New series: Agriculture in the Dhofar region, Oman

Part 1: Dhofar region

We have printed several reports on Dhofar in AAI News before. Starting this issue, we are going to present five reports on agriculture in the Dhofar area. The planned contents are as follows: 1. The characteristics of topography, climate and regional agriculture and livestock farming. 2. Agriculture around Salalah. 3. Livestock farming in the Jabal region. 4. Nomadism in Nejd and modern agriculture introduced recently. 5. Problems and challenges facing agriculture in Dhofar in the future and my personal view of the future.

1) Regional characteristics of Dhofar

Along with the Batinah coastal region, the Dhofar region, located in the south of Oman, has long been rated as one of the best agricultural areas in the country. This is because Dhofar region, due to the influence of the July to September monsoon, has a climate unique among the surrounding areas on the tip of the Arabian Peninsula.

As indicated in the chart below, in Salalah and Jabal, temperatures decrease in summer months due to the monsoon. In Jabal, as temperatures decrease, there is a tremendous increase in rainfall. This is caused when moist winds from the Indian Ocean in the south hit Jabal and become rain. However, the monsoon effects differ radically over the mountain ranges. In the "Nejd" area behind Jabal, dried air comes over Jabal in the form of a hot wind, creating a climate with strong winds and dry, hot weather. Nejd is only about 30km away from the coast, however the climatic changes that occur from the coastal areas to Nejd vary phenomenally. As a result, different types of agriculture and livestock farming occur. These make the most of each region's natural environment.

2) Regional characteristics of agriculture

1. Salalah coastal plain In the monsoon period, fruits such as coconuts and bananas, vegetables and grass for fodder are grown in a traditional manner, using infiltration water near the ground surface. Large-scale grass cultivation has been popular in recent years.

2. Mountain ranges Traditional livestock farming, mainly cows and goats, utilising wild vegetation as fodder.

3. Nejd area Traditional camel rearing. Large-scale grass cultivation irrigated by deep underground water has been seen in recent years.

Traditional agriculture and livestock farming have long been conducted in Salalah, Jabal and Nejd, and they have been recognized as Oman's main farming areas. However, at the same time, farming using modern methods has been promoted and has cut into the traditional farming areas. We would like to report on current conditions and various challenges for the future in the following issues.
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Part 2: Agriculture in the Salalah plain

Farming in the Salalah plain mainly occurs around Salalah city, which is the capital of the Dhofar region, and in Taqah in the east. As can be seen in the satellite image, the cultivated area is divided into two kinds: traditional fruit and vegetable farming (indicated in mosaic red along the coast), and new large-scale grassland (shown in clear red patches in the interior). In traditional farming areas, farmers grow fruit such as bananas, coconut palms and papayas (which are the main produce of Oman), and vegetables such as radishes, tomatoes, cucumbers and mint. Fodder is grown for household consumption. Water is brought by basin irrigation using irrigation channels.

Irrigation water is pumped from shallow wells 5 meters underground and brought to the crop land using channels. Much of the fruit grown in this area is shipped to Muscat and lots of other produce is consumed in and around the Dhofar region. These farms are generally owned by Omanis, but the daily work and management is entrusted to workers from Pakistan and India.

Large-scale grass farms popping up in recent years aim to produce fodder for milk cows and are run as national policy corporations. Water is piped from deep wells dug around the farms and distributed by devices such as center pivot sprinklers and rain guns.

However, there is a downside to this. As the large-scale grass farming expands using a large quantity of water, the problem of sea water intrusion has become obvious. Moreover, because of their coastal location, it is the traditional farming areas that are affected by the sea water intrusion which follows the lowering of the water table. An investigation by the water resource ministry also revealed that between 1974 and 1992, the percentage of areas with good quality underground water (0~2,000 ppm) had decreased from 42% to 23% of the area concerned (About 50km to the east and west and around 10km to the north and south from Salalah city). This tendency is prominent in areas around newly developed farms that use a large quantity of water.

Traditional cropland: There are three levels - coconut palms in the highest level, fruit trees such as bananas and papayas in the middle, and vegetables or grass at the ground level.

Fruit shops which sells directly from farms.
Agriculture in the Dhofar Region, Oman (3)

Part 3: Live stock farming in the Jabal Mountain Range

In the mountain range called Jabal in the north of Salalah, grazing livestock on pasturage has been extensively practiced since ancient times. Within Jabal, which is part of Dhofar State, fairly rich vegetation occurs in the monsoon-blessed area stretching approximately 20 km north-south and 80 km east-west, and this is where the grazing is practiced. The main livestock kept by farmers are cows for meat and milk. Also, camels are kept by 30% of the farmers, and goats by 20%. The most important livestock are cattle, which are well looked after by the heads of households and grazed and fed mixed fodder and dried fish. It is even said that the cows are regarded as more precious than the farmers' own children. On the other hand, camels which are also looked after by the heads of households are becoming less important. Compared to cows, camels have fewer uses for people, and camels are given fodder only when it is needed to supplement the grazing on pasturage. It is mainly children and women's work to look after goats (kept for meat and milk), and the goats are fed by free grazing only. Each family lives in a house which serves both as cattle shed and human residence, surrounded by a fenced yard for keeping young calves etc.

