

The NARBO Newsletter

(Network of Asian River Basin Organizations)

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Report of the recent activity

The First Thematic Workshop

— Water Allocation and Water Right —

Michitaro Nakai *

The 1st thematic workshop on water allocation and water right was held from December 5 to 9 in Hanoi, Vietnam. This workshop was organized by Red-Thai Binh River Basin Organization (RRBO), ADB, ADBI and JWA. 24 participants from 6 countries (Vietnam, Indonesia, Philippines, Thailand, Lao PDR and Japan) participated in this workshop.

On 6th and 9th, special lecture and 3 sessions were held. Special lecturer was Mr. Ian Fox, Principal Project Specialist of Vietnam Resident Mission, ADB, and the theme of the lecture is "Understanding water right and water allocation". Also, the themes of 3 sessions are "Water allocation issues", "Water right system" and "Drought management". In each session, participants made presentations and discussions, and finalized the sheets for session outcomes. Through these process, we could share the information on current situation and issues on water allocation and water right, which is one of the objectives of this workshop, so I think these sessions were very beneficial.

On 7th and 8th, field trips were held. On 7th, we went to the Hoa Binh Hydropower plant in Hoa Binh Prov-

ince, which is one of the most important infrastructures in Vietnam. On 8th, we went to Tac Huong Irrigation scheme in Thai Nguyen Province. In both field visits, participants were enthusiastic to make questions or discussions.

In addition, the situation of this workshop was broadcasted by Hanoi Television on 9th.

As a whole, all the participants of

this workshop were very enthusiastic and RRBO's arrangement was excellent, therefore this workshop finished successfully.

Finally, I'd like to express my sincere thanks to all participants, RRBO and its staff member, and all concerned organizations for their hard works and efforts.

*) ADBI, NARBO secretariat



Courtesy Call for Vice Minister (on 5th December)



Scenery of Meeting



Hoa Binh Dam (On 7th Dec)



Tac Huong Irrigation Scheme (On 8th Dec)

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Information from members

Royal Development Project regarding Upstream Area Rehabilitation and Maintenance

Kanokwan Yoowong *

His Majesty the King of Thailand has been dedicated to development work particularly in local population's livelihood who always facing on several problems caused by poverty, public health and environmental degradation. In fact, most of local population in Thailand makes their living by agriculture and livestock, therefore, the abundant natural resources are required especially in water resources. For this reason, His Majesty the King has emphasized on upstream area and forest area development and rehabilitation.

Thailand is geographically and hydrographically divided into 25 river basins. Ping River Basin is a major river basin in Thailand covering the area of 5 provinces namely Chiang mai, Lam Pang, Lam Poon, Kam Phaeng Phet and Nakorn Sawan. It is divided into 2 parts: Upper Ping and Lower Ping River Basin. Its geography and geological structure create valuable ecosystem including various types of forests such as dry dipterocarp, mix deciduous, pine and hill evergreen forest which are significant upstream forests of Thailand. At present, Ping River Basin is facing the natural resources problems such as forest encroachment particularly in watershed, deforestation, cultivation of local products, soil and water degradation as well as water shortage and flood problem.

The major causes of continuous and hasty deforestation in the upstream area are population growth together with economic growth in Thailand. The local people require further land for livelihood, food production and agricultural products to respond their basic minimum needs. Deforestation is the significant causes for flood, drought, water holding capacity, soil erosion, landslides and river shallowness. In addition, many declined forest area in Thailand necessitate the urgent reforestation for rehabilitation of upstream area and wild life's habitat.

His Majesty the King has acknowledged the mentioned problems on water and forest resources which relate directly to the needs of rehabilitating and maintaining the upstream area in Thailand. Many Royal Development Projects have been demonstrated by his initiatives. The target of these projects is to assist the villagers in managing natural resources for their better livelihood. Huai Hong Khrai Royal Development Study Centre is one of the projects, it was established on December 11, 1982 in the area of Pa Khun Mae Kuang National Reserved Forest, Huai Hong Khrai river basin that is one of the Ping River Sub-basin, at Doi Saket District, Chiang Mai Province.

The center's area covers approximately 1,360 hectares. Formerly, there had been severe deforestation which caused drought and forest fires. The center, therefore, focuses attention on conducting study and research on various development patterns such as forest development by cultivating three types of trees for four benefits, which are economic, fruit and firewood. Besides, there is also the fourth benefit, which is the conservation of soil and water to increase moisture. There is also the conservation of watershed areas by using water from the irrigation system, from rains and check dams to maintain moisture as well as by establishing wet fire breaks. The study also emphasizes the use of various development patterns to enable farmers to rely on themselves without having to destroy the environment. The center's operations are divided into 2 parts as follows.

