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AAINews

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The Arabian Peninsular Revisited

After three year's away, I was recently given another chance to set foot on the Arabian Peninsular. While my previous mission had been in the Las Al Khaimah, UAE, conducting research on water-saving vegetable cultivation, my destination this time was the town of Salalah, 1,000km southwest of Oman's capital Muscat.I have been working in the area of dry land agriculture since I was a student, but this was just my second experience of work in the field.

This time my work was in a neighbouring land to the country where I did my first fieldwork but it is in the same Arabian Peninsular, and by now I have started feeling some attachment to this part of the world. My position on this second visit was as a JICA expert and my duties were to conduct training in the field of vegetable cultivation. The actual work was in the Nejd Agricultural Research Station (NARS), 160km north of Salalah. Built in 1994 with technical aid from Japan, NARS has received experts on dry land agriculture from AAI since 1996. The series of articles titled "Agriculture in Dhofar" that was published in earlier issues of AAINews was based on AAI's work in NARS.

I received a big surprise on my first journey from Salalah to NARS. In order to reach NARS we had to cross a mountain range called the Jabal. It was a scenic drive past camels and grazing cows. Had I arrived during the monsoon season itself, visibility would have been limited to just a few metres due to heavy fog but my visit was right after the monsoon's end. The mountains were green all over, and I felt as if I were in Japan However, a short drive beyond the mountain range revealed a completely wild desert. I could have never imagined such a contrast between distinct natural environments located only a few kilometres apart. Although I had been pre-warned about the natural conditions in this area, it was still rather surprising for me as I had not expected the change to be so drastic.

NARS can be reached after another hour's drive through the same desert scenery with the mountains looming behind. NARS is surrounded by nothing but desert, and for researchers from Japan where there is no real arid land, it is an ideal place for fieldwork. The Arid Land Research Centre of Tottori University, from which I received my degree, has just built an arid dome this year. This is a glass dome in which climatic conditions can be controlled and dry land conditions can also be created. This facility, equipped with state of the art technology, may be sufficient for basic research. However, fieldwork is still necessary for applied research. I thought that it would be fantastic if we could establish some sort of supplementary research relationship in which researchers and students visit NARS to conduct research which would not be possible in Japan, then return to Japan to conduct complicated analyses and so on.

Luckily, arrangements were made for one of the NARS staff specialized in pasturage to come to Japan to study on a scholarship which commenced October 1998. He is now in Japan and under going language training. Later he will start graduate study at Tottori University. I hope that in the future he will make positive contributions to the agricultural development of Oman and at the same time that the friendship will grow stronger between Japan and Oman. (By IIYAMA in Oman, Dec 1998.)

Mountain range swathed in green: Jabal

Counterpart staff, Mr. Gahzey (at NARS vegetable farm)

Coexistence of Nature and Humans - Towards the 21st Century (2)

Part 2: Challenges facing zero-emissions in Yakushima

The Island of Yakushima has become well known world-wide since the discovery of "Jomon-Sugi", a cedar which is thought to be over 7,000 years old, and ever since Yakushima's registration as a UNESCO World Heritage site in 1993, the nature and the people's life on the island have frequently been featured both in Japan and overseas. The Yakushima Charter, which was adopted by the island's local assembly, also in 1993, declares a series of targets aiming at the achievement of coexistence between nature and humans, and the development of the island in a fashion that fully respects Yakushima's particular history, traditions and natural environment. In order to live in good harmony with nature by creating a resource-circulation based society that inflicts a minimum of wastage on the natural environment, the people in Yakushima are trying to achieve a zero-emissions system. This system sets three targets, namely: 1) no use of fossil energy within the island; 2) full utilization of resources obtained from the island; and 3) creation of a zero-wastage society and lifestyle.

The first target - "no use of fossil energy" - means the elimination of uses of fossil fuels (including heavy oil, gasoline, light oil etc.) which enter the island for the purposes of power generation and transportation fuel. Unusually for a remote island, Yakushima is very rich in water resources and some 70% of energy supply is already provided by hydropower generation. This is enabled thanks to the natural / climatic conditions of the island, where it is said to rain 35 days in a month! The average annual rainfall is 4,400mm, and the record annual rainfall stands at 10,000mm. In addition to the existing hydropower generation, the island is hoping to achieve self-sufficient energy supply by replacing fossil fuel-dependent power generation with the optimum combination of solar energy, wind energy, small-scale hydropower plants etc. Also under consideration is the introduction of electric vehicles in order to stop the use of gasoline for transportation.

