



Abstract: In recent years, the notion of sustainable development, using modern technology without compromising the vital eco-systems, and involvement of the community people in management of their development has emerged as a reaction to the highly technological and centralized processes that have governed thinking on development for long. The process of sustainable development envisages that people should not merely participate, but be in charge of their own development. Some initiatives in Bangladesh have just begun to show success with this complex process, and different models of people-managed and people-owned development have emerged. Perhaps one of the most notable of these is the remarkable work of the Southwest Area Integrated Water Resources Planning and Management Project, in short, SWAIWRPMP, implemented by the Bangladesh Water Development Board under GoB's Ministry of Water Resources, and financed by the ADB loan, Netherlands grant, and GoB contribution.

In the project area, there're 78 public flood controls, drainage/irrigation (FCD/I) systems in the region but most of the facilities created in the past have become underperforming or dysfunctional mainly due to sustained lack of maintenance. SWAIWRPMP had a plan to enhance the productivity and sustainability of selected FCD/I system from low performance and to enhance economic growth and reduce incidence of poverty along with strengthening of relevant institutions delivering appropriate services to stakeholders. The project has now poised to restore agricultural production in the region by renovation and usage of better-managed FCD/Is. This has begun to result in increased income and employment opportunities for farmers from enhanced agriculture and fish production achieving through drainage improvement, controlled flooding, year-round water management and adoption of modern agriculture and fish culture.

The project is now building appropriate institutions for sound regular maintenance of the FCD/Is because poorly maintained facilities are more vulnerable to floods, which, upon failure, cause greater damage affecting agriculture, fishery and other non-farm rural activities. SWAIWRPMP now sees that most of these infrastructures' improvement begun yielding higher returns with a short lead-time and less negative environmental and social impact. The engineering interventions are designed to repair and re-sectioning of worn-out embankments, repair and rehabilitation of regulators and check structures, re-excavation of silted up *khals*, paving of dyke-crest to facilitate road communication, and new dykes and structures where none is existing but productivity maybe significantly improved through water management. Non-engineering interventions are roping in both GoB line agencies and NGOs, community awareness raising campaign, formation of water management associations (WMAs) for both agriculture and fisheries, training of community people so that they can handle and operate the structures in future, modification of gate-operation to facilitate fish along with agricultural crops, and management responsibility transfer to the WMAs.

Lessons learnt are that the project has begun to show potentials to increase water security in the region and demonstrating practical ways and means to maximize economic and social benefits to the poor through people-managed FCD/Is.

Keywords: Participation, Sustainable Development, Agriculture, River Basin, Narail, Bangladesh.

Introduction: This paper covers a case study of a 9-year-long participatory river basin water resources management project in northwest Bangladesh that was planned, and still under implementation to improve the productivity and sustainability of the existing FCD/I schemes to yield higher returns with a short lead-time and less negative environmental and social impact. It would discuss how sustainable development using modern technology without compromising the vital eco-systems can be achieved through the involvement of the community people. The important part of the case is that water security can be achieved braving perennial floods, even in a country like Bangladesh, which is the biggest delta in the world, with joint endeavor of investment, technology and people's participation. It is important because it has demonstrated practical ways and means to maximize economic and social benefits to the poor through people-managed FCD/Is. The following chapters describe how it was planned and implemented.

Project Background: Bangladesh is located at the confluence of the Padma, Jamuna and Meghna, the three major regional river systems that brings about significant physical challenges including massive monsoon floods and drainage congestion, riverbank erosion, dry season water scarcity, natural disasters etc. Access to and effective management of water is critical for the livelihood of the rural poor as they fundamentally affect their productive and livelihood activities. Moreover, water management is further complicated by diverse and complex stakeholder interests, widely varying in different or even same topographical locations among agriculture, capture and culture fisheries, boat transport, rural industries, drinking water and associated non-farm activities. Water is also vital for the country's rich natural ecosystems. Thus, it's paramount to manage this critical resource through an integrated, participatory and decentralized approach with due attention to the interests of the vulnerable men and women.

