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Algeria-From Hydrocarbons to Hydroponics

If you lived in a country that was the eighth largest in natural gas reserves and the fourth largest gas exporter, you would think you were living in a wealthy nation. Then you throw in the fact that this location is the second largest country on the continent, about three and a half times the size of Texas with approximately 2,381,740 sq km and a population of only 33,769,668,015 persons per sq km., (Texas, as of 2006, had 23,507,783) one would think that crowding would not be a problem. This, a country with massive space to provide housing and agriculture, rich in hydrocarbons, and bordering the beautiful Mediterranean Sea, should be a prosperous country.

The country I just described to you is Algeria, located in the northern part of Africa and home to the Sahara Desert. Located in the southern region, the Sahara Desert occupies four fifths of this country's land. Temperatures in the desert can be extremely hot during the day and the rapid heat loss during to night cause the nights to be cold. In between the Mediterranean Sea and the Sahara Desert lies the High Plateaus, the Tell and Sahara Atlas ranges. The Saharan Atlas range receives more rainfall than those of the High Plateaus and includes good grazing land. Watercourses on the southern slopes of the range disappears into the desert but supplies the wells of numerous oases along the northern edge of the desert. The Sahara Atlas ranges which were once rich forests were exploited for fuel and timber. In 1970, the government started a vast reforestation program to help control erosion. The Barrage Vert project ended in 1980 due to lack of funds; by then the Sahara had already penetrated the gap between the Saharan Atlas and Aurès Mountains.

Poor topography is not the only thing working against Algeria. In 1962, Algeria won its independence from France. When this occurred, the Frenchmen moved out of the country, depleting the country of its managers, civil servants, engineers, teachers, farmers, physicians, and skilled workers. European-owned agriculture had accounted for about two-thirds of vegetable production and employed about eight hundred thousand farm laborers. Naturally, the Algerians took over the farms which lead to destruction of the land. Soil erosion occurred from overgrazing, and poor farming practices lead to desertification. The dumping of raw sewage and petroleum refining waste are polluting the rivers and coastal waters. Fertilizer runoff is causing poor water quality and inadequate water supplies.

With the desertification, rural farmers were unable to sustain their farms. Rural farmers moving into the urban areas are causing a whole new set of problems for an already struggling economy. This put an enormous strain on urban housing, explaining Algeria's highest per house unit occupancy rates in the world. Currently, government officials are reporting a shortfall of one and a half million housing units. Teachers being overtaxed, a failing infrastructure and healthcare have all caused a severe strain on their economy.

Little is being done to reduce unemployment and improve the standard of living. Currently, Algeria has twenty-five percent of its population below the poverty level. Forty percent of Algerians have a monthly income of eighty-one American dollars and spend fifty-eight percent of their income on food. Unemployment is reaching 12.3 percent, while inflation is at two and a half percent. Poverty levels are unlikely to decrease much with Algeria having the highest birth rate in the region of 17.03 per thousand compared to the death rate of 4.62 per

thousand. Clearly, the population of Algeria is growing. Wheat production has dropped fourteen percent from 2000 giving Algeria a food deficit of sixty percent.

To add fuel to fire, Algeria is a fairly young nation with 68.7 percent of its population between the ages of fifteen and thirty. This rising unemployment and lack of government confidence makes easy recruitment for militant groups. At one point, Algeria had rid all but thousand of its country's insurgents. Now, they are growing at alarming rates dubbing Algeria the next Iraq. Terrorist attacks against the educational infrastructure and bombings directed towards oil production have added additional economic instability and governmental unrest.

So, why does a country that is so rich in hydrocarbons struggle to maintain a harmonious economy? With lack of farming, education, research, and desertification, the Sahara Desert which was once home to lush rural farms and the Touareg, the nomadic pastoral people in north Africa, is now almost uninhabited. The Touareg, which once scattered the desert in large groups and numbered in the millions, are now down to thousand. The once lush rural farms have been abandoned, unable to provide adequate food due to lack of proper farming practices.

What are left of the farming families, are large families living under one roof consisting of grandparents, parents and children. Of the rural children, only about sixty-seven percent of them attend school as opposed to their urban counterparts that have an attendance rate of ninety-five percent. Education is free for six years through fifteen years of age. The farming family diet consists of bread, vegetables and fruit for dessert is common, although fresh vegetables are very hard to find in the winter. The most common staple of an Algerian is couscous. Couscous is spherical granules made by rolling and shaping moistened semolina wheat and then coating them with finely ground wheat flour. Couscous is usually served under meat or vegetable stew. Rural houses are built of stone or concrete on sun-dried blocks made of mud and straw. The roofs are made of flat tile or tin. In the rural areas, families stay more traditional where city dwellers work in factories and have more of a western influence, eating western type foods when they can afford it.

In 1962, agriculture dominated the economy, and Algeria was able to supply most of its own food. Now, only about three percent of the land is cultivated in Algeria leaving the country importing sixty percent of its food. Farming in Algeria is hard, due to the poor soil which is subject to erosion, and the water supply is generally irregular and insufficient. The main agricultural products continue to be wheat, barley, pulses, vegetables, dates, grapes, figs, olives, and citrus. Grain and pulse production varies significantly and depends upon the frequency and amount of rainfall during the growing season.

Many of the problems facing this nation were caused indirectly due to lack of education of farming practices and ecological responsibility. Basically, the Algerian farmers were not educated in soil conservation, and the government did not know to impose refinery regulations. What were the affects of over grazing? How would stripping the rich forest of their trees for lumber, fuel and additional farming land affect rainfall and soil erosion? Dumping of raw sewage and petroleum refinery waste shows ecological irresponsibility; polluting water supplies giving way to poor water quality.

