CONCLUSION OF THE 2003 TASAE

OVERVIEW

The 2003 TASAE was held on 5-11 November 2003 and had participants, country representatives, each of whom delivered their respective country reports. The representatives were Mr. M. Qaseem Naimi (Afghanistan), Dr. Mesbauddin Ahmed (Bangladesh), Dr. Tai-cheol Kim (Korea), Dr. Bancha Kwanyuen (Thailand), Dr. Anh Tuan Nguyen (Vietnam), Dr. Tuan Doan Doan (Vietnam) and Dr. Masayoshi Satoh (Japan). The topic was “Water resources demand and allocation associated with human survival and food production, and the role of agro-environmental education”.

PRESENT SITUATION

Present situation on the water resources demand and allocation associated with human survival and food production and the role of agro-environmental education in each of the participating countries can be summarized as follows:

Afghanistan

Afghanistan is a semi-arid land locked country located in the south central part of the Asia main land. Two decades of conflict, bombardments, years of severe drought, and the displacement of millions of people have been exacerbated by the country’s high illiteracy rate, low life expectancy and grinding poverty. Afghanistan’s urban environment is in a dismal state.

Agriculture production is the mainstay of the livelihood of rural communities in

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Afghanistan and is largely dependent on water supply from traditional surface and underground irrigation systems.

Nearly 85% of all irrigation systems in Afghanistan, covering about 3.2 million ha, are traditional schemes developed and built by farmers and operated and maintained by them according to traditional communal customs and practices.

The country is currently initiating development steps to sound environmental management, conservation and regeneration programs and activities. The country can overcome the damages by improving food security in the country by:

- Providing quality seed and fertilizer and other inputs,
- Raising the capacity of the national crop sector through the setting and upholding high agronomic standard for crop production,
- Rehabilitating and developing irrigation systems,
- Development of an integrated water resources management system,
- Increasing and advancing livestock production,
- Providing potable water,
- Preserving and regenerating natural resources and the environment,
- And more importantly by building national capacity and ownership.

**Bangladesh**

The overall water resource management situation including water availability, demand, supply and other related phenomena are of great concern in Bangladesh. The competing interests of agriculture, fisheries and navigation have to be resolved. Upstream developments in other co-riparian countries have reduced the availability of surface water
day-by-day. With supply diminishing and demand intensifying, it is becoming more and more critical to develop a clear management policy.

During the monsoon season, the flood damage from the Brahmaputra, Ganges and Meghna is catastrophic. On the other hand, the annual minimum flow (generally during February) of rivers near the Bay of Bengal is only 5% of the rivers peak monsoon discharge. Negligible rainfall during the same period (December to March) causes drought that adversely affect agriculture and other economic sectors. The incidence of both flood and drought in a yearly cycle profoundly affects river morphology in Bangladesh. Fifty-seven transborder rivers drain a huge amount of water from river basins up north to the Bay of Bengal in the south. The average annual sediment load that passes through the country to the Bay of Bengal is 1.5 to 2.5 billion tons.

Total surface water available for development during the dry period (December to February) is 19,170 million cubic meters (MCM). Available groundwater recharge is 21,088 MCM out of which 8,406 MCM is used in irrigation. Groundwater contributes about 70% of total irrigation and the rest 30% comes from surface source. About 95% of drinking water in Bangladesh is derived from groundwater. Arsenic contamination of this source was first detected in 1993 and now most parts of the country are affected by arsenic poisoning.

Agro-environmental education and related research are going on with the concerned universities and research institutions for proper utilization and management of water resources of Bangladesh.
Korea

WTO is a generally favorable system to the Korean economy, but detrimentally disadvantageous to the Korean agriculture. Most impending problems solved are how to harmonize reasonably these contradictions.

In the economic and social point of view, Korea is standing at the turning point to enter the group of advanced countries. Consequently, the value system of people is changing from quantity to quality, from development to conservation, from growth to distribution, and from production to environment. Even though infrastructure for agricultural production has been greatly improved, farmers are still poor and rural communities are rather exhausted compared to the advanced countries. The crisis of agriculture have to be overcome both through political tactics for food security, the diversity of rural characteristics, the amenity of rural society, the unification of Korea, and the international collaboration, and through technical tactics for eco-friendly irrigation and drainage canal, optimal recharge of ground water, environmental-friendly dam, the techniques of repair and maintenance, and the techniques of disaster prevention, etc.

