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AAINews

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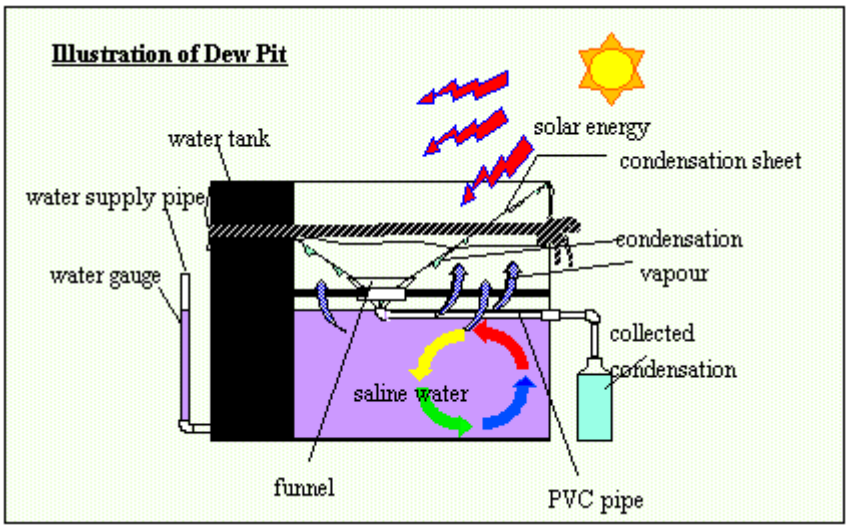
Competition at the World Water Day

The World Water Day Competition was organized by the Environment Agency of the UAE Federal Government on March 22, 1997. An announcement in the January 28th newspaper invited entries. These, the newspaper announcement stated, must be innovative or technological developments relating to the following three fields: 1) water saving, 2) appropriate water use, and 3) prevention of water contamination. We, the JICA team of experts, entered a dew pit. Although dew pit technology is not new and is widely known about, there are only a few cases of experimental research with actual equipment. In ancient days, around 4,000 BC, people in Jericho used the technology. In recent years, it has been recommended in the US Army's survival manual, was studied at the Hebrew University in Israel in the early 1970s, and there has been some dew pit research done in Tottori University in 1995.

The style of dew pit that we entered in the competition was the so-called "closed system" (as explained in the chart below). It may be easier to understand what it involves if one calls it a solar powered water desalination unit.

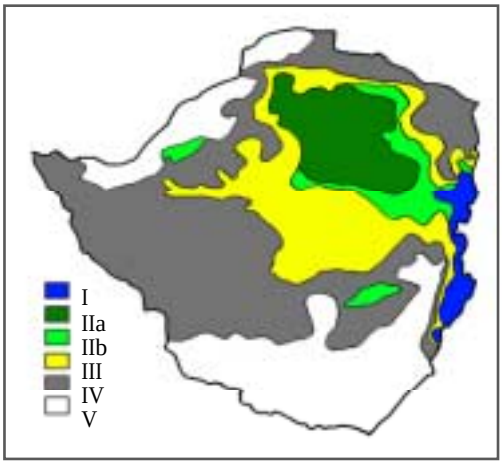
Every year on World Water Day in UAE it was the practice for universities and government offices to make displays illustrating their water-related activities. Starting this year, however, this custom has been replaced by an open competition organized by the Environment Agency with the goal of raising people's awareness on water issues. Surprisingly, it was our dew pit that received the first prize. To tell the truth, I have a mixed feeling about this. For one thing, although people in the Science Department and the Ministry of Water and Electricity are showing a great deal of interest in dew pit technology, only a small number of people in the Department of Agriculture seem interested. We have designed the pit in such a way that any blacksmith in any agricultural village can construct one without difficulty. I cannot help worrying about the over-exploitation of underground water resources and farm land in Abu Dhabi. The country seems to be indifferent about water issues. At the same time, I am happy that our work drew the attention of certain environmentally conscious people. (Reported by Shoji in UAE)



Agriculture and irrigation in arid lands: From a viewpoint of sustainability (5)