How does one fix this nation that is experiencing food shortages and rising prices? The solution is not as simple as a one step solution. Years of environmental abuse cannot be undone in a year or fixed with one change in practice. A plan of action must be multi-faceted.

Forest must be restored to the highlands. Research must start to genetically enhance trees to be able to withstand the harsh summers with intense heat and drought. By restoring the forest, this will prevent further degradation of the land, and slow down desertification. Grasslands and farmland can be re-established over time. Heat and drought resistant plants need to be planted that can provide additional foliage for grazing animals.

Rural farmers need to be taken out of the over populated cities and put back into the rural areas. In order to do this, the government must provide them a way for them to sustain a livelihood. To do this, education is a key. Education needs to be at both the formal level and informal levels. Providing agricultural education in the schools will increase interest in agriculture, producing future, well educated farmers and researchers. In the field training will give immediate training to those existing farmers and aid in refining current farming practices. In Burkina many sectors were restored using the Zai technique. In the Zai technique, pits are dug during the dry season. Once the pits are dug, they are filled in with organic matter. Then after the first rain, the pits are covered with a thin layer of soil then the seeds are spread around in the pit. These pits capture and hold rain so it aids in water retention. The seeds and the organic matter are protected from being washed away. This increases yields and eventually leads to an improvement in soil structure.

Educating individual Algerians will allow the private sector to start small gardens and provide inexpensive food. Currently, there is a lot of research being conducted using a soil conditioner called TerraCottem. TerraCottem is applied to keep the soil moistened and improves the effect of drip irrigation or other irrigation methods. Home gardeners surround their gardens with a fence or brick wall to act as a wind break from harsh desert winds. If more individuals are taught how to plant small gardens, they will be able to provide some food for themselves. Small groups or large families can establish community gardens all working together to combat the food shortages. Currently, the United States is experiencing an increase in grassroots groups in large cities such as New York establishing community gardens due to soaring food prices and health concerns. Individuals can be taught composting techniques that will help prevent soil degradation; they can also learn recycling.

Next, while two ideas mentioned will provide an avenue to reestablish the rural farmers and prompt individuals to start gardening, it does not alleviate the problem of lack of food during the winter months. With vast empty land, large greenhouses can be established in the Sahara. This will provide employment opportunities outside the cities and provide year-round fruits and vegetables. Since the desert does not have a lack of sunshine, greenhouses can be established in the deserts and be run on solar power. Solar power stations can be established which could power water treatment plants and air cooling regulators within the greenhouses. The establishment of solar power stations, water treatment plants and greenhouses will offer many new avenues of employment for the Algerians. In the greenhouses, hydroponics can be used. Hydroponic plants take less water than normal soiled plants. Less space is required to grow the plants and garden maintenance is reduced. The nutrients are recyclable and, therefore, save money. Generally, hydroponic plants produce higher yields also pests, weeds and diseases are easier to control than those in an outdoor, soiled environment. Hydroponics do not have a growing season, therefore, vegetation can be grown year round. Working off a technique developed by a German scientist in 1860, Dr. W.F. Gericke termed the process as hydroponics in the late 1920's. During WW II, the United States used hydroponics to grow produce for troops stationed on the Pacific islands. By the 1950's there were viable commercial hydroponic farm operations in America, Britain, Europe, Africa and Asia. This method of growing food is being used successfully today in many countries across the world. Hydroponics can be grown on a large commercial level or even

adapted to home use. Using hydroponics will aid in solving the unemployment rate and it will provide additional food, reducing the need to import food goods.

Additionally, research needs to be stepped up. Research needs to be done to try to develop more crops that are disease resistant, higher yielding, higher nutritional and drought resistant crops. Research needs to be done on developing components that will help reestablish and increase the nutrients of soil. New fertilizers should be developed that are unique to that region and allows them to grow new types of crops.

The solution does not stop at the farming level. Their government needs to step in and put strict controls on petroleum refinery plants. Dumping of their waste is destroying the water quality and the coastline. If conservation is not taught and controlled, severe problems will expand into the Mediterranean Sea. Effects of this could be devastating, reducing the amount of fish and fowl wildlife. Again, this can be done through intense education of government officials and refinery, mining and drilling personnel.

The fall of this nation just amplifies the importance of agriculture and environmental consciousness. Think about the affect the rural farmers had on the economy of this nation. Failure to fully understand proper farming techniques lead to the rural farmers leaving the rural areas and moving to the cities. This migration caused a decrease in food supply and increased urban housing needs. It caused unemployment to rise and food prices to soar. It put strains on the educational system and the government. Youths, unable to secure jobs and provide an income for their family started to rebel, equating to increased terrorist activity. This country, so rich in hydrocarbons was brought to its knees by a failing agriculture environment. So, instead of the hydrocarbons being the backbone of this society or any society, it should be agriculture.

The United States is working diligently to help this starving nation. On October 21-31, 2008, delegates from the USABC and the Embassy of Algeria will be visiting processing plants, nurseries, dairy farmers, milk processing plants, seed, dried fruit and nut producer and cheese makers within our great state of Iowa along with Wisconsin and California. The Algerian delegation will visit these plants and producers with the objective of purchasing United States products. At the same time, the delegation will meet with United States distributors to purchase Algerian agricultural products such as dates, figs and wine. But this is not enough, as the old Chinese proverb goes, give a man a fish and he eats for a day, teach a man to fish, he eats for a lifetime. Algerian farmers must learn how to restore its land and be taught new and innovative farming techniques.

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