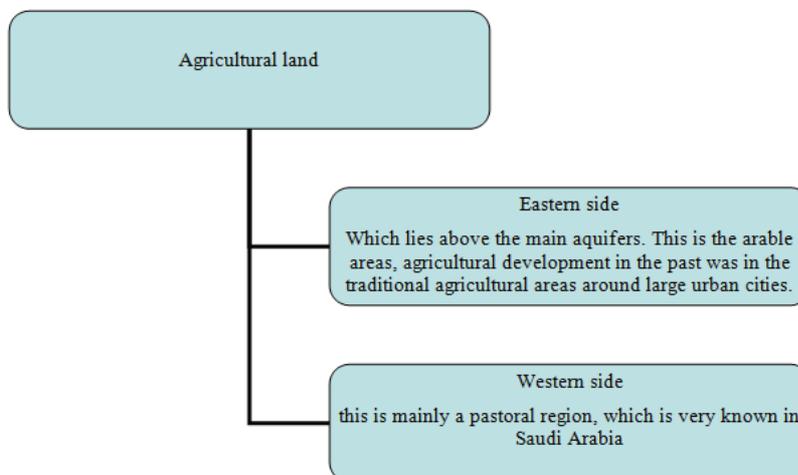


6 NATURAL RESOURCES IN AL-QUASSIM

6.1 Groundwater

Sources of groundwater provide almost all the needed water of Qassim region, the underground reservoirs is located in the eastern part of the region.

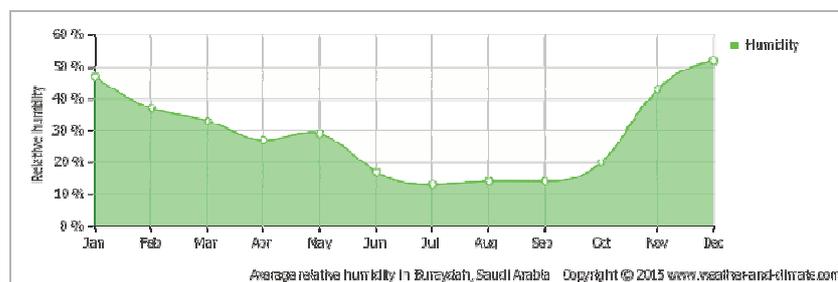
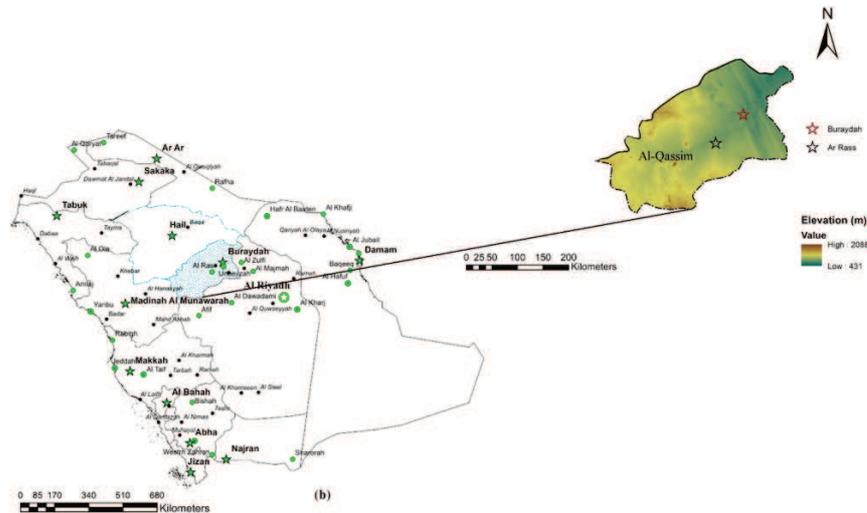
6.2 Agricultural land



