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Sustainable Agriculture in Oman and SDGs

“Development is not an end in itself; it is for building human; its tool and its maker. Then, sustainable development shouldn’t stop on the concept of wealth and building the economy, it should go beyond that to accomplish human’s progress and to find the citizen who is capable to contribute greatly and consciously in constructing the country.”

His Majesty Sultan Qaboos bin Said

The Omani renaissance and development plans were built and supported by the sustainable development philosophy. Sustainable development has been part of Oman long before the launch of sustainable development goals by the United Nations and it can be touched in the five-year development plans that were initiated in 1978. The United Nation’s SDG are included in Oman’s digital government strategy. In order to strengthen the use of the SDGs in the Sultanate, several initiatives have been found like the Oman Center for Governance and Sustainability (OCGS), The national youth program for skills development and the Sultan Qaboos Award for Sustainable Development in School Environment. The common target in these initiatives are the people especially the youth and this is totally make a powerful impact in the success of the sustainable development since his majesty confirmed that the most effective weapon in sustainability is the individuals and their contribution. Once you educate the youth and build a strong foundation, you build a mindset that will automatically see the importance of these goals in their daily life. For example, the Sultan Qaboos Award for Sustainable Development in School Environment create a generation that is aware of the basic sustainable development which will help them understand their role in the future when they go through their journey of higher education or once they join the workforce, either in the public or private sector.

The performance of the country in each area is tracked closely and it is driven by financial and environmental factors and by inspiring the society to participate and take part in the process. I would like here to focus on the agriculture sector in Oman in terms of the SDGs because of its importance as part of the country’s economic diversification strategy. As part of Oman’s vision 2020, the agriculture contribution to the GDP was supposed to reach 3.1% but unfortunately it didn’t exceed 1.7% in 2018. It is really important to have a sustainable agriculture, first of all for its important in terms of food security, with increased population in the world more food will be needed. It plays a big role in the economic development of the country and help in economic diversification. It will provide decent work opportunities with good income, with the increasing challenges facing the farmers, the new generation tend to move away from the farming because of its instability but once it is sustained it will attract a good number of workforce and this will somehow solve the unemployment problem happening now in Oman. Focusing on agriculture and its improvement help with adapting and mitigating climate change and finally understanding the

importance and the challenges that the agriculture faces will lead to responsible production and consumption as well.

Rosewater Industry

Oman has five distinct agricultural regions, one of them is the interior area in the Governorate of A'Dakhilya. I will focus on Al Jabal Al Akhdar which means the green mountain in Arabic with an altitude of 3000 meters above sea level. It has a pleasant climate and a very famous tourism destination. The climate is semi-Mediterranean and because of that different crops grows on the mountain like figs, grapes, pears, lemon, almonds, pomegranates and olives, but what really makes it famous is the growth of the roses that leads us to the rosewater production by the local farmers. The rosewater industry is part of Oman's heritage and what makes it unique is the way it is extracted using the traditional muddy ovens. The rosewater used for different purposes, cooking, as a fragrance, it helps with headaches and cosmetic purposes. The mountain rosewater is present and dominant in the high end Spa located in the five star hotels in Al Jabal Al Akhdar. Covering an area of seven acres, the number of the rose plants is around 5000 plants, 4000 liters per acre and the economic return is good and is estimated around OR 40,000 per acre per season.

This industry is facing a problem nowadays because of the climate change. The temperatures are rising and the rain is minimal and if this continue then this important industry that once was an important part of the culture, economy and history of Oman and the region will disappear. Many farmers will be without a good income and the unemployment rate will increase. This applies to all other crops in the area, for example the pomegranate output in 2017 faced a 60% drop due to the same problem of high temperature and lack of rain. The number of pomegranate plants is around 30,000 plants and it makes three million Omani rails in a good year, and this applies to all other crops.