The South West Area Integrated Water Resources Planning and Management Project, in short, SWAIWRPMP, thus, was planned to tackle the momentous problem Bangladesh was facing. It was, in fact, one of the five regional FAP studies (FAP-04) conducted in South West Region in 1993. The project was prepared through a Project Preparatory Technical Assistance (PPTA) under ADB TA finance (TA 4079). South West (S-W) area comprises the hydrological regions of the South West & South Central Regions representing about 27 percent of Bangladesh where 23 percent of its people live. Agriculture yield in the project area was less than the national average (3.1 t/ha) due to dominance of traditional varieties of crops and the area's susceptibility to flooding and slower expansion of irrigation. With about 51% of its population poor, the region had the most acute water management problems in Bangladesh¹.

In the project area, there were 78 public flood controls, drainage/irrigation (FCD/I) systems in the region but most of the facilities created in the past became underperforming or dysfunctional mainly due to sustained lack of maintenance. SWAIWRPMP, originally started in April, 2006, had a plan to enhance the productivity and sustainability of selected FCD/I system from low performance and to enhance economic growth and reduce incidence of poverty along with strengthening of relevant institutions delivering appropriate services to stakeholders. The project, however, was revised, re-casted and re-appropriated for a number of times, and scheduled to be ended by June 2014, has now hovering around to restore more cultivable land and agricultural and fisheries production in the region by renovation and usage of better-managed FCD/Is. This has begun to result in increased income and employment opportunities for farmers from enhanced agriculture and fish production achieving through drainage improvement, controlled flooding, year-round water management and adoption of modern agriculture and fish culture.

¹ DPP, December, 2005, BWDB, MoWR, GoB

Project Objectives: The goal of the project was to reduce the incidences of poverty measured in terms of income and nutritional status of poor men and women, and to institutionalize effective mechanisms for enhancing and sustaining the performance of FCD/I systems. Its specific objective was to enhance productivity and sustainability of the FCD/I systems from low-performance and high incidence of poverty, which are measured regularly in terms of economic indicators including increased agriculture and fishery production, income and employment in the subproject areas; and institutional indicators associated with sustainable operation and maintenance including sound water management associations and joint management institution establishment, adequate operation and maintenance and approved service delivery agency performance.

Apart from goal and specific objective, the project had three types of objectives more: Immediate objectives, intermediate objective and overall objectives. While the intermediate objective is to enhance and sustain water security and livelihoods of rural people within the defined hydrological boundaries, overall objective is to handover the project infra-structures to the stakeholders for sustainable operation and maintenance for improving economic growth and reducing poverty in the project area. Immediate objectives are: Objective A: Participatory Integrated Water Resources Management Plan for selected hydrological units; Objective B: Enhanced livelihoods & Livelihoods opportunities impacted by IWMP a result of upgraded infrastructures & increased water users participation; and Objective C: Strengthening Institutional Capacity of project officials for planning, implementing, operating, maintaining & monitoring.

Location of on-going subprojects: The project is divided into two subprojects: Narail *Beel* subproject and Chenchury *Beel* subproject, both under southwestern Narail District, Bangladesh (Fig.1).

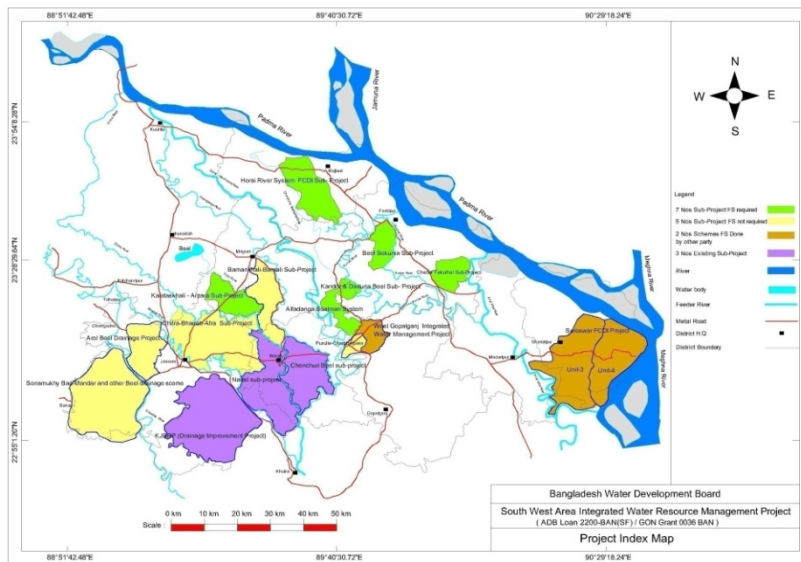


Fig.1 Source: Bangladesh Water Development Board

Narail *Beel* subproject (Fig.2) has a command area on 31,500 ha involving 7 SIPs (Subunit Implementation Plan) and the same number of WMAs (Water Management Associations), 44 WMGs (Water Management Groups) and a JMC (Joint Management Committee); whereas Chenchury *Beel* subproject (Fig.3) has a command area on 25,500 ha involving 6 SIPs, 8

WMAs, 61 WMGs and a JMC. Subunit area is further divided into WMG areas (Fig.4). For example, SIP-NSP-8 has an area of 3,811 ha involving 11 WMGs under that SIP.

