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

Part 1 : Irrigated agriculture in arid lands

The irrigated agriculture which utilize river or groundwater are often introduced to arid lands because of the scarcity of annual rainfall. In case of Pakistan in West Asia, irrigation facilities which can utilize abundant water of Indus river have been constructed since the colonial period and vast areas have been irrigated. However, excess irrigation has been causing problems such as water logging and salt accumulation in the soil. Similar problems are reported in Syria as well. In UAE in the Arabian Peninsula, agricultural and/or afforestation projects which seems more or less environmentally unconscious have been implemented with abundant oil money. These projects are causing deterioration of water quality, drying up of groundwater and salt accumulation in the soil due to inadequate irrigation with saline water. Thus, it is urgently needed to plan and implement appropriate projects in terms of scale and level with nationwide viewpoint.

As mentioned above, problems like salt accumulation are often caused by irrigated agriculture in arid lands, and two methods seem to be effective to avoid those problems. One is to irrigate adequate amount of water, and the other is to drain the excess water away. However, when the scale of irrigation facility or organization is very large, it is rather difficult to control the amount of water provided to each farmer properly and timely. As a result, farmers are apt to irrigate excessively when water is available. This is understandable because, in arid lands, crops easily die without irrigation and grow better when irrigated with more water. As long as such situation continues, it would be almost meaningless if agriculture extension officers and experts of aid organizations intend to train farmers how and when to be irrigated. These problems can be solved if farmers can use enough water whenever they want, which means irrigation facilities should not be too large so that farmers can control them by themselves.

When irrigated agriculture is newly introduced to arid lands, irrigation using well or river water is generally adopted. But, before the modern irrigated agriculture, usually they have traditional cultivation practices even in such arid areas. "Water harvesting" which makes use of scarce rainfall is one of them. And "Oasis agriculture" which often uses underground canals is another traditional way in arid lands. Compared to the modern agriculture, crop yield with traditional way is unstable and poor. However, in terms of sustainability, traditional practices are more advantageous than the modern ones which tend to cause problems such as salt accumulation within a relatively short period. On the contrary, traditional practices have been used for a long time and causing few problems, which proves that the practices suit the climate and other conditions of the areas and conserve the environment. Thus, when we engage agricultural development in arid lands, it is indispensable to study traditional cultivation practices carefully.

Salt accumulation (Pakistan)

Oasis agriculture (UAE)