Proposed Solutions

The new technology of cloud seeding is considered a good proposal. Cloud seeding is a process that involves modification of the weather and it changes the amount of the rainfall that drops from the clouds by injects elements into the air, this process helps in inducing rain where there is no or minimal rainfall due to climate change. The Omani farmers are looking into this option since it has applied and experimented in the United Arab Emirates and it showed some good results. A paper from Meteorological Research Institute, Tsukuba, Japan that was published also showed that cloud seeding has been proven effective especially in winter time and this is very applicable for the case of roses in Al Jabal Al Akhdar because of the high altitude and winters are usually cool in the mountain area. Other solutions might include new technologies of indoor systems that will control the temperature and provide good water system. These proposals are related to the farming part but when it comes the end product, other proposals might be included after making sure there is enough growth of roses. Japanese companies that are specialized in skincare products that uses rosewater from other places might have a deal to use Omani rosewater since it is very pure due to the manufacturing precision using traditional methods with no additives only roses and water. Omani rosewater is also very well known for its smoky essence which make it very unique especially

when used as a fragrance which open a door for collaborations with fragrance companies in Japan. The other alternative is having a byproduct which is rose oil that is heavily used nowadays in cosmetics because of its very high benefits.

Other Agriculture Area in Oman with Challenges

One of the main agricultural area of Oman is on the Al Batinah Coastal Area. This area has two main seasons, winter season from November to April and summer season from May to October. The winter season is remarkable because the temperature and the humidity is good for growing most crops outside without any aid. Local farms during this time produces a wide range of vegetables not only for Oman but also for Dubai, Bahrain, Qatar and Kuwait. The main issue for Oman comes when the summer season arrives then Oman changes from a net exporter of vegetable crops to an importer of almost all of its vegetable crops.

With this summer and winter season in mind, there are big opportunities for indoor systems for not only vegetables but also fruits. Most of Oman's fruit requirements are imported because fruit trees need to be sustained through the summer season, while some fruits like Mangoes and some citrus varieties manage but the quality is not that good. Oman is also having some banana production but again because of the very hot summer the quality is not that good as per imported bananas from the Philippines, the main country that is supplying bananas to Oman.

There are several factors that need to be considered before protected or indoor systems can be considered in a year round system. Temperatures reaches in summer over 45 degrees Celsius with night temperatures not going less than 32 to 33 degrees Celsius.

Humidity during summer is very high, especially at night. Humidity in summer can be anything from 80 to 90%, This makes cooling difficult as most cooling systems in the Middle East work by evaporation of water with the pad and fan system. If the air is already saturated with moisture, it is difficult to evaporate more water in the air and therefore the cooling system is not efficient.

Any system that is installed in Oman has to be cost effective. In the winter the project will get competition from local farmers that are producing vegetables in huge quantities. In winter the smaller tunnel greenhouses in Oman with fan and pad evaporator systems works very well because of the reduced humidity and heat and they turn out high quality produce at very low prices.

The main time for the big greenhouses to make money is in summer months when local farmers cannot produce quality products because of the heat and humidity. The maintenance and upkeep of these of greenhouses that runs through summer is normally higher because of the high temperatures and also requires more experienced in-house personnel because there are no companies that are having contracting services for maintenance for these type of greenhouses.

Capital investment is normally very high and payback schedules are really not attractive when looking at the dynamics that 4 to 5 months (middle of winter) of the year does not give that good return and therefore the remaining 8 months is charged with a higher payback.

If you consider a hydroponic greenhouse the quality of water is something to take into account. The water quality is good enough in Oman for growing in soil but not for pure

hydroponics and the greenhouse have to rely on a RO plant. These types of plants are now cheaper and more effective than ever but an issue with RO plants is what to do with the brine water. At the moment there is no legislation dealing with brine water disposal in Oman but since RO plants are getting more common place disposal of brine water is becoming something of an ecological issue that needs to be considered. Previously it was not build into the cost structure but needs to be added.