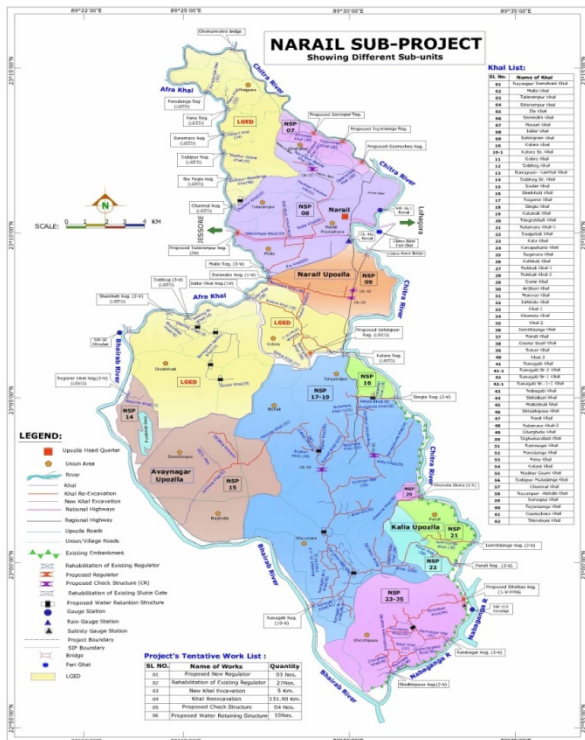


Fig.2

Source: BWDB



Fig.3

Source: BWDB

Subunit area is further divided into WMG areas (Fig.4). For example, SIP-8 in Narail subproject has an area of 3,811 ha involving 11 WMGs under that SIP.

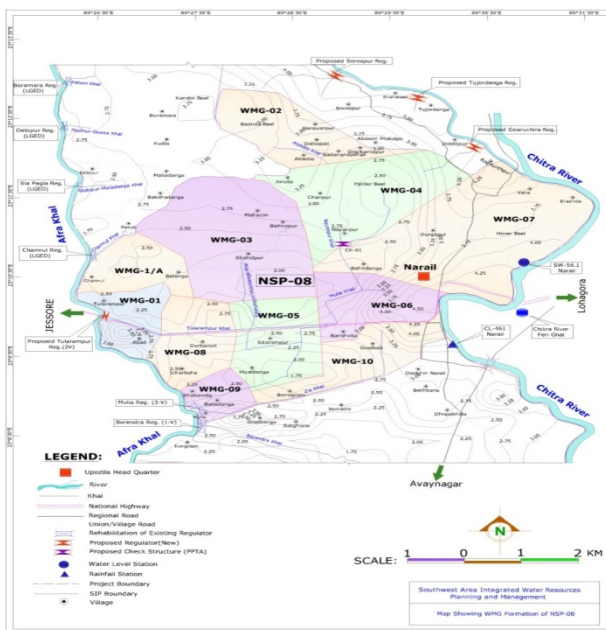


Fig.4

Source: BWDB

Project Outputs: In order to achieve the immediate objectives of the project, both investment and institutional programs were launched in three components, viz. participatory integrated water management plans (IWPM), institutional strengthening and project management (ISPM) and productive and sustainable water management systems. While IWPMs were meant to identify, screen and prepare participatory plans (feasibility studies), ISPM was meant for institutional development, monitoring and management. Main activity focus was to the last component, i.e. prepare SIPs; civil engineering interventions, e.g. construction/maintenance of flood embankments (re-sectioning, improvement and retirement), regulators, sluice gates, and pipes, water retention structures, re-excavated irrigation and drainage canals and local riverbank protection; and enhanced production and livelihoods through agriculture and fishery development and livelihood enhancement².