To achieve "full utilization of resources from the island", Yakushima is aiming at the use of local resources in order to achieve self-sufficiency of resourses as well as the development of local industries. Specific project plans include Research and Development of Yakushima's indigenous medicinal plants, introduction of agricultural and horticultural products suited to the mild climate, and promotion of eco-tourism making the most of the island's rich natural resources. Activities with regard to the third target "creation of zero-emissions society" includes separation and recycling of household garbage, and the circulation and recycling of resources by connecting different industrial activities. What is currently being tried is the domestic disposal of organic wastes from households to make compost and various recycling methods of wastes from primary industries (i.e. agriculture, forestry and fisheries).

However, there are also new problems arising as a result. In Yakushima, where currently flammable wastes are burned and non-flammable and large waste is buried underground for disposal, there has been an increase in the amount of large waste such as furniture, electric products and vehicles. Furthermore the disposal of waste left by the increasing number of tourists is becoming a problem. The challenge facing Yakushima in its efforts to rid itself of wastage and create a resource- circulation based society is still at its beginning. We hope people in Yakushima will keep trying, to the best of their abilities and in their own time, to achieve a unique way of local development making the most of the island's characteristic closed system environment. And in keeping with its status as a World Heritage Site, we hope that Yakushima will find a way for its human inhabitants to coexist with nature.

Solar power generator

Illegal dumping of wastes

Eco-Station for electric vehicles

A heap of deserted cars

Agriculture and Forestry in Pakistan (2)

Part 2: Irrigation farming on the Punjab-Sind Plain

The Punjab-Sind plain has a very old tradition of irrigation farming. The main water sources for irrigation in this area are the Indus and its tributaries.These mostly originate in the mountains, which means that there are characteristically significant seasonal changes in water levels. The most commonly used irrigation scheme in former times was the employment of simple watercourses cut through the riverbanks, into which water would flow only when the water level of the river was sufficiently high. The use of such watercourses was restricted by season and it was possible only in limited areas close to the river.

Later, irrigation in areas away from the river also became possible by controlling water flows with dams and by leading watercourses through the highlands. The main irrigation facilities in the Indus river basin include 16 barrages and 43 sets of irrigation channels, and the total length of main channels are as long as 64,000 km. Moreover, there are some 100,000 joints which connect the main watercourses to their branches, and the total length up to the very ends of the branches including channels into each farm amounts to 1.6 million km, covering 16.8 million ha of irrigation land in total. The main agricultural products from this area are wheat, rice, cotton, sugarcane and forage. The contribution made by irrigation farming here is significant not only in terms of food production but also as a source of supply of raw materials to domestic industries, especially the cotton industry.

Dam in Taunsa

Main irrigation channel

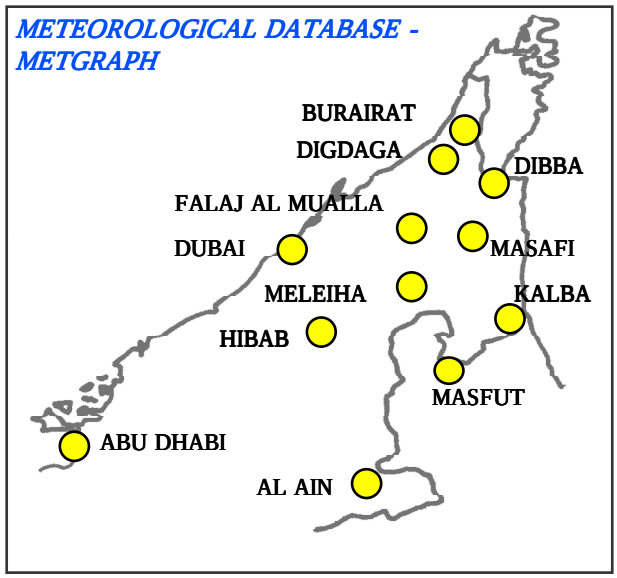
The end of the line for a branch channel

