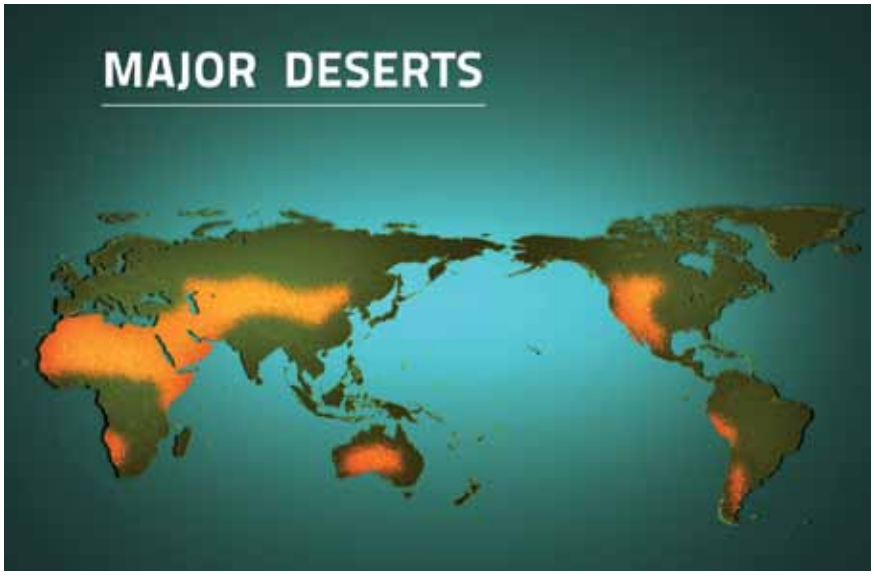
From North Africa to Asia: Making the Deserts Inhabitable

by Ramtanu Maitra

April 11—Hussein Askary, chairman of the European Labor Party in Sweden, has for years discussed water development projects across the Mideast and North Africa with engineers, development experts, and political leaders. In an interview with Ramtanu Maitra of *EIR* today, Askary said, "The existing and expanding deserts are the greatest obstacles to economic development in those regions, [but] there are several interconnected ways to deal with the problem of first limiting the expansion of the desert, and then actually making use of that land for the benefit of the nations of these regions."

FIGURE 1



This vast desert region stretches from the Atlantic coast of North Africa through the Arabian peninsula, across the Zagros Mountains to Iran and Central Asia, and all the way to western China.

The North African, Arabian, and Central Asian deserts are the most formidable "water challenges" in the world. What could have been a process to improve the situation through measures such as seawater desalination—especially nuclear desalination—has not occurred. The new Egyptian government, in particular, is confronting this challenge.

Askary describes the huge problem this poses for human ingenuity—and for China's Economic Road and Belt development across Eurasia—in a broad geographical sweep which few people see.

"This vast desert region can be considered an interconnected and continuous climate system, as each part affects the other. It stretches almost continuously from the Atlantic coast of North Africa through the Arabian Peninsula, across the Zagros Mountains to Iran and Central Asia, and all the way to western China, for about 13 million square kilometers. Large parts of those regions receive less than 250 mm/year, and often almost no precipitation. The semi-desert or semi-arid areas which are partly populated, receive 250-500 mm of annual rainfall.

"These deserts are, at the same time, expanding, not only due to the lack of adequate measures, but also the political destabilization and wars."

But this process can begin to be reversed by the progress of science and application of existing modern water technology. The key measures include:

- creating new water resources, such as desalinating seawater and brackish water, using nuclear power;
- river diversion schemes, among the most important of which are the Transaqua Plan—in which the Vatican has been involved—for replenishing Lake Chad through diverting a portion of the extraordinarily large flow of the Congo River;

• developing the infrastructure systems in the existing river basins, such as the Nile, Tigris, and Euphrates, to make the maximum use of the water and reduce waste of it;

• better management of the existing vast groundwater potential;

• development of new methods and technologies for agriculture and irrigation, both to expand the green cover in the desert areas, to improve the traditional agriculture in the river basin areas, and to expand groundwater-fed desert agriculture with effective irrigation systems and reduction of the salinity of the soil.

These, Askary says, are one integrated approach.

Desalination and Nuclear Power

More than two-thirds of the world's production of freshwater by desalination occurs in Southwest Asia, specifically in the Persian Gulf. Saudi Arabia alone produces 25 million cubic meters of water per day, which is estimated to be one-half of the world's total. The United Arab Emirates (UAE) produces around 3 million cubic meters per day. However, these countries will have to more than double the amount of desalinated water in the next decade, and triple it in the decade beyond. Water consumption will rise from 8 billion cubic meters in 2012 to about 11 billion cubic meters in 2016. Massive investments are already projected in this area.

A major problem in these projections is that the desalination of seawater is reliant on thermal power plants run by oil and gas. Saudi Arabia, for example, uses 1.5 million barrels of oil daily to produce the electricity and heat used for desalination. So, tripling and quadrupling that amount of fuel is a major economic and environmental problem.

One of the key solutions to this problem is to use nuclear power for these purposes, and to use fossil fuels as chemical feedstocks. According to the International Atomic Energy Agency's studies, medium-sized nuclear reactors are suitable for desalination.