1. Tasks on study, experiment and research namely the study and development on water sources, forest, land, intensive farming, milk cow and livestock and fishery, the study and experiment on crop cultivation, conservation and development frog farming
2. Tasks on extension of study Centre can be classified into
 - ▶ Forest Development by training on



deforestation impact and forest fires to the villagers surrounding the center

- ▶ Land Development by training on soil and water conservation
- ▶ Agricultural Promotion by encouragement on crop cultivation, farm products, dry crops, industrial crops and organic agriculture
- ▶ Occupational Promotion in family by training on clothes sewing, food preservation within agricultural housewife
- ▶ Livestock Promotion by training on milk and beef cows and birds
- ▶ Fishery Promotion by training and promotion on a variety of fish species

Implementation of development work at the centre up to the present day has achieved a certain level of success particularly in terms of infrastructure construction, study, experimentation, research and intersectional cooperation among the various government agencies and in providing certain services to the people in the target villages encompassing the Centre.

In conclusion, Huai Hong Khrai Royal Development Study Centre is an illustration project to develop, rehabilitate and maintain natural resources particularly in water resources, land and forest in Thailand that provide moisture in the soil, allow the forest to stay green throughout the year. Finally, local population will get the benefits from the integration of natural resources management.

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Teesta Barrage Project in Bangladesh

Md. Azizul Haque *

1. Background

Bangladesh is a country of agro-based economy. It has more than 300 rivers, tributaries and distributaries. Still a vast area of North Bangladesh suffers from scarcity of water for irrigation its agricultural lands, not only in dry months but also during monsoon when a prolonged spell of scarcity/no rainfall affect crops. The idea of irrigation from the Teesta River was conceived since British time (1945). In Bangladesh territory, the preliminary feasibility report of the project was prepared in 1960 by M/S Haigh Zinn and Associates in collaboration with A.C.E. Ltd. and M/S Binnie and Partners Ltd. prepared the second one during 1968-70. M/S Haigh Zinn and Associates proposed a Barrage at Goddimare while M/S Binne and Partners Ltd. located it at Doani. After emergence of Bangladesh in 1971 the Government gave serious thought for undertaking the project. Under the changed circumstances engineers of Bangladesh Water Development Board (BWDB) and Bangladesh University of Engineering and Technology (BUET) reviewed the previous reports, conducted fresh survey, investigation, planning and detailed engineering. The site of the Barrage was selected at Doani where the present Teesta Barrage of Bangladesh proudly stands today.

2. Outline of the Teesta River Basin

The Teesta is one of the important rivers next to the three major rivers of Bangladesh. It is recognized as the most unstable, wandering and young river of the country. The river originates in the glaciers of the Himalayas in Sikkim at about 6400 metre above mean sea level (MSL). It flows for about 172 km in mountainous region before emerging at Sevak Railway Bridge into the alluvial plains of North Bengal in India. It crosses another 97 km of Indian plains before it enters into

Bangladesh about 19 km north of Dalia. It flows for about 130 km in Bangladesh territory before it joins the Brahmaputra river at Chilmari. The catchment area of the Teesta river upper basin is about 10550 sq. km (including upper and middle basin) of which 7200 sq. km. falls in Sikkim-Darjeeling Himalayan region. The lower basin covers 3290 sq. km. in the flood plains of Jalpaiguri district (India) and Bangladesh. The catchments area in Bangladesh is about 2071 sq. km. The average discharge during June to September, observed at Dalia, is about 1,800 cumec, while that of winter and dry months is only 200 cumec. Flow is lowest in the month of February and seldom exceeds 160 cumec.

3. Boundary and Area

The Project is bounded by the Teesta on the north, the Atrai on the west, Santaher-Bogra Railway line on the South and Bogra-Kaunia Railway line on the east. Command Area of the Project is 750,000 ha and the irrigable area is 540,000 ha.

4. Objective

The main objective of the project is to increase agricultural production through supplementary irrigation and thereby create employment opportunities.