These livestock are raised mainly by grazing them on the natural vegetation of the mountain range, and in the season of scarce pasture the cattle are moved to neighbouring regions (northwards or southwards) in search of more grass. It is said that today this type of traditional pasturage has declined due to an increase in artificial fodder supplied by humans. However, in the monsoon season which renders the region around Salalah greener, one can see a lot of livestock (especially camels) coming down from the mountains. Apart from livestock farming, frankincense and honey are famous and very expensive farm products from this region. In the monsoon season, locally grown cucumbers and mushrooms also enter the market. In addition, compost made from cow dung, though not called an agricultural product, is an important income source for local farmers. (See AAInews Vol. 2 for details about frankincense)

In 1994, the number of livestock in this region was reported as amounting to 147,000 cows, 47,000 camels and 89,000 goats, but numbers are thought to have increased since then. Local people try to amass more and more cattle, regarding them not as a mere income source but rather as a form of property. However, the current number of cattle clearly exceeds the natural carrying capacity of the region's pasturage. It is readily apparent that the natural vegetation is rapidly degrading due to the practice of free grazing. Locals recall that until about two decades ago, Jabal was covered with thick forest and grassland - so dense that one could easily get lost if one left the path. Although both farmers themselves and relevant agricultural authorities admit the fact that overgrazing is occurring, no proper measures seem to have been taken so far. Only in a few areas the Forestry Department of the Ministry of Agriculture and Fisheries in Salalah is carrying out small-scale projects such as tree planting to recover the lost vegetation, and the preservation of some areas for seed production.
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Part 4: Pasturage in the Nejd and the development of modernised agricultural farm zones

In the north of the Jabal region on which we reported in the last issue, there is a vast, barren desert area called Nejd. In this area are found a number of wadis originating in the Jabal region in the south. The plain changes its features from soil desert in the southern part to sand desert in the north, leading further up to the Rub'al Khali Desert of Saudi Arabia. This area has long been used by the nomad Bedouins for raising camels, and there has been date farming in some small oases, but otherwise the area has few inhabitants and it has generally been regarded as being of little use.

However, during the process of resource assessment conducted along with oil exploitation in this region, it was discovered that the Nejd area has abundant water resources, which consequently have started to be exploited and utilized in recent years. Since the first center pivot irrigation system (a sprinkler system with water pipes moving in a circle) was introduced in 1986, some 900 ha of farm land (some temporarily out of use) has been created in the Nejd as of today. In some parts melon and alfalfa are planted, but the major crop of this farming area is Rhodes grass (a gramineous plant that grows as pasture) used as forage for livestock (mainly cattle) in the mountain region and for camels in the Nejd. Today this area serves as an important supplier of cattle forage (which previously used to be imported from northern Oman and Saudi Arabia).

While the Nejd is gaining in importance as a major forage producing area, some problems have been pointed out with regard to the development of the farm land. Although in the early period of the agricultural development, the water resources of this area were thought to be in great abundance, the decline of ground water levels due to intensive water pumping from the ground has become a problem. Some of the farm land where water used to be supplied from wells which pumped up water solely by water pressure, had to be abandoned as water could not be taken from the wells due to lowered water pressure, and in many farms submersible pumps had to be installed deeper to reach the declining water level.

In such circumstances the local government is now being careful about the development of agricultural land in this area, and today construction of new wells or of new farms is, in principle, regulated. In reality, however, there can be seen many pieces of land fenced around and set aside, implying further agricultural development of the area.
Agriculture in the Dhofar Region, Oman (5)

Part 5: The meaning of 'the inter flow of Dhofar agricultural products'

The following is a brief summary of agricultural practices in different parts of Dhofar State that have been reported in previous issues of AAI News:

1) Salalah (coastal plain): traditional vegetable and fruit cultivation, dairy farming on pasturage cultivated using modern methods.

2) Jabal (mountain region): traditional pasturage for cows and camels.

3) Nejd (desert region): camel pasturage and modernized pasturage production.

The farming practices of these areas are deeply related to each other in complementary ways. As summarized in the table below, the major products from each area support the farming activities of other areas in the form of food, fertilizer and forage. The flow of agricultural products within Dhofar is not entirely a closed circle - other areas contribute - but the local interdependence is considered to be fairly significant (chemical fertilizers excluded).

<table>
<thead>
<tr>
<th></th>
<th>To Salalah</th>
<th>To Jabal</th>
<th>To Nejd</th>
</tr>
</thead>
<tbody>
<tr>
<td>From Salala</td>
<td></td>
<td>Food products, dairy</td>
<td>Food products, dairy products</td>
</tr>
<tr>
<td></td>
<td></td>
<td>products fodder from fish</td>
<td></td>
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<tr>
<td>From Jabal</td>
<td>Meat, dairy products cattle</td>
<td>Meats, cattle manure</td>
<td></td>
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<tr>
<td></td>
<td>manure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>From Nejd</td>
<td>Pasture, camel meat</td>
<td>Pasture</td>
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</tbody>
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What should be also mentioned here is that this relationship of interdependence among the above regions has been more and more significant in recent years. In other words, each region's agricultural activities cannot proceed independent of the other regions, and the role of producing specific products is becoming increasingly divided among the different regions. For many years past, farming practices in each region were effectively self sufficient but as agricultural production activities expand in area it seems that inter-regional dependence is also growing.

