Nature and Agriculture in Syria

Part 1: Varied Climates of Syria

Syria is located in northern part of the Middle East, in latitude between 32° and 37° north and longitude between 35° and 42° east. The area covers about 1,850,000 km², almost half of Japan, but their topography and climate are full of variety. The Mediterranean coast area has plain coast of 180km long and 20-30km wide, and mountains parallel to the coast. The weather is temperate and cultivation of citrus fruits and greenhouse vegetables are popular. The Mediterranean mountain area consists of steep mountains stretching from south to north. Some of the mountains such as Jabal Sheikh in south west of Damascus reaches up to 2,800m above the sea level. It snows in winter and annual precipitation is more than 1,000mm. Apples are produced on the mountains. In inland plain area, the "Fertile Crescent" spreads from east side of the mountains along the border with Turkey. Rainfall in winter, high temperature and dry weather in summer make this area an important grain producing zone. The desert called "Badia" spreads in south-east, and occupies more than 40% of the country.

Agriculture is one of the main industry in Syria. Agricultural products are very important not only for domestic consumption but also for export. The basic problems of Syrian agriculture are unstable production due to the cultivation practice solely depending on rainfall, and lack of infrastructure such as irrigation facilities. Moreover, as vast area of the country is semi-arid land, conservation of natural environment has to be put into serious consideration when development projects are planned. So-called "sustainable agriculture" should be more focused in order to solve problems such as soil erosion, salt accumulation and desertification, which are major common issues in arid and semi-arid areas.

In this series, we would like to divide Syria into four areas according to the climatic features and introduce cultivation practices of each area, environmental problems and their trials which seem to be effective for sustainable agriculture.
Part 2: Mediterranean coastal regions

The Mediterranean coastal region of Syria is characterized by coastal hills of 20 to 30 km in width, sandwiched between 180 km of coast-line and mountain ranges that run parallel to the coast. At high altitudes, the annual precipitation amounts to more than 1,200 mm, and even the coastal plains have over 800 mm in rainfall per year. Due to these climatic conditions, comparatively high relative humidity (more than 65% on average) and low evapotranspiration (under 1,600 mm per year) constitute the main characteristics of this area.

Agriculture in this region is characterized by citrus crops and greenhouse vegetable farming. In particular, citrus, mainly oranges, in this area accounts for more than 90% of all Syria's citrus production. For citrus farming, the windbreak around the farm plays an important role, sustaining mild micro-climatic conditions on the land. However, if windbreaks are too thick, they could promote the breeding of pests such as white fly. Therefore, guidance for farmers is necessary, which is based on the results of experiments regarding optimum concentrations of fruit trees and the most suitable citrus fruit for various conditions. Also, in recent years, there has been large-scale damage to the citrus crop caused by the citrus leaf miner. Nonetheless, pest control without pesticides has been proved to be effective, thanks to the development of pest control methods using natural enemies at the agricultural institute. As for greenhouse vegetables, the main crops are winter tomatoes and cucumbers. New irrigation methods such as drip irrigation have been introduced – mainly to greenhouse farmers. However, because there is no sufficient comprehensive training for the operation and maintenance of these systems, the advantages of the new irrigation methods have not been achieved effectively. The promotion of bee keeping, which takes advantage of the year-round warm climate, is an important task as is the promotion of the use of bees to increase production of green house vegetables. Turning now to agricultural land use. Olives are the main crop in this area and are planted on most hills. Tobacco and peanuts are also characteristic features of agriculture in this area. In addition, the agricultural institute is carrying out experimentation to introduce crops such as bananas, coffee and tea. These initiatives have not filtered down to the farmer's level, however, because such crops require the protection by greenhouses during the low temperatures that occur during the winter.