5. Phasing and costing

Although the implementation of the project started in 1960, the actual construction of the barrage was taken up in 1979 and that of canal system in 1984-85. To derive early benefits, the project has been phased out viz. Phase-I and Phase-II. The phase-I (restructured) has a command area of 154,250 ha with a net irrigable area of 111,406 ha. It is spread over 12 upazillas. It comprises construction of a Barrage, Flood Embankment, Flood Bye pass, Silt Trap, Main Canal, and part of canal system with improvement of existing drainage canal. GOB's own resources were

financing the project since inception. In 1985 and 1994 GOB entered into three loan agreements with Saudi Fund for Development (SFD), Islamic Development Bank (IDB) and Abu Dhabi Fund for Development (AFD) for partial financing of the project. After phasing out of the project, the Phase-I was completed in June 1998 and the cost incurred is Tk. 9695 million.

6. Physical Infrastructure

For achievement of the project objective i.e., to provide supplementary irrigation to a net area of 111,406 ha in phase-1 under gravity irrigation system through the irrigation network various types of physical infrastructure were implemented including the main Barrage, Canal Head Regulator, Silt Trap, Irrigation and Drainage Canals etc. A short description of some of these infrastructures is provided below:

6-1 Teesta Barrage

The Teesta Barrage is constructed over the Teesta River to raise the water level and thus, to feed the main canal taking off from its upstream side. The Barrage itself is situated at Doani, Lalmonirhat completed in August 1990. The Barrage is 615 m long fitted with 44 opening (vent) with radial gates. Width of each vent is 12.19 m. The design discharge capacity of the Barrage is



Fig. 1 Teesta Barrage

12,752 cumec. The Barrage is divided into 2 portions by divide wall, named Weir proper and Under-sluices. There are 7 under sluiced bay. Normally the crest level of the under-sluices is kept equal to the deepest bed level of the river during

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non-monsoon seasons. As the crest of the under-sluice pocket is at a low level, a deep channel develops towards this pocket, which helps in bringing low dry weather discharge towards this pocket, thereby, ensuring easy diversion of water into the canal through the canal head regulator. Rest of the bays is normal bay (weir proper). There is a silt excluder in the under sluiced portion of the barrage. Tunnels of silt excluder are used to attract coarser particles. In Teesta Barrage, gates do most of the ponding. Gates of barrage can be operated by remote controlled power driven system, locally controlled power driven system or manually. This Barrage is fully operational now. This Barrage is serving as a bridge for vehicular and pedestrian traffic also.

6-2 Canal Head Regulator (CHR)

A Canal Head Regulator (CHR) is provided at the head of the off-taking main canal, and serves the following functions:

- i) It regulates the supply of water entering the main canal
- ii) It controls the entry of silt in the main canal



Fig. 2 Canal Head Regulator

- iii) It prevents river floods from entering the main canal.

The CHR is 110 m. long fitted with 8 no. of vent (radial gates). Width of each vent is 12.19 m. Discharge capacity of the CHR is 283 cumec. The CHR is fully operational at present.

6-3 Silt Trap

A Silt Trap covering an area of 45 ha adjacent to the CHR was constructed for arresting silt before supplying irrigation water to the Main Canal. Due to presence of Silt Trap, the resultant rate of siltation in the irrigation canals is very low. Here mecha-

nism is very easy, just discharging water into a larger area, resulting lower velocity and helping siltation in these areas called Silt Trap.

6-4 Irrigation Canal

Direct irrigation scheme using a barrage requires a network of irrigation canals. The main canal systems of the TBP consist of four main canals i) Teesta main canal, ii) Dinajpur secondary major canal, iii) Rangpur secondary major canal and iv) Bogra secondary major canal. Length of the Teesta main canal, total secondary major canal, secondary canal and tertiary canal are 33.67 km, 74.85 km, 224.91 km and 356.53 km respectively.

6-5 Hydraulic Structures

Mainly Regulators, Siphons, Escapes, Aqueduct and check/drops are the hydraulic structures constructed through out the project area. Total no. of hydraulic structures constructed are 856 (including X-drainage structures). Operation systems of the project structures are user friendly.

7. Command Area Development (CAD)

The Teesta Barrage Project (Phase-I) was completed in June, 1998. The irrigation network constructed need to be evaluated in an integrated way to identify the bottlenecks of the system to bring the potential area under irrigation. As such a Command Area Development (CAD) Project for Phase-I was introduced in 1998-99 for five years. The project cost is Taka 968 million. The objective of the CAD project is to accelerate agricultural production up to full potential by irrigation coverage and integrated water management as well as socio-economic enhancement by introducing multiple development programs viz. fisheries, duck culture, grass cultivation, afforestation etc. The following government organizations were involved to attain the objectives: Bangladesh Water Development Board (BWDB)

Directorate of Agricultural extension (DAE)

Directorate of Fishery

Directorate of Live stock

Directorate of Forestry.