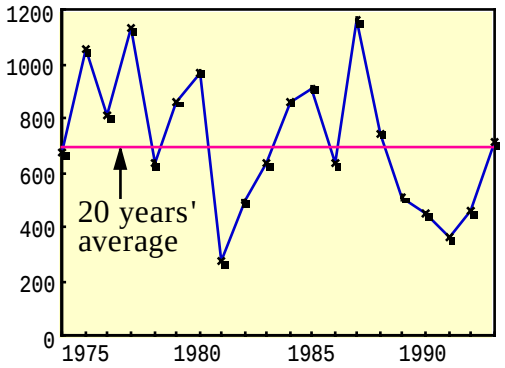
Part 5: Agriculture and supplementary irrigation in Zimbabwe

Precipitation in Zimbabwe varies considerably from region to region. Some areas experience over 1,000 mm of rainfall annually, however, there is also a significant amount of land that is semi-arid receiving just 500-600 mm of rain in a year. When considering agriculture in Zimbabwe, it is important to take into account the natural regions and the country's land tenure system. Zimbabwe can be divided into five natural regions as indicated in the illustration where they are graded from I to V. Areas that falls into categories I and II are suitable for agriculture and receive a fair amount of rain (between 750 and 1,000 mm per year). From regions III to V, conditions become increasingly harsh. In region V, annual precipitation is under 450 mm and, to make matters worse, rainfall is irregular. Such land is therefore unsuited to agriculture and is mainly used for extensive grazing.



Natural Regions of Zimbabwe

When it comes to the land tenure system, Zimbabwe has five main systems. These are broken up into state land, large-scale and small-scale commercial farm lands, communal land and resettlement areas. The sizes of large scale commercial farm vary from some hundreds to some thousands of hectares and such farms are mainly owned or operated by Zimbabwe's white population. Small scale commercial farm usually covers from 50 to 200 hectares per household, and is granted to black farmers as private property. Communal land and resettlement areas are also farmed by the black population. If one superimposes a land tenure map on a natural region map, one can see that a lot of areas desirable for agriculture are occupied by large-scale commercial farm, whereas communal land and resettlement areas are concentrated in regions characterized by low precipitation which makes them undesirable for farming or by areas where extended grazing is the only option.



Take a look at the Midland province, in the central area of Zimbabwe. This serves as a good example. This region has an average annual precipitation of around 600 mm and is classified as natural region III. Farming is rain-fed and the main crops are maize, cotton, sunflowers and peanuts. The graph, which shows changes in annual rainfall over a 20 year period, indicates that there are large fluctuations in precipitation. In rain-fed agriculture, volume of production depends not just on the amount of precipitation but also on rainfall patterns. Some rainy seasons have a long period where no rain falls, which could inflict serious damage on crops, depending on their stages of growth. If supplementary irrigation can be provided during the crucial period that determines growth and yield of crops, it will have a tremendous effect when it comes to reducing drought damage and increasing production. What has been preventing the introduction of supplementary irrigation is the factor of cost. Supplementary irrigation, which employs the turning sprinklers used in large scale farms, is beyond the reach of small scale farmers who have insufficient capital. It is necessary to develop or improve cheap realistic technology and apply it to small scale farming. Possible irrigation methods include irrigation from small ponds, "pitcher irrigation" which supplements water through the burial of unglazed vases at crop roots, and saving rain water in underground (cistern) to prevent evaporation.

Small-scale farm depending on rain-fed farming

Large-scale farm irrigated by sprinkler

Nature and Agriculture in Syria (5)

Part 5: South east desert region

In the south eastern region of the country, along the borders with Iraq and Jordan, lies the desert region known in Arabic as "Badia". This region accounts for 55% of Syria's land area, and much of the badia is arid with an annual precipitation of under 200 mm. In winter, the temperature in some areas drops below 0oC. By contrast, temperatures in the summer soar to 40oC. Temperature fluctuations, both in one year and in one day, are very large. From a geographic perspective, the southern side is higher in altitude and some areas along the Jordanian border are covered with lava beds.

It is impossible to grow crops in this region without irrigation, therefore farming can be seen only along the rivers Euphrates and Kabul. Wind-born sand particles and salt accumulation are two major problems facing agriculture in these areas. Other problems include localized torrential downpours and floods which can cause major damage to farm land. The surrounding areas have been used by nomads. However, as farm land expands and areas where the nomadic lifestyle is no longer possible increase due to afforestation projects, pressure is being exerted on natural vegetation which serves to accelerate land degradation. This causes more drifting sand and an increase in flooding. Under the circumstance, it is an extremely important task for the future of the Badia region, to establish desertification prevention technologies and methods that effectively utilize the characteristic features of the region.