Regarding environmental issues, the main issue is the intrusion of sea water in farmed land. This occurred in the Damsalho area to the north of Latakia city. This area used to have many orchards mainly composed of citrus trees. Due to the over extraction of underground water for the Sports City and hotel development, however, irrigated water quality is deteriorating at speed. Some farms have already been abandoned and salinized land continues to expand. In hill regions, soil conservation on slopes is becoming an important task. Gentle slopes are mostly utilized for olive cultivation and traditional stone-walling techniques are observed. On steep slopes that cannot be used for crop production, soil conservation efforts such as afforestation are being carried out. However, more effective measures are sought, since soil erosion on some of the steep slopes is extremely severe.
Part 3: Mediterranean mountain regions

The mountain range which runs from the south to the north along the Mediterranean coast was formed by geological activities in the Dead Sea rift valley. To the south west of Damascus loom the steep shapes of the Haramoun mountains known for the 2,814m peak Jabal Sheikh. North of Damascus area the Qalamoun mountains rise to peaks of over 2,500m. Mountains disappear at the northern border with Lebanon, however Alawin mountains and Zawiyah mountains stretch on both sides of the Ghab lowland into the north to join mountain areas in Turkey. Rain is concentrated in winter with a large amount of snow fall in high areas that forms water sources.

Mountain areas between Damascus and Beirut are the watershed of the Barada river that flows through Damascus. They are also an important area for the production of fruits such as cherry, apricot and apple. Scattered at the foot of Jabal Sheikh, there are beautiful apple producing villages. Land utilization is advancing into the north mountain areas, and in some places, terraced fields rise up the slopes almost to the peaks, creating magnificent scenery. Silk worms have been reared in some areas for many years, but the silk business has been declining in recent times and many mulberry trees have been replaced with fruit trees. Forests of naturally occurring syndian (Quercus calliprinos) are seen in the area, and there are some Lebanese cedar sanctuaries.

One of the universal problems apple growers face is frost damage to flower buds due to low temperatures. People in this area have been taking counter measures which include fumigation using old tires and gasoline, and water sprinkling. Furthermore, the department of agricultural extension has recently undertaken the introduction of anti-frost fans. All apple fields are located in high altitude areas, often near the upper most tributaries of rivers. The use of fertilizers and pesticides in apple growing involves the danger of river water contamination. Regarding forestry, FAO's community afforestation project is underway. The short term goal of this afforestation activity is the production of fodder, fuelwood and fruits. In the long run, afforestation can create windbreaks and can conserve soil and wildlife. One problem of this project is the antagonism that exists between the project's executors and the local people who had previously been utilizing the land in various ways. In the future, it is an important task to develop comprehensive forest management in order to promote sustainable agriculture and stock breeding, attaining the full understanding of the local community.

Finally, related to the WID (Women In Development) issue, women in farming villages in mountain areas spend less time engaged in farming than their female counterparts in villages devoted to agriculture of crops such as wheat and cotton. Therefore, they have a high potential to develop means of acquiring additional income; by processing the fruits and nuts they produce, and by making silk textiles. The positive development of this sort of supplementary income source will be an extremely important task in the future.
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Part 4: Inland plains

On the inland slopes of coastal mountains and at the south foot of the northern hill region, there are stretches of alluvial and basin plains. In winter, there is a relatively good rainfall, and rivers and springs emerge in mountain areas. Summer is blessed with hot and dry climatic conditions, and from ancient times this area has developed as an important granary. One can see vast areas of wheat fields in winter and this scene really deserves the name "the Fertile Crescent".

The main crops of this area are barley, wheat, cotton and sugar beet. Pulses such as chick peas and lentils, and maize are also widely cultivated. Barley can be cultivated with rain water, however, summer crops such as cotton and maize require irrigation. The main characteristic of this area's agriculture is that excess crops and residue (e.g. stubble) from the fields are utilized as an important resource for livestock fodder. From the beginning of Spring to the beginning of Summer, livestock grazes on natural vegetation. When wheat cultivation is over, livestock is brought into the wheat fields. After eating what is left on the land, livestock is moved to other summer crop areas. After they have fed on the residue of the cotton crop they are fed artificially during the winter, waiting for the growth of natural vegetation in spring.