At the moment, Iran is the only country in the region which has an operating large civilian nuclear power plant. The Bushehr plant, which is a product of cooperation between Iran and Russia, was inaugurated officially in September 2011, and reached its full capacity of power production (1,000 megawatts) in August 2012. Iran is planning to build several new nuclear reactors, with the expressed aim of increasing the energy output of the country and desalinating seawater.

FIGURE 2

This is a project in Iraq. Instead of just a few hundred meters, a greenbelt should be several kilometers wide. You have a shield of greenbelts, and you move against the desert.

The UAE, through a contract with South Korean Korea Electric Power Corporation (Kepco) is building four 1,400 MW nuclear plants to be completed by by 2020.

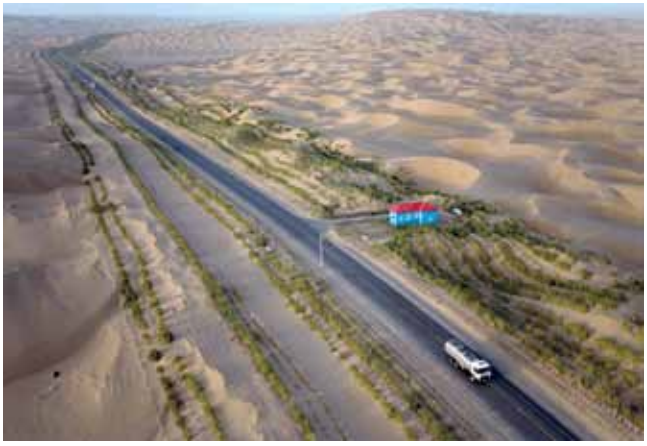
Egypt signed an agreement with the Russian atomic energy corporation Rosatom in February, to build the first of a number of nuclear power plants along the western Mediterranean coast of Egypt at El-Dabaa. The expressed objective is to use the power for seawater desalination in that remote and dry area of the country, where almost no freshwater exists in sufficient amounts to sustain an urban and industrial center. If successful, Egypt will continue to use the nuclear technology in the Red Sea region too.

Expanding the Desert Cover

A great deal of research has been done and is continuing in many countries, Askary reports, to develop new strains and types of crops and plants that are resistant to the high temperatures in these regions and to the increasing salinity of the soil. One type can be planted near existing rivers, canals, and abundant groundwater. These are fruit-bearing trees such as palms, olive trees, eucalyptus, and tamarind trees, for example. These are highly resistant to heat and salinity, but they still need large amounts of water.

Therefore, they are planted, as proposed by many

FIGURE 3



This is China, the Taklamakan Desert Highway. They wanted to protect the road from the moving sand. You pump water from underground: It's salty water, but they have planted types of plants that resist salt.

governments, closer to existing water resources and and urban infrastructure systems, because they need a labor force to manage them, and power and water infrastructure to sustain that. These can be used as a barrier to protect the existing agriculture and urban centers against the encroachment of the desert and the frequent sand and dust storms. These, then, can be expanded in the form of "green belts" outwards against the larger desert. In certain areas where there are saline lakes or saline groundwater, such as in western Iraq or Algeria, halophytes can be planted to create another green cover for moderating the air temperature and increasing the moisture in the atmosphere.

The farther you go into the desert, the more you will be challenged by lack of water and infrastructure. Therefore, there are active plans, although on a limited scale, to plant certain types of plants or shrubs that are extremely resistant to drought, and can be sustained on a limited amount of water or even on the scarce natural rainfall. These would a first line of resistance against the desert. These plants can be supported by "dune fixation," or soil-stabilizing structures using dry plants or artificially produced materials such as plastics.

Then there is the development of irrigation techniques. Submerging the crops, the traditional method, leads to enormous waste of water through evaporation, and to increased salinity left behind by the evaporated water. Therefore, this is being abandoned in many parts of these desert regions. It is being replaced by pivot-sprinkler systems and drip irrigation, so that only a minimal amount of water is administered to the roots of the plants through plastic-tube systems.

The most advanced centers for the development of these sorts of techniques are in countries that suffer from desertification, but that are equipped with technological and industrial know-how. An example is China's Ningxia Academy of Agriculture and Forestry Sciences in China, where many experts from Arab countries are trained, and the Jacob Blaustein Institute for Desert Research at Ben Gurion University in the Negev Desert in Israel.

Space Technology

The crucial question is whether there are possibilities of managing weather change in this vast arid area, and by what means.

Askary has discussed this with Egyptian and other experts. "Left to the raw powers of Nature," he says, "these regions will be subjected to recurring cycles of droughts and wet periods. However, with the creative intervention of human labor, gradual changes can be made to moderate, and finally control the climate systems."

The scientific frontier work for this purpose, is electrical ionization of the atmosphere—essentially using ground-based electrically powered ionization of the low atmosphere, to cause the formation of low cloud cover somewhat in the same way that cosmic rays from the galaxy have been shown to do. Two of the countries in which experiments with such ionization have been underway, are in the region: Israel and the United Arab Emirates.

Askary notes that "All the infrastructure, agriculture, irrigation projects proposed in this issue of *EIR* will have a definite positive impact on these regions, but how much impact will depend on the scale and rapidity of action.

"One way of determining that is by using space technology to follow the moisture cycles on Earth from areas of vegetation to other areas, measuring the impact of precipitation [and learning] . . . where this moisture is migrating.

"Creating new green zones in or near the deserts will potentially have a similar impact, he said."