

AFFORESTATION AND AGRICULTURAL DEVELOPMENT IN THE
WESTERN REGION OF ABU DHABI

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Introduction. Except for the Liwa oasis, little afforestation or agricultural development work had been undertaken prior to 1975 either in the private or in the public sector in the Western region of Abu Dhabi. Work on the implementation of a number of afforestation projects in the public sector started in 1975. Extreme saline, arid and desert conditions prevailing in the Western region of Abu Dhabi make it the most difficult area for agricultural development in the whole of the United Arab Emirates. In spite of the harsh climatic and edaphic environmental conditions prevalent in this area and after tackling various problems suitably, a substantial amount of progress has been achieved in the agricultural development field in last about five years.

Review of Work done during 1975-80. Both the Forest Department and the Agriculture Department of Abu Dhabi Municipality have their development projects in the Western region. The Forest Department executes its afforestation and plantation projects either directly by employing its own technical staff and labour or by contracting with the qualified and suitable International afforestation and landscaping companies. More than a dozen afforestation companies are engaged at present in executing afforestation projects in various parts of the Western region. The area of the individual afforestation projects leased out to the companies varies from 200 to 500 hectares. The companies are required to complete initial plantation operations in a period of one and a half year and then maintain the plantation of the desired species comprising mostly of 'Ghaf' (*Prosopis spicigera*) 'Samar' (*Acacia tortolis*) and 'Sidr' (*Zizyphus spinachristi*) for a period of two years. After successful culmination of the projects and at the conclusion of the contract period of about three and a half years, the plantations raised by the companies are handed over to the Forest Department for subsequent maintenance and management. There are twenty one projects covering a total area of over 7000 hectares now being executed by the companies in the Western region of Abu Dhabi. Of this, upto date over 2000 hectares have been planted and the remaining about 5000 hectares are in the process of being laid out and afforested by the companies.

As regards the direct projects, the Forest Department in the Western region of Abu Dhabi is handling 27 projects spread all over the Western region including the Liwa oasis. The total area of the various projects of the Forest Department is over 5000 hectares and of this about 3000 hectares have already been planted and are being maintained and managed at present. The total area of

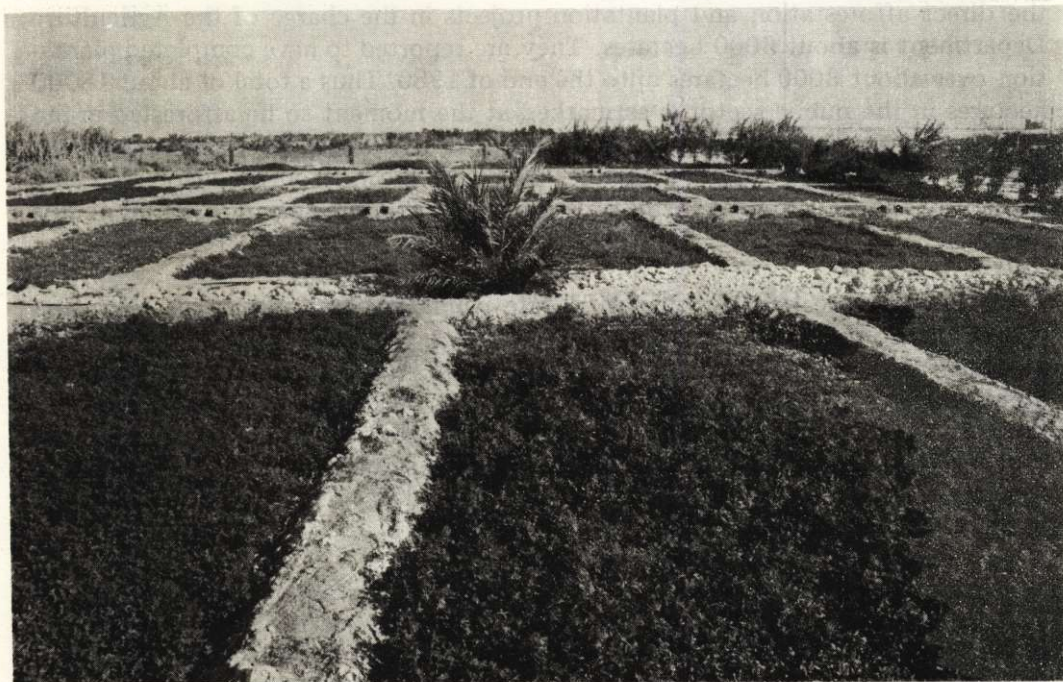
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the direct afforestation and plantation projects in the charge of the Agriculture Department is about 6000 hectares. They are reported to have completed plantation over about 3000 hectares upto the end of 1980. Thus a total of about 18000 hectares in the public sector is earmarked at the moment to be afforested in the Western region and of this over 8000 hectares have since been planted during the last about five years. The number of plants growing on the afforested area owned by the Government in the Western region is more than 1,600,000 at this juncture.

