

Part 5: The Demonstration Project of Large-Scale Desert Greening by the Japan Petroleum Energy Center (PEC) (4)

In this issue we introduce research related to the fourth theme, "eco-friendly & energy-efficient technology" and the last and fifth theme, "cultivation technology of salinity-, drought-, and heat-tolerance plants".

Eco-friendly & energy-efficient technology

1. Demonstration of solar power technology

Solar power technology has been developed mainly in the West (US, Italy, Germany, Switzerland, and Spain etc.). Saudi Arabia, with such favorable conditions as the copious sunshine typical in the desert area, lags behind these countries in terms of the scale of its solar power generation. This research project has the following objectives: a) to examine the marketability of solar energy as an independent power source in Saudi Arabia, b) to establish the physical and technical durability and reliability of solar power technology under the severe climatic conditions of the desert, c) to optimize the operation method (by anticipating and protecting the facilities against sand and silt adherence / accumulation), d) to establish the reliability of new types of solar battery such as the see-through amorphous, etc., e) to make the solar power system practical enough to start operation on an industrial scale. The project is to suggest various plans for solar power application such as its use as an energy source for hydroponics facilities etc.



2. Effective land use plan & technology employing remote sensing and Geographic Information Systems (GIS)

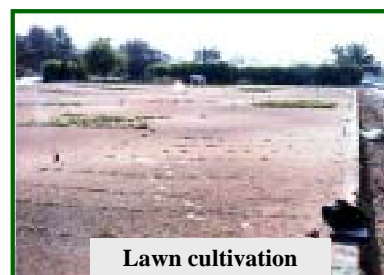
This research project aims to develop remote sensing technology to monitor the long-term changes in the desert environment. These include factors such as the green-cover ratio, vegetation status and the agricultural productivity of the vast territory that is Saudi Arabia. It also aims to demonstrate and disseminate GIS technology which can be used for urban planning etc. The project is trying to develop the technology to comprehend the seasonal changes of vegetation, its geographical range, and the growth of agricultural products, by processing data from satellites such as Landsat, SPOT, JERS-1, etc. It is also developing a database of geographical information including vegetation, soil classification, geology, topography, plus roads, buildings and the sewage systems of Khafji and a few other sites in the north-eastern parts of the country. The GIS outcomes fed with the data from such a database will be demonstrated for utility in urban and land use planning.



Cultivation technology of salinity-, drought-, and heat-tolerance plants

1. Lawn cultivation

The research activities under this project include: a) a survey of the current utilization and distribution of lawns in Saudi Arabia, b) a survey and assessment of the growth of Bermuda grass and Zoisia grass - both eco-friendly and salinity tolerance species - which were selected in Japan, c) the study of various aspects of lawn cultivation such as the colors, growth density, coverage and the extent of pest damage, etc., d) an examination of salinity-, drought tolerance of the selected grass species, e) the collection of genetic resources that can be utilized in Saudi Arabia and other countries to examine their potential as useful lawn grass, f) and the supply of lawn grass seedlings to the main, large-scale pilot farm in Khafji. After selecting species suitable for cultivation in Saudi Arabia, the project will try to develop appropriate cultivation methods for the selected species at the main pilot farm. It will also try to devise technology for water-saving lawn grass management by incorporating some of the water-saving technologies reported earlier.



2. Plantation of date palms and other trees

The date palm is a symbolic tree which forms the landscape of not only Saudi Arabia but also the vast area ranging from the Gulf region to North Africa. It is also a major agricultural product of this entire area. It is said that there are over five thousand varieties of dates in the world, out of which some 450 are produced in Saudi Arabia. Normally the dates are classified according to the quality of the fruits. Since the area around Khafji hosts a highly saline environment, called "sabkha" (meaning salty wetland or swamp), it is necessary to select highly salinity- and drought-tolerance tree species for the greening of this area. Under these circumstances, the objectives of this research are including : a) the collection of date varieties to be used for micro-propagation by tissue culture, and genetic analysis and photosynthesis research, b) the production of high-quality date seedlings by means of tissue culture, c) the development of genetic analysis technology to conduct identification of date varieties, d) the collection, from within and outside the country, salinity- and drought-tolerance tree species for greening activities, e) the study of the growth of date palms and other greening tree species in the area highly prone to salt damage, f) an examination of the functioning of salinity- and heat-tolerance in relation to the photosynthetic process, and g) the production of tree seedlings to be supplied for cultivation in the main pilot farm.