Badia is increasingly becoming a target for new development due to the utilization of underground water and the introduction of water harvesting agriculture. There have already been many projects regarding development in Badia. The ICARDA experimental center has developed model crop fields using a water harvesting technique, and at the Malaga experimental center in the suburb of Aleppo, various research programmes are underway regarding such issues as vegetation rehabilitation and range land management. In cooperation with the UNDP, the Irrigation Department is implementing a comprehensive basin development project at the Mhasse experimental center with the aim of improving the efficiency of water use. The Badia Development Department has been undertaking research on sand fixation in the Kisrah area and on the prevention of desertification in Jabal Bishri. In the Tanf region close to Syrian borders with Jordan and Iraq, vegetation rehabilitation and livestock development programmes are underway using various water harvesting techniques. In addition, at Mount Abd Al-Aziz in Hassake, Japanese researchers and Japan Overseas Cooperation Volunteers have been conducting research work into vegetation on grazing land and soil and livestock breeding on the basis of resource management. There have been many interesting findings. Considering the agricultural development of Syria from a long term perspective, resource management in expectations of Japan's future contributions in this field.

An ICARDA demonstration field for water harvesting

Experimental site for range land management in Malaga

Water harvest in the Mhasse experimental center

Plants in Oman and UAE: Part 1 - Cruciferous Flower Fields in the Desert

The Al Hijr mountain range near the UAE's border in north Oman is a comparatively water rich area dotted with Omani-style oases. However, it is a very harsh environment with temperatures in the dry season reaching 50°C. Stones are burned black by the sun and Acacia trees stand enduring the intensive heat. As was also the case last year, this year's cooler season had a significant amount of rain, and alluvial fans that extend from the mountain slopes are speckled a faint green. Under Acacia and other trees and in hollows, the green color is more vivid. Woody plants produce new leaves, perennial plants grow new shoots from the roots, and annual plants hurriedly germinate and flower one after another.

Since these annual plants germinate only after rainfall in the cool months, they are not really either heat-resistant or drought-resistant. Nor do they appear to be salt-resistant. However, they possess characteristics that are highly adapted to the climate. Because they need to produce flowers to create seeds within a limited period after the rain, once germinated they immediately begin to grow both in size and at the same time develop reproductive functions. For as long as water is available, they continue to produce flower buds. And they die as soon as the roots reach to the dry zone. Some species can regrow if water continues to be available, therefore it might not be accurate to call them annual plants. Many of these annual plants belong to the order cruciferae. Particularly noticeable is Diplotaxis harra (photo 1) which bears vivid yellow flowers and which occurs frequently in mountain areas and alluvial fans. Another obvious species is Eremobium aegyptiacum (photo 2) which produces white flowers, and is often seen in the sand dune areas just off alluvial fans. Both occur commonly in this area and are nothing special. The sudden explosion of Diplotaxis harra, however, was truly spectacular in mid-February last year when it emerged all over the alluvial fans of the Al Hijr mountain range in the west (photo 3). This occurred as a result of intermittent rain that started in December two years ago. Erucaria crassifolia is another cruciferous plant that is seen in the area (photo 4).

Although this season has had a similar amount of precipitation, the massive clusters of Diplotaxis harra that flourished last year did not appear this year. The biggest factor for this appears to be the timing of the rainy season's commencement and termination. In the last season, there was intermittent rain from December to March. Therefore, wet conditions were maintained through all the four cooler months. By contrast, this season had only a small amount of rain in January. Although germination of Diplotaxis harra was recorded, the germs subsequently died as there was no further rain until mid-March. Although there was a reasonable quantity of rain between mid-March and mid-April, it came too late for other seeds to germinate. The temperature was also too high by then for the germs to benefit from the rain. As shown in this example, in extreme environments with constantly unpredictable climates such as those that characterize the UAE, vegetation is heavily influenced by yearly climate changes. Nonetheless, it is interesting to note the fact that such lovely cruciferous flowers manage to survive in this arid area.

Photo1（Diplotaxis harra）

Photo 2（Eremobium aegyptiacum）

Photo 3（Diplotaxis harra）

Photo 4（Erucaria crassifolia）