A good deal of planting with date palms and tree species has also been carried out on private farms and land holdings belonging to the local people, especially in the Liwa area of the Western region. During the last 5 years, a large number of tree seedlings were supplied to meet the demand of the local inhabitants from the government owned nurseries. The tree seedlings have been generally utilized to raise shelterbelts or wind breaks on private lands. The cultivation of the date palms has also been considerably extended on private lands especially in the Liwa oasis during the last about 5 years.

Al Bujair Nursery. Among the various afforestation projects being executed in the Western region mention may be made of the Al Bujair nursery project which was started in 1977 to produce primarily tree seedlings required for our afforestation projects. The ground water at Al Bujair happens to contain less than 2000 parts per million of total dissolved salts which has been used to raise tree seedlings in a sheltered and partially covered nursery area of about one hectare, at the foot of a large sand dune, a few kilometers to the east of Beda Zayed-Liwa road. Al Bujair nursery can produce upto 300,000 transplantable tree seedlings annually. It is the main source of tree seedlings and plants of fodder bushes like *Atriplex* used in the afforestation projects of the Forest Department and those distributed amongst the local farmers in the Western region. At Beda Saif, not far from Al Bujair, along the Beda Saif-Liwa road, a set of four green houses each covering an area of 750 square meters is now being erected to enable us to have controlled environmental conditions for raising nursery plants and other plant material which could not be easily propagated earlier in the open nurseries.

Beda Zayed-Liwa Road Shelterbelt Project. A brief reference may also be made to the Beda Zayed-Liwa road side shelterbelt project started towards the end of 1980. This project has been designed to protect the asphalted Liwa road which passes through high sand dune country by raising a protective tree shelterbelt for a distance of 55 kilometres from Beda Zayed township to Muzeira village, the present terminus of the Liwa road. The wind break will be raised with arid zone tree species in a width of 200 metres all along the windward i.e., the north western side of the Liwa road. It would involve levelling of extremely uneven high sand dune terrain with heavy earth moving machinery over a width of 225 metres for a distance of 55 kilometres. It will involve for levelling purposes, cutting, carriage and filling of hundreds of millions of cubic metres of dune sand



Fodder plots raised by basin irrigation in a date garden at Medina Zayed.

Photo: Author



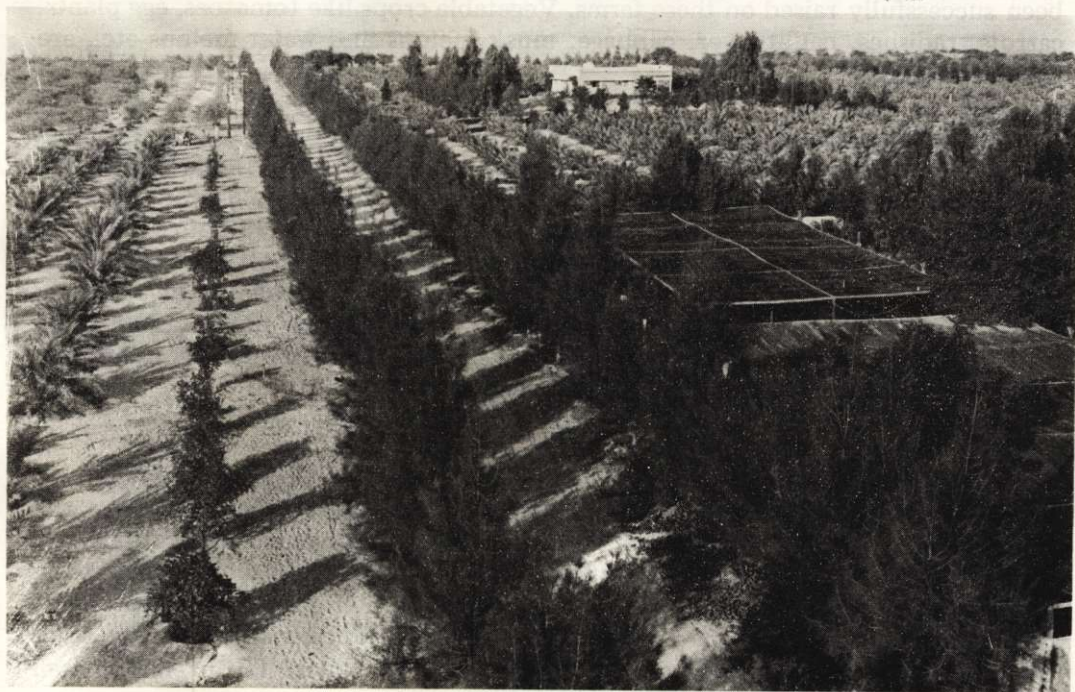
About 1-year old "Rak" (*Salvadora persica*) plantation raised with drip irrigation at Safran, Abu Dhabi Emirate.