Project Targets: Targeted results anticipated at macro level (abridged): Cropping intensity increases by 30 percent; Annual cereal and other crop production increases by 166Tt, and 72Tt, culture fish production 5Tt; gross margin per family increases by 40 percent; permanent employment increases by 7.2million days; and annual family income increases by over BDT 2,000. Targeted results anticipated at micro level (abridged): SIPs-120, WMA-120, Farmers enrolled-70 percent, WMA registration-100 percent, women's representation-30 percent and 120 implementation agreement signed, At least 20 percent WMAs starts microcredit etc³.

Project Progress by Outputs: As per project plan, all **physical works** (incl. FCD/Is) to be completed by end June 2013 and the project has achieved significantly its targets to complete the civil works, though lagging behind in some cases. The remaining works have also been targeted already. Table1 shows the details, which is as under:

Name of Main Components	NSP	CSP	Total	Progress
Embankment re-sectioning/construction	27.21 Km	34.5 km	61.71 Km	70%
Khal re-excavation	227.5 km	198 km	425.5 Km	85%
Rehabilitation of regulators	9 Nos.	5 Nos.	14 Nos.	90%
Construction of regulators	14 Nos.	7 Nos.	21 Nos.	65%
Check structures/Culverts/Foot bridges	4 Nos.	9 Nos.	13 Nos.	15%
Water retention Structures	16 Nos.	7 Nos.	23 Nos.	-
Inlet & outlet structure	4 Nos.	12 Nos.	16 Nos.	20%
Riverbank protection works	-	2.80 Km	2.8 Km	70%
Irrigation scheme	-	1 No.	1 No.	50%
Deep Tube Wells for drinking water	50 Nos.	60 Nos.	110 Nos.	50%
Construction of WMA/WMG Training Center			25 Nos.	35%

Table1: Civil works. Source: SWAIWRPMP Report, Jan/2013

Together with these works and FCD/I infrastructures, the project already has improved flood management, has improved water use efficiency through preparation & implementation of IWMP, has reduced salinity intrusion through water regulating structures thereby preventing

² DPP Logframe, December, 2005, Re-casted RDDP Logframe, August, 2012, BWDB, MoWR, GoB

³ *Ibid*

land degradation, and has reduced water logging through drainage improvement structures & measures.

Regarding **agriculture** development, the project planned and executes demonstration plots and farmers' field schools on different crops with WMG participation. 15 demo plots and 30 FFS have been organized within the last fiscal while 30 and 34 respectively have been planned to be organized during the current fiscal. Due to the construction and/or rehabilitation of the FCD/I infrastructures together with the information education and extension program, both the cultivable area and paddy production in the project areas have been increased from 34,248 ha (baseline-2004-05) to 36,183 ha (2011-12) and 72,103 Mt (baseline-2004-05) to 121,423 Mt (2011-12) respectively. It was a significant achievement at any scale. Cropping intensity has also been increased by 17 percent (from 190 percent to 207 percent) against target of 30 percent, and jute production has been increased 4 times than the pre-project condition. All other produces like wheat, pulse, oilseeds, and vegetable also grew by 350T, 2,368T, 1,220T and 6,104T (Table2).

Crops	Year 2004-2005			Year 2011-2012		
	Area (ha)	Yield T/ha	Production T	Area (ha)	Yield T/h	Production T
B. Aman	8622	1.2	10346	4808	1.2	5770
LT. Aman	2635	1.57	4137	115	1.57	181
HYV T. Aman	5946	2.35	13973	7393	2.71	20035
Local Boro	581	1.85	1075	46	1.63	75
HYV Boro	8661	3.60	31180	11627	3.86	44880
Hybrid rice	-	-	-	8035	5.34	42907
Aus	7803	1.46	11392	3851	1.66	6393
Aromatic rice	-	-	-	308	3.84	1183
Total rice	34248		72103	36183		121423
Wheat	1221	1.92	2344	869	3.1	2694
Jute	2784	2.37	6598	9613	2.5	24033
Pulses	6229	0.6	3737	7017	0.87	6105
Oil seeds	3272	0.6	1963	3350	0.95	3183
Vegetables	1105	17	18785	1732	14.37	24889
Crop Intensity		190%			207%	

Table2. Crop-wise cultivation area, yield, production & CI Source: SWAIWRPMP Report Jan/2013