As the Punjab-Sind plain hosts mainly alluvial soil, irrigation channels constructed on the plain are made of soil which absorbs a large quantity of water. This, coupled with other problems such as the wearing out of dams and channel joints, and the lack of funds for their maintenance, is said to have resulted in an efficiency rate for the irrigation system that is less than 40% today. The loss of water from the irrigation channels themselves poses a significant limit to the development of agricultural productivity, as it causes not only a great loss of irrigation water but also causes other problems such as unnecessary and excessive waterlogging and salt damage. Therefore, the most important strategies for agricultural development in this area include prevention of waterlogging, salt damage and floods, as well as the rehabilitation of existing irrigation and drainage systems, and achieving an increase in the efficiency of water management schemes. In the 1960s the Salinity Control and Reclamation Project (SCARP) and more recently the National Drainage Programme was started at the national level. SCARP is an irrigation and drainage management project, which aims at protecting farmlands and increasing agricultural productivity by controlling groundwater levels with tube-wells. The tube-wells not only serve to lower the groundwater level to a harmless point, but the pumped water is also added to irrigation water, thus contributing to an increase in cultivation areas. Technical support has been provided by Japan in various related fields here, such as the establishment of groundwater control and irrigation facilities to increase irrigation areas, water management projects (especially canal lining at the individual farm level) and the rehabilitation of worn-out barrages. Damage to the irrigation systems caused by floods, due to seasonal increases in water, from the mountain areas has also been a serious problem especially on the right-hand bank, and some river basin management projects have been carried out in the flood-ridden area as well

Mini Series: AAI's Database Management (2)

Part 2: Management of numerical data in table format from BASIC and Excel to File Maker

In this article we would like to discuss how AAI has been dealing with numerical data such as meteorological data and statistics related to agricultural production and visual data such as photographs. Today it is common practice to use ready-made software programmes, but when the so-called PC first appeared, programming languages such as Fortran and BASIC occupied the mainstream of computer data processing. One example of earlier database management programming at AAI is data processing using BASIC for meteorological observation data gathered in UAE. With this programme data such as temperature, moisture, evaporation, rainfall, wind speed etc. obtained from over 10 observation stations in UAE can be entered and linked to a simple map, and by typing in certain information gathered at the field or observation site the necessary data can be extracted in figures or made into a graph. This kind of programming language was later replaced by so-called statistical software, such as Lotus 1-2-3 and Excel, which made it far easier to enter data, add data, correct data and create graphs. Macro is used for data processing.



Starting screen of MET GRAPH (Excel)

In developing countries, statistic data related to agricultural production are often shown simply in the form of a table or data book, but if complicate figures can be transformed into graphs or processed statistically the data can be not only displayed but also effectively utilized. Therefore, it may be interesting for our counterparts in developing countries to actually see how uninteresting accumulations of figures can be processed into colourful, simple and understandable graphs. For this purpose simple macro is good enough. What is important in any case is how the obtained graphs and results of statistical processing and calculation should be interpreted and fed into the next step (i.e. modification of the plan, policy-making etc.). Needless to say, the accuracy of raw data is also crucial.

The later debut of File Maker was rather shocking for those of us who at AAI had been processing data with our own programmes and macro such as BASIC and Excel as discussed above. Excel is probably good enough (or better) for dealing with a large amount of numerical data only, but File Maker has various advantages. One advantage is that it enables us to easily process not just figures but also images (photos) at the same time. This enables us to conduct various stages of data processing without having to create our own programme (though File Maker has a programming function called Script). Another advantage is that we can freely change the layout of output.At first AAI was using File Maker to process text and numerical data for managing its address book, reference database and business schedules etc. Later on, based on the earlier experience with File Maker and by improvising on its concept and functions, we created card-format databases for dry-land plants with photos (database of arid plants) and the Tanedasu (a seed database).

One of our complete card-format databases is "Plants in UAE" which was introduced in AAINews Vol.10. Since then "Plants in UAE" has been further improved and refined as a database of some 200 plant species found in UAE. Data on each plant including name, photos (whole, flower, habitat), characteristics (shape, habitat environment, resistance to salt and dehydration etc.), and use, are recorded and data search is possible from any entry field. In addition, the database also contains maps of different habitat types such as sand desert, mountain and coastal regions, and it is possible to conduct a search of plants by habitat while looking at the map. Data are still lacking for some plant species, so we are going to do further research and study so as to complete the information in the database.