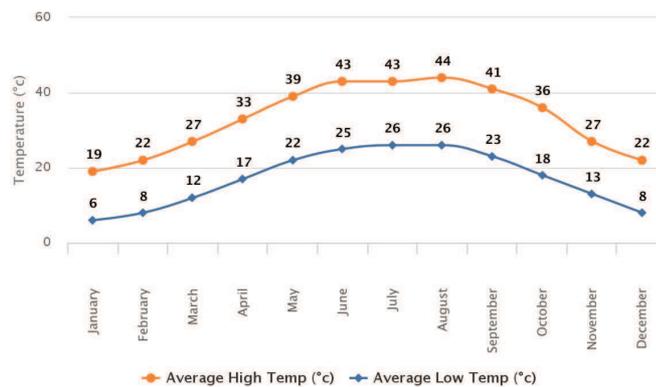
6.3 Minerals

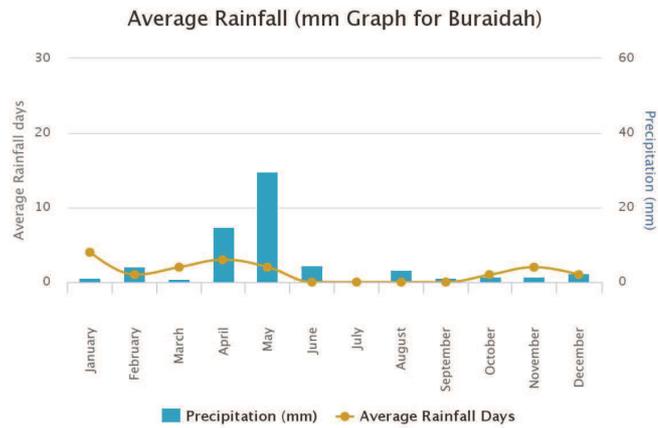
- Mineral Bauxite in the northeastern region.
- Gold is available in Ackiberat mine.
- Salt and kaolin.
- Gypsum.
- Plutonic rocks and marble.
- Sediment used for the industries in the cement and the tiles in Qassim.

7 ENVIRONMENTAL ANALYSIS FOR BURAIDAH



Average Temperature (°C) Graph for Buraydah





8 CONCLUSION

Saudi Arabia now in a transitional phase each region in the country have a future plan towards Sustainability. However; to reach a Sustainable level of living in Qassim we should not underestimate the social and cultural factors that's affect the society, where they are very committed to the tradition, and to consideration the environment factors which is has a huge effect on the region.

REFERENCES

- Al-Jamea M.: Towards social and cultural sustainability in the designs of contemporary Saudi houses. *International Journal of Sustainable Human Development*, 2(1), 35-43, 2014.
- Al-Muhanna A., *Eco-Neighborhood In Al- Quassim*, Capstone project thesis, 2016.
- Al-Naim M. A.: Identity in transitional context: Entity in transitional context: Open-ended local architectural in Saudi Arabia. *International Journal of Architectural Research Arch net-IJAR*. Vol. 2, No. 2. 125-146, 2008.
- "Buraidah Monthly Climate Average, Saudi Arabia." Buraidah, Saudi Arabia Weather Averages. N.p., n.d. Web. 29 Apr., 2016.
- Galal K.: Evaluation of social and cultural sustainability in typical public house models. In *Al Ain, UAE. Int. J. Sus. Dev. Plann*, Vol. 6, No. 1, 49-80, 2011.
- Mossad, Amr, and Abdulrahman Ali Alazba, "Drought Forecasting Using Stochastic Models in a Hyper-Arid Climate." *MDPI*. N.p., 25 Mar. 2015. Web. 7 May 2016.
- Saudi Arabia. Municipality of Al Qassim. *Geographic Profile*. N.p., n.d. Web. 20 Apr. 2016.
- Saudi Arabia. General Authority for Statistics. *The General Population and Housing Census*. N.p., n.d. Web. 26 Apr. 2016.
- Susilawati C., and Al-Surf, M. A.: Challenges facing sustainable housing in Saudi Arabia: A current study showing the level of public awareness. *Queensland University of Technology*. In: *The 17th Pacific Rim Real Estate Society Conference*, Bond University, Gold Coast, 2011.
- "World Weather & Climate Information." *Weather and Climate: Buraydah, Saudi Arabia, Average Monthly Humidity*. N.p., n.d. Web. 29 Apr. 2016.