Fig. 3 Beneficiary Training



Fig. 4
Afforestation
along Canals

Fig. 5
Duck culture
by beneficiary



7-1 Irrigation Systems and Irrigation facilities

The project will provide irrigation supplies with flood protection and drainage facilities to a gross area of about 750,000 ha of which net benefited areas are 540,000 ha. The irrigation system in the Phase-I area includes 154.57 km main and branch canals, 211.70 km secondary canals, 387.65 km tertiary canals and more than 3000 nos. of control structures different sizes.

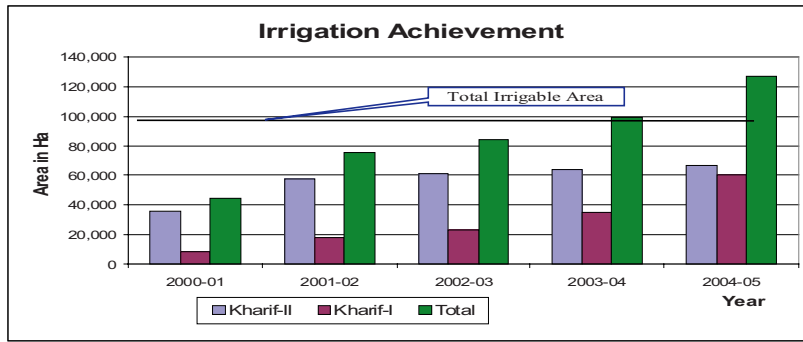
7-2 Irrigation Coverage

Irrigation coverage has remarkably been increased in the project area during the last years. It is observed that cropping pattern and cropping intensity have been changed remarkably in the irrigated area. Currently, HYV Aman and Boro have widely been practiced by the farmers and at least two crops are grown in a year. The irrigation achievement and irrigation coverage during last five years is shown in Fig.6. These show that the irrigation coverage increased with time.

7-3 Field Irrigation, Drainage and Water Management

To supply irrigation water to its command area from the available waters of the Teesta River in right time,

Fig.6
Irrigation
Achievement



water management is essential. For efficient water management in an economic way, people’s participation in every step is necessary. People’s participation is required for the maintenance of the tertiary canals and field channels as well as to collect the service charges as set by the rules. To achieve this goal the formation of Water Management Group (WMG), Water Management Association (WMA), and Water Management Federation (WMF) is going on. Service charge collection from the beneficiaries is already started. The target achieved so far for formation of the WMG, WMA, and WMF is shown in Table 1.

Sl. No	Name of the Organization	Target	Achievement	Remarks
1	Water Management Group (WMG)	2000	1880	
2	Water Management Association (WMA)	52	60	25 nos. have been registered
3	Water Management Federation (WMF)	1	-	

Table 1 Achievement of Water Management Organization

7-4 Drainage Facilities

TBP has been implemented to ensure Kharif-II rice in a flood free environment. Existing natural river systems serve the drainage function of the project. The river systems drain the runoff from both within and outside the project area.

8. Impacts of the Teesta Barrage Project

The actual performance due to intervention of the Teesta Barrage Project along with engineering, agriculture, fisheries, social, economic and environmental condition is provided below:

- The project is an example of self-reliance through domestic resource

mobilization although a part was financed by SFD, IDB and AFD. The main TBP Phase-I has been implemented with local expertise in the fields of planning, design and construction. Implementation of the project has helped adaptation of higher and modern technology.

- The Teesta Barrage Project (TBP), Phase-I made a revolution in agriculture through irrigation, flood protection and drainage improvement, by allowing intensive agricultural practices from shifting single to double or triple cropping, scientific cultivation of HYV and crop diversification instead of local varieties and

secured crop harvesting. Increased crop yield from about 218,288 M. Tons to about 710,036 M. Tons, higher income and employment generation and improved communication facility for crop marketing created a great impact on the socio-economic development of the people of project area. The shift in cropping pattern and cultural practices has been reflected in the form of increase in the cropping intensity to 218% (in 2005) in the project area with project against 180% (in 1994) in without project condition.