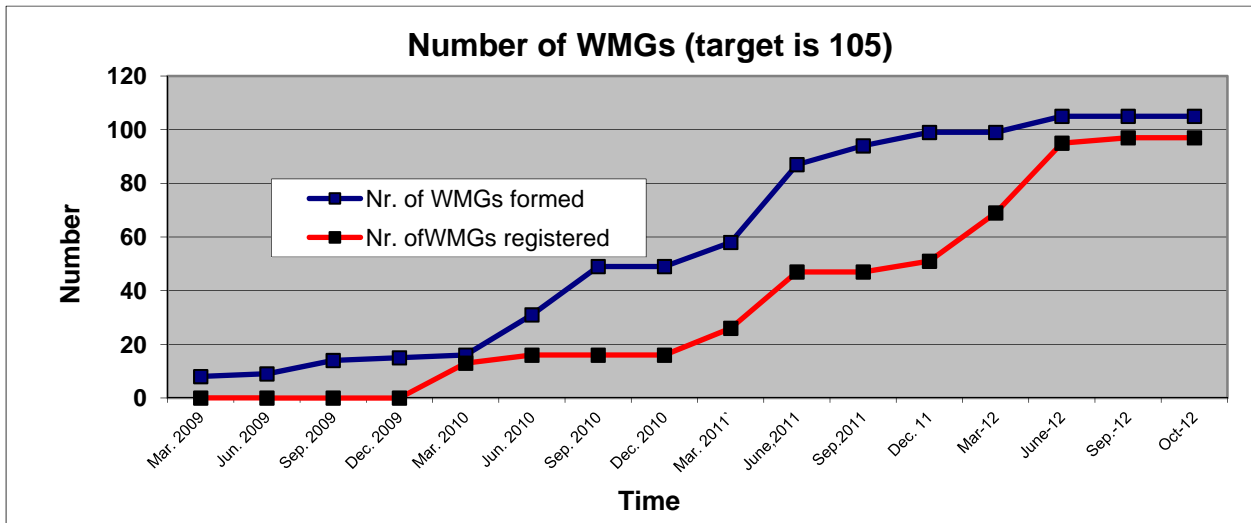
For **fisheries** development, demo activities like pond preparation, appropriate fingerling size, proper feeding requirements incl. time and depth, Field School of Fishery have been organized. During last year, 30 such demo events and 13 FSF have been organized while the project planned to hold 45 demos this year. Classroom training and fingerling stocking in the *beels* are on-going, and the WMG members harvesting and restocking of fingerlings regularly. The project also established fingerling sanctuaries at Nalamara *Beel* and Roukhali *Khal* with the help of Department of Fisheries (GoB) and members of the WMG. Because of all these interventions, fish production in Chenchury *Beel* has been remarkably increased, by 78 percent (culture and 25 percent (capture), and by 84 percent (culture) and 38 percent (capture) in Narial *Beel*, in comparison to the baseline data.

Regarding **gender** development, great progress has been registered by the project, as the participatory project management has achieved women's involvement in different income generating activities, in water management organizations and landless contracting societies. It was more than the target 34 percent. So, far, 50 percent destitute women involved in IGA, 2,259

persons (1,262 women) of 94 WMG have got skills training, e.g. nursery, duck/goat rearing, sewing etc, and 30 percent women are engaged in collective action initiatives. 30 percent of them have capacity-building, confidence-building, leadership, accounting and business management training.