Photo: Author



About 3-year old Eucalyptus shelterbelt at Al Babha along Tarif—Beda Zayed road, Abu Dhabi Emirate.

Photo: Author



About 4-year old Medina Zayed plantation. The picture depicts plantation, main avenue, nursery and rest house.

and earth. The area to be levelled and planted in the form of a protective shelter-belt will cover about 1100 hectares. A battery of five D8 Bulldozers started levelling the Liwa road side strip towards the Liwa end of the road near Muzeira village during November 1980. The project is expected to be completed in about 3 years time.

Date Gardens. One of the plantation activities of both the Forest and Agriculture Departments in the Western region is to raise date gardens which after their completion are allotted by the Government to the local inhabitants and are handed over to them to be worked as their date palm and agricultural farms. These date farms cover an area of either about 2 hectares (160m x 130m) or about 1.5 hectares (152m x 100m) each. Along the outer boundary of these date gardens is planted a shelterbelt of arid zone tree species like 'Ghaf' and 'Sidr' which is followed by another two peripheral rows of date plants at the spacing of 8m x 8m. Thus, the 2 hectares date garden contains 126 date plants and the 1.5 hectare date garden is planted with 110 date plants. The central unplanted area of these farms measuring about 0.5 to 1 hectare is laid out with lined channels and is meant to be cultivated by the farm allottees for raising fodder and vegetable crops as required by them. The trees in the shelterbelts and the date trees are irrigated through drip irrigation system but the cultivation of agricultural crops in the middle of the farm is carried out by basin irrigation of small plots measuring about 16m x 4m laid out on the two sides of the lined irrigation channels. Fodder crops like lucerne, barley, sorgham millet, maize and sugar can have been successfully raised on these farms. Vegetable crops like tomatoes, egg plants, carrots, radishes, cauliflower, cabbage, musk melons and water melons etc., are also being grown.

Whereas the Forest Department is executing two date garden projects at Medina Zayed and at Al Kharima (Liwa), the Agriculture Department date garden project are located at Ghiatee, Beda Zayed, Zafra and Liwa. Uptodate 105 date gardens at Ghiatee, 90 date gardens at Beda Zayed, 35 date gardens at Zafra and 30 date gardens Liwa have been completed. Most of these have been handed over to the local inhabitants for cultivation and management by them. The completed 260 date gardens at various places contain about 32000 date plants. More date gardens are being laid out and raised at the above mentioned places for ultimate allotment to the local people.

Raising of Fodder and Vegetable Crops and Fruit Trees. Besides cultivating these in the date gardens, a number of vegetable and fodder crops have also been raised successfully in sheltered localities in many of our afforestations projects. The limit of salinity without too adversely affecting the yield of these crops appears to be total dissolved salts upto 6000 PPM. However, as the sandy desert soils are deficient in organic matter and mineral nutrients they are to be treated with heavy doses of organic manure and chemical fertilizers for their proper development and successful cultivation.

The growing of fruit trees such as grafted 'Sidr', fig, pomegranate, citrus, guava, mangoes and phalsa etc., has also been attempted recently in a few places in the Western region. The high salinity of the soil and water appears to affect the establishment and growth of many fruit species adversely. Most of the fruit species grown at Al Bujair where the salinity of the ground water i.e., TDS is less than 2000 PPM appear to be doing better than other places with comparatively more brackish water. About 50 'sidr' plants grafted in situ with scions of superior varieties are doing well at Bujair and Beda Saif and have already started bearing good quality fruit.

Range Development. In the afforested area managed by the Forest and Agriculture Departments, interplanting with fodder bushes such as *Atriplex*, 'Arta' (*Calligonum comosum*) 'Markh' (*Leptadenia pyrotechnica*) etc., is also being done. These fodder bushes are planted in between the tree species and are irrigated by drip irrigation. The fodder bushes after their establishment are repeatedly cut to provide green fodder for the domestic livestock. They also provide feed to the natural and in some places introduced willdlife in the forest plantations.

A project for range development has recently been initialed by the Agriculture department in the Bainuna area of the Western region. The area of these range improvement blocks which have been recently fenced is about 25000 hectares. It is planned to carry out plantation and range development operations in these large enclosed blocks to restore them to their full potential as natural grazing grounds. The project started in 1979 is in its initial stages at present.