As far as land use is concerned, the important key to promotion of sustainable agricultural development in the future is a shift in direction away from existing overly exploitative agricultural methods involving wheat and cotton rotation. Although it seems to be necessary to revise basic crop rotation patterns, it is not always easy since these major crops are planted according to production plans formulated by the Government. Sometimes these production plans prevent implementation of adequate crop rotation patterns. In the future, it is necessary for concerned governmental bureaux to co-ordinate their activities with a view to realizing efficient and sustainable land use. In order to develop agriculture that keeps soil fertile, the active introduction of leguminous crops in rotation is desirable, although this has not been very successful because it is difficult harvesting such crops using machinery. Given this, it is highly important to develop organic farming methods, rationally combining crops and livestock production. For this, research needs to be further promoted regarding the use of animal manure, green manures and also recycled fertilizers. Regarding water use, salinization on irrigated land has become an extremely serious problem. Once salt accumulates on the surface of soil, huge costs are incurred should the land be improved. An important task for the time being is to establish a water management system which prevents the accumulation of salt. To realize this, it is necessary to formulate and introduce sound water supply systems that fit cropping patterns. It is also necessary to consolidate water management at the field level, with farmer's groups voluntarily maintaining irrigation channels. There has been a new and interesting experiment which aims to use salinised soil effectively by introducing salt-resistant crops and establishing fish farming.
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 Kirsrah 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.
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Part 6: Future Challenges

In the last five parts in this series we have chiefly examined agricultural systems unique to each region of Syria and the environmental issues they face. In this part, we have compiled a chart of current environmental issues and possible counter measures, in order to list future tasks that need to be undertaken in order to utilize Syria's natural resources sustainably.

<table>
<thead>
<tr>
<th>Items</th>
<th>Current Environmental Problems</th>
<th>Possible Measures</th>
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<tbody>
<tr>
<td>Water Quality Conservation</td>
<td>Contamination of river and underground water due to agricultural chemicals, household and industrial effluent. Impact of contaminated water on agriculture and household water supply.</td>
<td>Implementation at the national level of measures to counter water contamination. Employment of simple household effluent treatment systems at the regional and residential level. Water quality improvement and improvement of waterside environments by promoting water access improvement projects.</td>
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<tr>
<td>Soil Conservation</td>
<td>Soil erosion and degradation on the steep slopes of coastal areas. Wind erosion and shifting sand problems in the inland desert areas. Soil degradation due to continuous exploitative agriculture.</td>
<td>Transmission of traditional stone walling techniques as a means of preventing erosion, and water harvesting. Promotion of afforestation activities for erosion control, rain water cultivation, and sand fixation. Transformation of crop rotation systems.</td>
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<tr>
<td>Salt Accumulation</td>
<td>Intrusion of sea water into underground water supplies due to over pumping. Inappropriate water management. Seepage from irrigation channels. Poor drainage. Overuse of chemical fertilizers.</td>
<td>Thorough implementation of appropriate water management systems by organizations such as water management co-operatives. Implementation of appropriate irrigation and water seepage measures in accordance with amounts of water consumption for different crops. Maintenance of drainage channels.</td>
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<tr>
<td>Women's Issues</td>
<td>Physical burdens on women such as water fetching, pest control and agricultural labour. Lack of understanding on the part of men regarding activities to improve living conditions. Stagnated agricultural income.</td>
<td>Reduction of women's burdens by easy measures such as the introduction of simple labour saving devices. Development of local produce based on detailed market surveys. Activation of handicraft and food processing industries.</td>
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<tr>
<td>Badia</td>
<td>Desertification caused by inappropriate land use (deterioration of land due to &quot;gamble agriculture&quot;, deterioration of natural vegetation due to expansion of land off limits to grazing.)</td>
<td>Experiments on improvement of water harvesting techniques and vegetation rehabilitation. Implementation of practical activities in ways that co-exist with the nomadic lifestyle.</td>
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In Syria, tourism development based on historical heritage will continue to be a very important industry. In the future, it will be an important task for tourism development and the recreational activities of residents, to maintain waterside environments, promote water quality improvement, and improve people's access to water along the river banks. Water quality improvement activities at the local level, such as household effluent treatment using charcoal, are desirable. Also, in order to realize the transmission of traditional stone walling techniques, the promotion of appropriate water management on the regional level and the reduction of women's labour, activities at the local residential level will play an important role. Furthermore, it is impossible to discount nomadic people's lifestyles when considering effective use of Badia. In this way, to sustainably use natural resources in Syria, it is necessary to promote activities on a regional basis and with the participation of local people. It is our strong hope that Japanese assistance will embrace these ways of thinking and will involve co-operation in a way that will truly contribute to the improvement of people's lives.

Water pollution in rivers has become a major issue all over Syria

Daily water fetching is almost entirely carried out by women