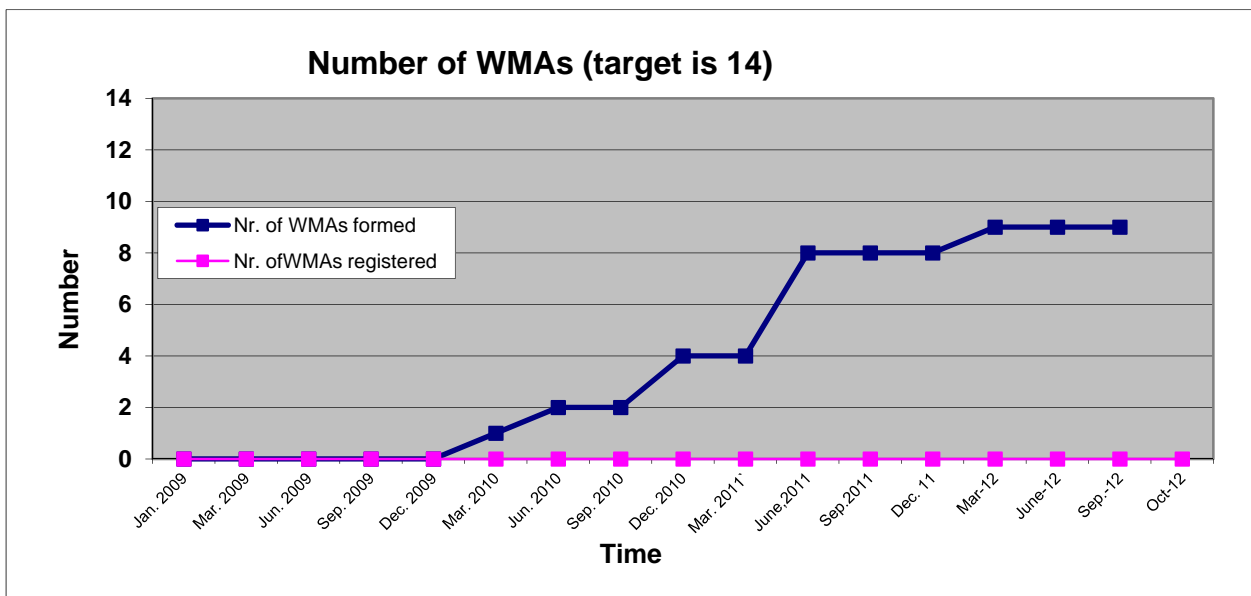
For **livelihood** enhancement, out of total 102 WMG formed, 50 of them were given various assets like goat (40), duck (2,617), and sewing machine (17). While the recipients of assets were all destitute persons, 98.89 percent of them were women. Their assets were multiplied, and thus, leading them to financially solvent.

Water Management Organizations: Targets of WMG formation was revised at 105 from 120, and so far, 102 WMG formed, all registered (Graphs1).



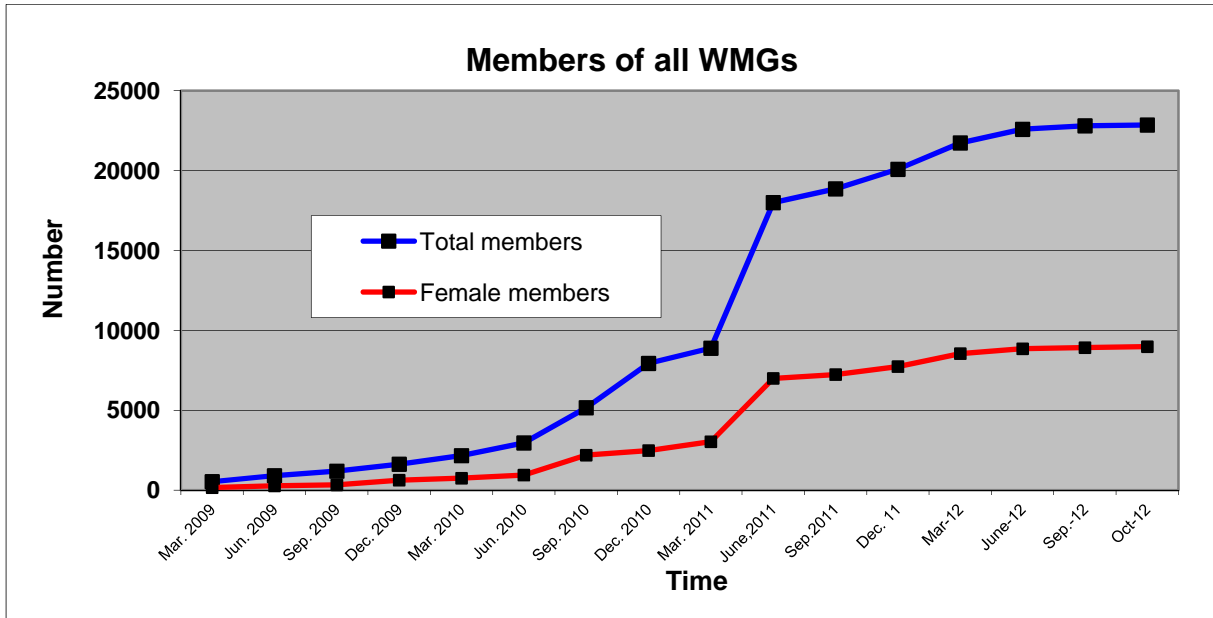
Graph1. Numbers of WMGs Formed and Registered Source: SWAIWRPMP Project, BWDB

WMA formation target was 14, and so far 11 organized and none of them are registered (graph2). This has been a major challenge remains with the project needs to be handled.