Current Systems used but with not much success to reduce the heat in the middle of summer. However some of these and especially combinations are currently been used in Oman in the winter season and therefore it is possible to grow crops in winter of very good quality.

The suggested solutions by Omani agriculture companies and their challenges

1. Shading – shading has limited success because the temperatures are too high and therefore you need more shade, the plants then do not get enough sunlight but still heat.
2. Fogging systems – for the same reason as why the Pad and Fan evaporator system doesn't work well in summer the same applies for the fogging system. You could also fog with very cold water but the frequency has to be high and then the plants are always wet. Cold water fogging works very well to reduce the temperature, but solutions needs to be explored how not to have the plants wet inside the greenhouse.
3. Aluminum netting: This is having good results but it also depends on the quality of the aluminium netting, low quality will only have limited success where higher more reflective netting gives better results.
4. Reduced Humidity: One of the options is to reduce the humidity of the air with some heating system and then use the low humidity air in the pad and fan evaporated system. System is not that known and uneconomical at the moment.
5. Full closed refrigeration systems: The moment you talk about full refrigeration you have to close the greenhouse from exposure to direct sunlight and use artificial light, as the system will be too expensive to cool with an open sunlight system.

In conclusion, there is a lot of potential for Omani agriculture. There always a new technology is evolving when it comes to farming practices and I think the most important thing for a successful and sustainable agriculture in Oman is to address the right problems and understand them. In this report I tried to address the main concerns and challenges that Oman and Omani farmers are facing hoping for solutions to be applied from companies all around the world especially Japan with the innovative and most recent solutions in this area that are applicable and cost effective.

References

(n.d.). Retrieved from

http://www.omaniyat.com/wps/portal/index/?ut/p/a1/hdBLDoJADAbgs3gBWhhAXQ5OfPAIQRhNgYMjhgDBq4voq6cCF21-Rr_rbAIQZep20h0lsh67R89tzcE1wg-tOV52w8ihrZzu2paxLG9AdIHgB_FMV-

http://www.omaniyat.com/wps/portal/index/?ut/p/a1/hdBLDoJADAbgs3gBWhhAXQ53g9UU1366PgzlyBdjy0WblB10HjPD4CvfN0KGGq25hghJRqGn_wB8Gf_HfB_5AUGTrSBi1Jm_bsSWmdkIoA3-

<http://www.omaniyat.com/wps/portal/index/?ut/p/a1/hdBLDoJADAbgs3gBWhhAXQ5TFv8kY5yesN4q7rFCGIKHPIICsI0wYuVRTFeDbKVozuIM5taw!!/dI5/d5/L2dJQSEvUUt3QS80SmlFL1o2XzMwRzAwTzlJTUtUTUEwMjNWRko5TDYzREQ0/>

Badi, H. A. (2017, September 19). High heat, lack of rain affect pomegranate crop this year. Retrieved from <http://www.omaniobserver.om/high-heat-lack-rain-affect-pomegranate-crop-year/>

Bear, L. (2016, August 01). Oman's Secret Spa Ingredient. Retrieved from
<https://www.lightfoottravel.com/health-wellness/omans-secret-spa-ingredient/>

MacBride, E. (2016, May 29). A Visit To The Famous Rose Water Distillers In The Mountains Of Oman. Retrieved from
<https://www.forbes.com/sites/elizabethmacbride/2016/03/30/a-visit-to-the-famous-rose-water-distillers-in-the-mountains-of-oman/#d70b32326025>

Muscat Daily Newspaper. (2016, April 17). Rosewater distillation, profession of generations in Jebel Akhdar. Retrieved from

<https://muscatdaily.com/Archive/Features/Rosewater-distillation-profession-of-generations-in-Jebel-Akhdar-4oiw>

Zacharias, A. (n.d.). Future of the Omani rose is not looking pretty. Retrieved from
<https://www.arabianbusiness.com/the-future-of-omani-rose-is-not-looking-pretty-679404.html>