- Fish culture in the project area improved due to the availability of water which ultimately increased

fish production. Breeding and multiplication fish seeds increased in ponds, irrigation canal and drainage canal of the project area. Nearly 150 km main and secondary canals 600 km of major drainage channels and silt trap reservoir have created a watershed of about 50 sq. km which provide ample opportunities for fish and duck farmings.

- Groundwater recharge, reservoir, water flow through the irrigation canals networks, green crops and the trees along the dykes have positively impacted on local environment and weather. Due to SW irrigation, GW recharge has been increased significantly, creating more opportunity for conjunctive use of surface and groundwater

- Afforestation along the canal dyke, borrow pits, barrage site, roads along with various grasses of the area created a green belt in the region. Green crops have brought in green revolution.

- During execution of the TBP Phase-I 39.70 million man-days were created whereas during CAD components about 1.8 million man-days of skilled & unskilled labour were engaged as labor force, which produced a positive contribution to poverty alleviation of the project area.

- Socio-economic condition of the people of the project area improved due to project intervention assured a better living condition and literacy rate increased significantly. Education, health and sanitation, social infrastructure, employment generation, poverty reduction and social solidarity have improved to a great extent.

9. Concluding remarks on the Teesta Barrage Project

Teesta Barrage Project may be considered as one of the most successful water resources management project of Bangladesh Water Development Board.

Demand for food in Bangladesh is increasing. Implementation of the Phase-I of the TBP project has boost up the agricultural

production and thereby helping in satisfying the increasing food demand. So, implementation of Teesta Barrage Project Phase-II

has become a logical consequence of the achievement of TBP Phase-I.

From the secretariat

1. The Second General Meeting is coming up

The Second General Meeting is scheduled to be held from February 14 to 16 at Jatiluhur-Purwakarta, Indonesia and the preparatory work is now on the final stage.

The program was set, but some changes will be made, so, please check the latest information on NARBO website and contact us through e-mail if you have questions.

2. Secretariat meeting at JWA HQ

The JWA NARBO secretariat had the half-day meeting with Mr. Wouter and Mr. Dennis, who were on the way to Korea to attend the Third NARBO training course on November 10. At the meeting, they discussed how to organize the Second General Meeting, the First Thematic Workshop in Viet Nam and how to activate day-to-day NARBO activities etc.



Secretariat staff mumbling

Ten months has already pasted since I became one of the members in JWA secretariat. The secretariat is in the International Affairs Division and there are nine staff (one is working for Asian Development Bank Institute in Tokyo) are working now. Among them, two staff members are devoting to IT (website, newsletter etc.) and to translation and interpretation.

It seems that ten staff (including the Director) is quite enough to deal with NARBO activities. But they are working until late at night almost every day to deal with the preparation works of the Second General Meeting and international businesses in JWA and they look a little bit tired these days.

They look have another bane that they can't get enough information from members for the website and newsletter etc. NARBO is the network, so members' active involvement is quite important, I guess.

This winter, we have the record-high snowfall in northern part of Japan and the very cold days nationwide, but the secretariat is working very hard to promote NARBO activities. I'm looking forward to your active involvement and please well take care.



Network of Asian River Basin Organizations

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Program of the Second General Meeting

As of February 1

DAY 0	13th February 2005 (Monday)	Arrival of participants, check-in and Registration	
DAY 1	14th February 2005 (Tuesday)		<i>Field Visit</i>
DAY 2	15th February 2005 (Wednesday)		<i>Workshop</i>
08.45 – 10.15	Session 1	Water Quality Management	KOWACO
10.30 – 12.00	Session 2	Flood Management	JWA
13.15 – 14.45	Session 3	Water Financing	Indonesian NARBO Secretariat
15.00 – 16.30	Session 4	Performance Benchmarking	ADB, IWMI
19.30 – 21.00	Side event:	Indonesian NARBO Members Meeting	Indonesian NARBO Secretariat
DAY 3	16th February 2005 (Thursday)		<i>General Meeting</i>
09.00 – 09.45	Opening Session		Organizing Committee
10.00 – 12.00	Session	“The report of NARBO activity 2004-2005”	Chaired by chairperson
13.15 – 16.00	Session	“NARBO Charter and Work plan 2006 – 2007”	Chairperson
16.15 – 16.45	Selection	“NARBO Constitutional Body”	JWA, ADB, ADBI
16.45 – 17.00	Closing Session		JWA, ADB, ADBI
DAY 4	17th February 2005	Participant are back to home countries	