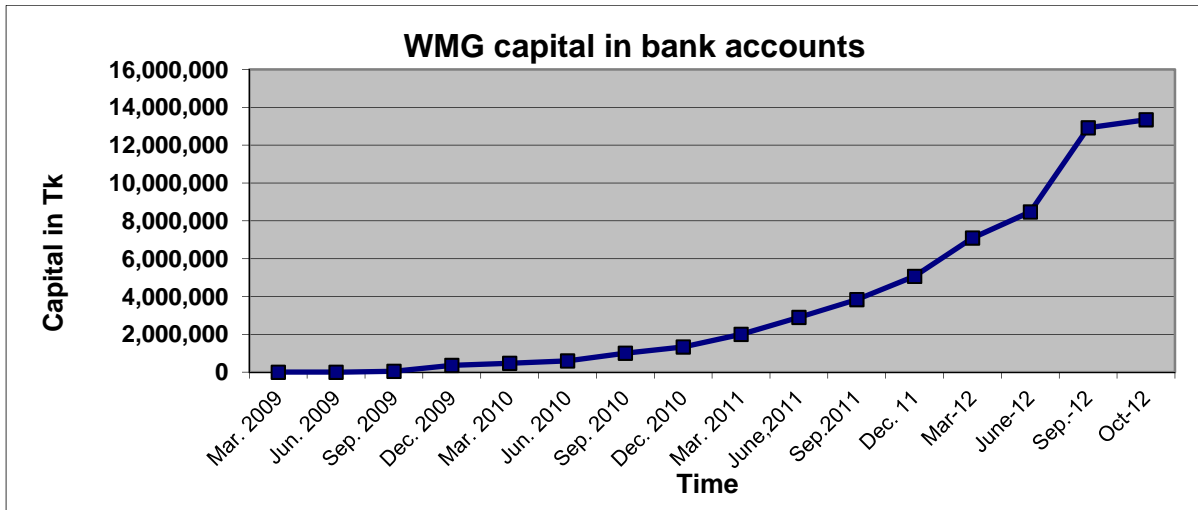


Graph2. Numbers of WMGs Formed and Registered Source: SWAIWRPMP Project, BWDB

Memberships of WMGs by gender and their capital in the bank account is shown in Graph3 and Graph4 that depicts that the two subprojects have 22,857 members, out of whom 39.28 percent are women, and their cumulative capital is BDT 13,345,572.



Graph3. Members of WMGs by Gender Source: SWAIWRPMP Project, BWDB



Graph4. WMG Capital in Bank Account Source: SWAIWRPMP Project, BWDB

All the 4 graphs presented also depict that membership growth and their contribution has started to grow from 2010, 4 years after the initiation of the project, and mainly achieved during the last 3 years.

Regarding **handing-over FCD/I infrastructures to WMA**, which is one of the major goals of this project, the process is quite underway, and for that reason, O&M manual has already been finalized, MoU has been approved by BWDB, and negotiation for O&M contracts have been started.

Key Issues and Challenges: Key issues and challenges of the project are as under, but may not be limited to only these as articulated below⁴ (Table3).