We agricultural engineers of Korea have to find out new projects to ensure that farmers are getting rich both economically and mentally and so they can enjoy the amenities of rural life. New projects are related to disaster prevention, information techniques, agro-eco-environment system, and improvement of public welfare facilities, needless to say water saving and automation of irrigation and drainage. And also we build the theory on the role of agro-environment education through the public
information of multi-functionality of agriculture, the innovation of education in college, and the accreditation of engineering and APEC engineers system.

**Thailand**

Generally the annual specific yield of water for Thailand is relatively high due to high rainfall in every region of the country. The water availability per capita is also relatively high except the central plain due to high density of population. The surface water is abundant only in the rainy season but the amount of flow may reduce greatly in the dry season therefore groundwater is used as the second source of water during the dry period. The major water uses are irrigation, domestic water supply and industry, respectively. According to the government policy domestic supply must always get the highest priority followed by agriculture. Even with large amount of water supply, there is still water shortage throughout the country due to insufficient storage, recession of inflow, and excessive growth of demand. In addition the main source of irrigation water and municipality water supply is surface water but the main source of rural water supply is groundwater.

Rice is the crop with the lowest productivity in term of yield and income and vegetable is considered to be the most productive in term of water and land. Nevertheless rice is still the most popular crop since it has a high potential for the market because of both internal consumption and exportation. In order to cope with the situation with higher risk of water shortage for agriculture, the water sector has tried to improve water allocation and water management especially for irrigation. The irrigation efficiency is improving such that more crops can be produced with less amount of water. Finally,
agro-environmental education is implemented through people’s participation, school education and seminar arranged by water resources agencies.

**Vietnam**

The water resources in Vietnam is estimated relatively rich. Vietnam annual average annual rainfall is 650 BCM; mean annual flow totals 880 BCM, ground water are estimated to be 48 BCM. Agricultural sector is the largest water user, using 75 to 90% of the total water volume used in Vietnam. Industrial and service water use has been increasing and the share is 10-25% by 2010.

Rural poverty is associated with monoculture practices and low yields due to a lack of water resources and water control infrastructures. Lack of safe water supplies and irrigation were the biggest issues related to the poor. At present 40% of Vietnamese population has no access to clean water and there is still 16% of cultivation land, which has no irrigation. Improving water supply to the poor would be a measure for poverty reduction in Vietnam.

Due to deforestation, urbanization, fertilizer use in agriculture, over-exploitation of ground water and wastewater, the water resources is depredated. The country is experiencing wider localized and seasonal water shortages, particularly as demand increases. Development additional storage facilities, improving basin planning, and developing groundwater as an alternate source are recommended so that new supplies cannot match the demand.

Facing with the emerging water shortage and natural resources degradation, the agricultural environment management is an urgent matter in Vietnam. Thus, the human
resources training for this field has played an important role in the development, in which, the community and gender issue training has to be considered and is essential to improve their knowledge and understanding on water resources demand and the agro-environment.

Japan

Irrigation sector quantitatively occupies almost two thirds of the total water abstraction in Japan. Industrial water and domestic water supply have rapidly increased their demand during the last forty years. Dam construction has been the major method of water resources development. The government introduces a water right system for water allocation in a river. It allows related water users to decide the water allocation during drought time through their negotiation.

The government cannot start an irrigation project unless most of the beneficiary farmers agree to the project. Once it starts, farmers must pay a certain ratio of the construction costs. In return, they are given the opportunity to express their opinion on the project plan, including the method of water distribution after the project’s construction.

Japanese farmers are totally responsible for operation and maintenance of their irrigation systems. They establish a Land Improvement District (LID) for each irrigation system following Land Improvement Law. They manage it through a representative election system. Uneven water distribution in an irrigation system is solved during the sever droughts by temporal change of water distribution system to avoid partial damage among member farmers. Water cycling by LID is another way to solve uneven water distribution problem.
KEY ISSUES AND RECOMMENDATIONS

1. Water Shortage and Allocation

1.1 Water is a scarce resource; population is increasing to put additional pressure on this valuable resources.

1.2 One of the poverty issues in the third world country is shortage of water. Poor people tend to have less accessibility to water.

1.3 Improper allocation and use of water endangers the quantity and quality of water.

Recommendation:

1.1 The water resources should be handled in a proper way to preserve the quantity and quality of the available amount of water.