Self sufficiency within a region of the traditional sort is sustainable but its productivity is low. On the other hand, the expansion of agricultural productivity is taking place under the name of 'modernization,' and this seems to be destroying the traditional forms of agriculture, which were sustainable in the past.

By combining only the positive aspects of the above two forms of agricultural activities, one could achieve 'sustainable modern farming,' and this should be the goal of future agricultural development. In the next issue, the final part of this series considers the future of agriculture in the Dhofar region.
Part 6: Future tasks and directions for agricultural 'development' in Dhofar

Nowadays maintaining self-sufficient economic and agricultural communities is almost impossible in most areas and Dhofar is no exception. History has proved that it is difficult for self-sufficient forms of agriculture to endure, particularly so in the face of current systems which are characterized by large scale intensive forms of agricultural production (exploitative agriculture). It may sound an exaggeration, but it is true to a great extent that the farming activities in Dhofar, developed and practiced over hundreds of years, are facing extinction as a result of the drastic social changes of the past two decades. It is too grave a task to come up with all the solutions here, but I would like to examine the current agricultural problems and potential solutions in Dhofar, as well as make some personal observations.

In the Dhofar region the traditional form of agriculture (sustainable, but limited in terms of productivity due to natural / environmental restrictions) is being overtaken by more modernized forms of agriculture (problematic in terms of sustainability, but with a productive capacity greatly expanded due to human technology). The following table is a summary of the current problems, challenges and measures being taken. It also shows the environmental conditions and perceptions of the local people in the region.

<table>
<thead>
<tr>
<th>Region</th>
<th>Environmental changes and conditions</th>
<th>People's social perceptions</th>
<th>Measures currently taken</th>
</tr>
</thead>
</table>
| Salalah | 1) Lowering ground water level due to water pumping for recently created pasture land  
2) Increasing salt levels in ground water | 1) Consumers are happy with milk (supply)  
2) Farmers are in trouble, but other people (not personally experiencing any injuries or facing risks) have little concern | 1) Investigation into ground water quality  
2) Transfer of existing pasture land to Nejd (plan) |
| Jabal  | 1) Increasing number of cattle  
2) Decline in forest areas  
3) Illegal logging for fuel wood  
4) Shortage of natural pasture  
5) Increasing amount of harmful plants | 1) Local people do not see the increase of cattle as a problem  
2) Decreasing forest areas and shortage of pasture are seen as a problem in terms of how they diminish cattle feed | 1) Establishment of natural vegetation reserve for seed production  
2) Consultation / guidance for the locals  
3) Elimination of harmful plants |
| Nejd   | 1) Lowering water pressure in the third aquifer (Lowering ground water levels)  
2) Increasing salinity of pasture land soil  
3) Lack of machine maintenance capacity | 1) The number of local people is small  
2) There are few local farmers (those who are engaged in agriculture are workers brought in from other countries) | 1) Restrictions on opening up new farmland  
2) Restrictions on digging new wells  
3) Establishment of pilot farms  
4) Investigation of ground water resources |

It can be seen from this table that clear problems and challenges exist. Sufficient counter measures, however, are not being taken. The reasons for this in turn can be summarized as follows:

1) Lack of personnel who could plan and undertake projects. In other words, the problems are perceived but cannot be quantified due to the lack of capable manpower; and this leads to a situation where the real dangers are neglected.

2) Lack of communication and information exchange between relevant authorities and other concerned parties. The information owned by each organization involved is not being made full use of. Even within the Ministry of Agriculture and Fisheries, different sections are not aware of each other's on-going agricultural projects.

3) The authorities are not willing to be actively involved in development programmes for the Jabal region. This is because, due to past civil war experience, apparently the central authorities tend to avoid contact with the mountain tribes or turn a blind eye to matters which are likely to cause controversy among the Jabal locals.

4) The local people's sense of values (in this case relating to cattle and farmland) are very different from ours. For them, cattle are not merely an income source but are also valuable property in themselves. Therefore local people believe it is important to invest fortune to increase the number of cattle even if they know they may not be able to sell them in the long run.

5) Whatever measures may be offered to alleviate their problems, local people tend not to co-operate unless they are first shown visible achievements and the benefits they can derive personally.

6) People in the Nejd region still seem to believe that there are inexhaustible amounts of water. Also in this region water resources are not investigated sufficiently (partly for reasons related to 1).

With the current situation described above in mind, then, from now on what kind of ideas and actions are necessary? In order to discuss the future of agriculture in Dhofar taking into account the above problems and the various local conditions, it is inevitable that we consider not only agricultural development but also the issues relating to the environment and resources conservation.

(P.T.O)