Key Issues and Challenges	Opportunities and Options
Completion of the civil works / FCD/ infrastructures	Have been targeted but remains as a challenge
SIP endorsement	Endorsement of the SIPs by district coordination committee
All WMG registration have to be completed	Will be followed
WMA formation /Registration	1. Remaining WMAs to be formed and registration of WMAs to be followed. 2. Limitations of WMA registration should be discussed with GoB's DoC. Remains as a major challenge
Internal conflict resolution within WMA	Have to be established effective conflict resolution measures by rotating leadership, and instituting internal audits etc. Remains as a challenge
Important WMO indicators like largest farmer enrolled, and leadership should be cautiously examined	Action will be taken to ensure sustainability of the people's institutions but remains as a challenge
Regular WMG performance review and identification of the weaknesses	Regular performance review with checklist by the field staff
Financial management training to all WMG	Have to completed
Collective Action Plans of the WMG and their vision and strategy prepared and checked	Will be prepared/checked
Strengthening of O&M manual	Have to be prepared several sample regulator operation plan and duly consulted with the WMGs
Revising Gender Action Plan and proceed further to implement that plan	Consultation with BRM gender consultants, revision of GAP
Maintaining incentive system to well-rated WMGs	Will be followed by providing them priority to programs
Inventories have to be prepared to ensuring that public water bodies in the subproject area are leased-out to concerned WMG	Will have to expand the inventory to those under GoB's Ministry of Land. Remains as a major challenge
At least, 50 percent of WMG members are provided with Farmers' Field School training	Have been planned and followed
All farmers in the project area should be allowed to participate with a number of field meetings and demos.	Are being designed and followed
Provide training and other IGA opportunity to professional fishermen in the <i>Beel</i> areas	Are being followed so that captures fisheries get momentum
Livelihood enhancement programs are to be enhanced	Will be followed

Table3. Key Issues and Challenges

Opportunities and Lessons Learnt: - This paper presents opportunities and options to resolve the issues side by side above, but we want to share some of our learning that we've got during the course of the implementation of the project. Those are articulated below in Table4.

⁴ Consulted the Aid Memoire of Asian Development Bank, 28 May, 2012; and as discussed by the project management and inputs collected from the consultants and project staff.

Involvement and participation of the people is possible provided there is a committed staff and leadership to educate, organize and motivate the people for the attainment of a common goal.
Voluntary action either by an individual or people is an extremely vital factor to promote, facilitate and catalyze people's participation in sustainable development.
A mix of commitment with flexibility, sensitivity, innovativeness and autonomy are essential for success.
Integrated approach to people's participation in sustainable development are necessary for involving people whole heartedly. The approach being employed must have the potential to generate the spirit of cooperation, caring and sharing, adjustment, harmony, self help, self reliance and special emphasis on the resource poor farmers particularly women.
Need based planned initiatives and their proper prioritization by the people themselves through democratic decisions with focus on the poorest and weakest and proper consideration for gender issues ensures better and fuller participation.
If economic downfall is followed by lack of people's organization, then boost in organization is also followed by economic boost. Assured economic benefits attract participation of the people. The first benefit must go to the poorest of the poor and first input must come from the governments and donors to sustain the emotions and confidence of the poor. It is a successful method to bring people together. Once they come together they talk, discuss, plan and act collectively and share the costs and benefits in a just manner.
Any process aiming at arousing people's participation must start with the people themselves. Sustained efforts over considerable long period of time are required for the people to gain confidence for self development.
The basic components of land, water and vegetation are the vital links to bring rural people together as their livelihoods are closely dependent on these natural resources.

Table4. Opportunities and Lesson Learnt

Recommendations/Findings/Options/Questions: We have generated some findings that are articulated below in Table5. These can be taken as our recommendations, and can initiate discussions.

Though there has been considerable improvement in the status of poor men and women and much has been done yet more remains to be done to involve them fully in the process. This means that holistic men and women development needs specialized and extra effort for them, esp. for the poverty-stricken ones.
There is little effort towards the development of agro-based small scale industries under the project to enhance the value of the labor and products and keep the participation of the poor people intact.
The managerial capability of the WMGs/WMOs are still weak and thereby weakening the participation of poor men and women. Value-added economic programs for the poor needs to be developed/added for their better and sustained income since social scientists confirm that a bit well off people are better managers/leaders⁵.
It is easier to construct/renovate FCD/Is but somehow difficult to develop managerial and/or leadership capacity of the poor people to own and operate those on their own on a sustained manner. Though the South West Area Integrated Water Resources Planning and Management Project have made considerable progress, its issue of sustainability is a question so far.

Table5. Recommendations/Questions

Acknowledgements: It gives us immense pleasure in expressing our gratitude to ADB for accepting our abstract and provided the scope to present this case study at the Asia Water Week, 2013. We also express our thankfulness to BWDB/MoWR/GoB, ADB staff and experts, GoN/EKN and officials of the ADB Country Mission, Bangladesh, and lastly, we thankfully acknowledge the contribution of the international and national consultants, project staff and beneficiaries for providing us continuous support to implement this project successfully.

⁵ Michael Todaro and Stephen C. Smith, "Economic Development 11th Edition". Pearson Education and Addison-Wesley, 2011.