1.2 Water should be allocated in such a way to eradicate poverty as well as to realize the high water use effectiveness.

1.3 Strengthen and promote the involvement of public and private research organizations for appropriate use and management of surface and ground waters.

2. Global Weather Change

2.1 Changing pattern of the global weather influencing the distribution and availability of water both in terms of time and location.

2.2 Integrated management of flood control, drainage and irrigation issues

Recommendations:

2.1 To make irrigated agriculture sustainable, it is necessary to modify the existing cropping pattern to cope with changing spatial and temporal water availability. Plan and construction of proper storage facilities should be considered.
2.2 There should be a research to study the degree of global weather change and to find solutions to related water resources management, agro-ecological conservation etc.

3. **Ecological and Environmental Conservation Issues**

   3.1 Over exploitation of groundwater deteriorates the water quality and ecosystem in the streams including supply of dependable drinking water.

   3.2 Human activities on irrigation and drainage have been creating different ecological and environmental systems.

   3.3 Salt-water intrusion to coastal areas giving serious influence to agriculture and fresh water supply.

**Recommendation:**

   3.1 Public awareness should be promoted through the activities of media, academic institutions and the extension services.

   3.2 There should be a voluntary organization to conserve the soil, water and ecology and the culture and tradition in their own villages.

   3.3 Some water should be allocated to diversify aquatic life resources even in the non-growing season.

4. **Irrigation Efficiency**

   4.1 Low irrigation efficiency at project and field level due to seepage loss, poor water application and low reliability of water supply.

   4.2 Limitation of fund for irrigation infrastructure is a constraint in improving facility and applying new method and technology to increase irrigation efficiency.

   4.3 Lack of recognition on conjunctive use and water recycling in the basin level.
**Recommendations:**

4.1 Research and extension on how to apply water to get the maximum efficiency should be implemented on various crops, climatic and soil conditions.

4.2 More budgets should be allocated for the development, rehabilitation and improvement of irrigation facilities.

4.3 Irrigation efficiency under water shortage condition should be evaluated by the concept of “more crop per drop”.

4.4 Raising irrigation efficiency is one of the targets in water management improvement. At the same time reliability should be considered as a key element in successful water management.

4.5 Irrigation efficiency should be evaluated on field, project and basin levels.

5. **Farmers Participation**

5.1 Lack of farmers’ involvement in planning, design and construction stages prevents the farmers from feeling the ownership of their irrigation system.

5.2 Knowledge of farmer on irrigation technology and management is a basic component for successful farmer participation in irrigation system management.

5.3 Lack of cooperation and coordination among farmers, water user group and officer.

**Recommendations:**

5.1 Farmer participation in irrigation management should be both individual and as a group.

5.2. Formation of water user group should be based on willingness and full understanding of farmers not the persuasion of the officer.
5.3. The operation of field ditch should be the responsibility of farmer and the management on lateral level should be transferred to the farmer based on their capability and willingness with capacity building.

6. **Water policies, legal issues and institutional policies**

   6.1 Lack of coordination among stakeholders in the river basin context leads to mismanagement and deterioration of natural resources in the basin.

   6.2 The water right system has not been established in many countries that lead to excessive application and water shortage from place to place in the river basin. However, a crucial issue in its introduction is the ownership of the water right.

   6.3 Lack of cooperation in management of water use of international river leads to unfair allocation of water and catastrophe such as flood and drought especially at the downstream countries.

   6.4 Regarding the subsidy on water management there are wide varieties recognized among countries. According to negotiation of WTO, the subsidy on agriculture should be reduced for a fairer world trade on agricultural products. However, some countries evaluate the external benefit of irrigation, thus try to increase the subsidy.

**Recommendations:**

   6.1 Priority may be in placed for water allocation. Several countries participating in this seminar place the domestic water supply as the first priority. The subsequent priority sector should be placed according to the criteria for each country e.g. human survival, food security, poverty, economic capability, seniority, etc.

   6.2 The experience on integrated river basin management should be analyzed and exchanged among countries.
6.3 Water right system based on water law should be introduced to get the stable water allocation by assuring and controlling the water intake.

6.4 Water charge should be assessed in two aspects; one is to raise the awareness of water value for better water resource allocation and another is to make the farmers pay for the operation and maintenance cost.

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