

Homework 7 Solar Power for Africa Due Monday October 18, 2021

Charlie Patton from Seawater Greenhouse, a commercial business that manufactures solar powered, seawater driven greenifying and green house irrigating evaporative systems will speak to the class on October 19. The technology may have application in areas away from the sea. For instance, Ethiopia doesn't have a seacoast but does have substantial lakes that might work with this technology especially in the Rift Valley where some endorheic lakes (evaporation is the only outlet like Pyramid Lake in Nevada) are growing due to climate change and the land is quite arid. A good example is Lake Basaka. (Some endorheic lakes are shrinking due to climate change like Lake Chad in Cameroon/Chad/Nigeria, the Caspian Sea in Iran and other countries, and Lake Turkana in Kenya.)

- 1) Give a description of the Seawater Greenhouse technology and compare it with other evaporative systems using seawater such as the Saudi desalination plant <https://www.youtube.com/watch?v=RyRuQCMG1Uk>, and desalination projects in Egypt, Morocco, Israel and other places you can find.
- 2) Do a web search to find the situation at Lake Basaka. Explain the significance of the problem, especially as it could impact the fresh water Awash River (a major source of irrigation water in the Ethiopian rift valley). You might look at google map to consider the distance between the expanding saline Lake Basaka and the Awash River.
- 3) Could the Seawater Greenhouse technology be used to limit or stop the expansion of Lake Basaka. Make a back of the envelope calculation based on web information from Seawater Greenhouse and the information you have concerning the expansion of Lake Basaka to estimate the land area needed and the ball park cost of such a public works project. How would the cost compare with the Saudi desalination plant?
- 4) Comment on the Seawater Greenhouse operations in Somaliland and in Morocco. What is the political difference between these two locations? What special problems would exist for implementation in Somaliland that are not present in Morocco?
- 5) In an unrelated topic, there is an interesting approach to alleviate climate driven heating in India that is described in the BBC video linked below. Comment and give your opinion on how this approach could be applied in Africa, especially in hot climates such as in the Sahel such as Chad, Niger, northern Nigeria and Cameroon etc. <https://www.bbc.com/news/av/world-asia-58820950>