Some Suggestions for the Future Agricultural Development Work. (i) *Need to have Detailed Information regarding Ground Water and Climatic Conditions.* All afforestation and agricultural development work in the Western region depends primarily upon the availability of good quality ground water for irrigation purposes. It is, therefore, very necessary to have a detailed ground water survey carried out all over the Western region at the earliest to have detailed information about its availability and quality. It is likely that we may be over using this resource in some places like the Liwa area. There is some recharge of the underground water reservoirs by the scanty precipitation and occasional fog and dew which occur in the Western region. To know precisely about this recharge by natural precipitation and about other climatic factors, such as temperature, wind velocity, evaporation etc., a series of well distributed, agro-meteorological or weather stations should be set up in the Western region. At present only one agro-meteorological station at Medina Zayed has been established by the Forest Department and is working since 1978. This station is providing useful data.

(ii) *Organization of Research Work.* In order to be able to persecute afforestation and agricultural development work successfully and more effi-

ciently, research is required to be carried out to solve a number of problems. Experiments should be laid out to determine the optimum water requirements of tree crops, date palms, fruit trees, agricultural crops etc. Research should also be carried out with regard to various types of fertilizers and their doses etc. Research is also needed to determine suitable seed provenances of tree species, fodder bushes and agricultural and horticultural crops. The seeds and plants of the most suitable varieties of trees and crops determined by experimentation should be recommended and used for general cultivation. Experimental work may also be done to find out the most suitable form and structure of protective shelterbelts. Work also needs to be done to determine most suited pesticides and their doses etc. Research into nutritional deficiencies of soil including trace elements needs to be undertaken. To carry out scientific research work, specialized staff will be required and the possibility of undertaking this work in collaboration with the faculty of Agriculture Al Ain University may be investigated.

(iii) *Conserving and Developing the Existing Natural Vegetation.* Some pockets of natural vegetation consisting of 'Ghuram' (*Avicennia marina*), 'Arta' (*Calligonum comosum*) and 'Ghada' (*Haloxylon persicum*) etc., are still surviving. It will be advisable to demarcate, conserve and develop these patches of natural vegetation before they disappear altogether on account of their destruction by increasing pressure of population. They would also be useful as natural grazing grounds and wildlife refuges. Whereas so much attention is being given to creating new forests something must be done to protect and conserve the still surviving natural vegetation in some sheltered and favoured localities. Not much has been done to conserve and manage the natural vegetation so far.

(iv) *Wildlife Introduction and Management.* We have at our disposal now some sizeable areas of well stocked forest plantations which are suitable for wildlife introduction and management. A number of indigenous wildlife species like the hare, the fox and birds like the desert sparrow, the dove etc., have grown in numbers in the last few years. The gazelle has also been introduced in some plantations. A suitable wildlife introduction and management plan needs to be prepared and implemented for the afforested areas which can provide adequate feed and shelter for Wildlife in the Western region.

(v) *Overall plan of Agricultural Development for the Western Region.* In view of the considerable size of the existing agricultural development work in the Western region and that envisaged for the near future it would be advisable to have a well considered overall agricultural development plan for this area as soon as possible. This would need collecting a good deal of basic data required to prepare the desired plan. The Planning Department of Abu Dhabi Emirate may associate themselves for this work with the Forestry and Agricultural Departments of the Abu Dhabi Municipality for procuring any needed information that can be had from them. The plan should cover the proposed development in the fields of afforestation, horticulture, agriculture and natural resources management. It should be possible to collect and collate the data hand to prepare a suit-

able agricultural development plan in a period of six months to one year.

(vi) *Need of Extension and Training.* To assist the private sector, suitable extension and training work for the farmers and the workers engaged in agriculture in the Western region needs to be organised. Many farmers are extremely keen to undertake scientific and profitable farming and should be helped in this regard. This work could perhaps be organised in collaboration with the Federal Ministry of Agriculture who already have some of their representatives working in the Western region. The agriculture extension set up should also arrange to supply seeds of suitable varieties of recommended crops, fertilizers and pesticides etc., to the farmers. Demonstrational plots of recommended varieties of crops and suitable cultural practices may also be laid out, on private farms. Agricultural extension literature may also be published in the form of leaflets and pamphlets and distributed amongst the farming communities.

In view of the envisaged extensive programme of afforestation and range development, it is suggested that arrangements may be made for practical training of the forest and range workers in the Western region. For this purpose a Forest and Range training school could be set up at a central place. Suitable practical training courses and refresher courses for the in-service training of the workers could be run at the proposed school.