

Empowering community for Water Security & Sustainable Development

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KEYWORDS

Water Security, Water Governance, Sustainable Development, Equity, Participatory Irrigation management, WBADMIP, Water Users Association (WUA)

ABSTRACT

West Bengal has six agro-climatic zones with very diverse hydro-geo-morphology. The impact of climate change is posing threat to water security; whether it is the intrusion of saline water in the southern districts or erratic rainfall in the dry lateritic belt of the Western districts. Some blocks in the alluvial districts are facing depletion of groundwater table. The West Bengal Accelerated Development of Minor Irrigation project (WBADMIP) was launched in the year 2012 by the Government of West Bengal with financial support from the World Bank. Main objective is to increase agricultural production among the smaller and marginal farmers of the rain-fed areas through creation of minor irrigation structures, strengthening of the community-based institution i.e. Water Users Associations (WUAs) for taking the ownership of the irrigation structures and providing Agriculture support services on agriculture, horticulture and fisheries. In the existing system of governance, these sectors were handled by different government departments which generally operate in silos resulting in limited impact. The Project experience demonstrated that community driven, decentralized approach with institutional support can strengthen the water governance and make the initiatives more inclusive. The minor irrigation schemes built under the project is entrusted with the democratically formed body called Water User Association. However, the process of democratizing the decision-making in water governance has to come up with the availability of clear operational guidelines, as well as a gestation period for building the community capacity for water resources planning and management. This paper describes the key aspects of project strategies on water security and the role of local community in the water governance and sustainable development.

WB ADMI Project (West Bengal Accelerated Development of Minor Irrigation Project) is a World Bank-supported project implemented by the Water Resources Investigation & Development Department (WRI&DD), Government of West Bengal since January 2012 to December 2019. Considering its success the project has been continued with state funds. The project objective is to enhance agriculture production in the rain-fed and underprivileged areas of the state by creating assured irrigation facilities. The project works through Water Users Associations (WUAs) and extends the agriculture support services including agriculture, horticulture & fishery activities to the beneficiary farmers of the command area to maximize the returns.

Table 1 Salient features of the WBADMI Project

Project Name	West Bengal Accelerated Development of Minor Irrigation Project (WBADMIP)
Project Period	January 2012 - December 2019
Supported by	World Bank
Implemented by	Water Resources Investigation & Development Department (WRI&DD), Government of West Bengal
Project Cost	USD 205 Million (INR 1380 Crore)
Project area	Single cropped rain-fed areas of the state
	Small & Marginal Farmers
	Tribal & Women
<i>Presently continued with State Funds and Phase-II is approved</i>	

WBADMIP is aimed at creation of minor irrigation infrastructure which includes water harvesting structures like check dams, water detention structures, re-excavation of old silted creeks in sundarban areas, Pump Dug well, Tube well and Lift irrigation schemes. In addition, agriculture support services are provided in the command area. The emphasis has been on surface water-based systems which has also helped in recharging of the ground water. The results have been more visible in predominantly single cropped areas of western lateritic zones and Salinity affected Sunderban areas. So far 255 Check Dam and 2056 water detention structures have been created. In the Coastal Saline Sunderban area around 510 km of silted canal has been re-excavated which has facilitated increased storage of rain water.

Key learnings of the WBADMI Project is that any standalone irrigation infrastructure development without community involvement is not sustainable. In this project community involvement has been ensured through integration of agriculture support services like agriculture, horticulture and fishery activities in the irrigated command area of the minor irrigation schemes. In existing system of governance these sectors are handled by different Government Departments which generally operate in silos. In WBADMIP the focus is on outcome and there is an effective convergence through community participation. Integration of these together helps in improving effectiveness and continuously growing command area. This has resulted into a better ownership of the community. Farmers are organised in the form of Water User Associations (WUAs) which take active part in the project right from the stage of conceptualisation to operation and maintenance of the irrigation schemes. WUAs formed in this project are today involved in operation & maintenance of the minor irrigation infrastructure, better water management practices & crop planning to maximise the command area, production of high value crops and production of various fish species. WUAs collect water charges for the water services provided to its beneficiaries on agriculture, horticulture & fishery purpose, which has demonstrated a sustainable model for infrastructure management in this sector. Engagement with WUAs in this project is on ethical principles which has led to their empowerment.

Table 2 Projects Components

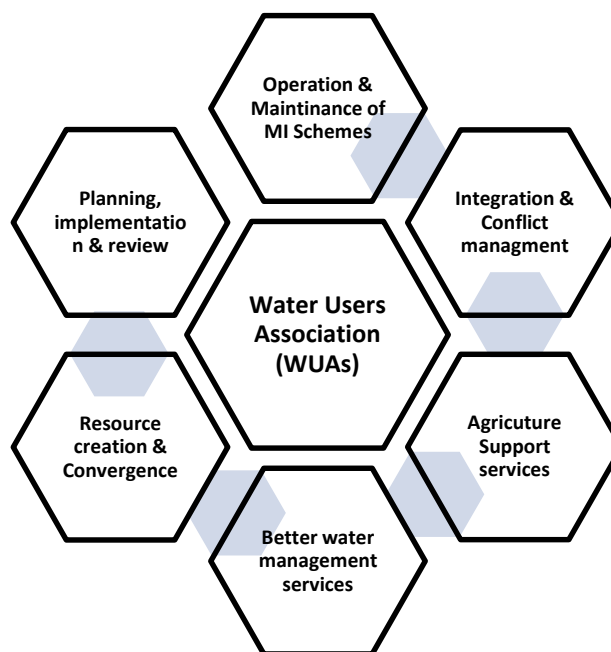
- A. Strengthening community-based Institution - Water User Associations (WUAs)
- B. Development of Minor Irrigation (MI) schemes
- C. Agriculture Support Services
 - I. Agriculture
 - II. Horticulture
 - III. Fishery
- D. Project Management

The project has four components as per table 2.

A. Strengthening community-based Institution (Water User Associations (WUAs))-

All the water users of the Minor irrigation schemes are grouped as Water user Association. It is registered under Society Registration Act 1961. WUAs are the single window delivery system for all the project interventions. They are empowered for operation, maintenance and management of Minor Irrigation Scheme created by the project. WUA size varies in different agro-climatic zones from 15-100 members. Women & tribal involvement is encouraged. More than 85% of the

Figure 1 Role of Water Users Associations (WUAs)

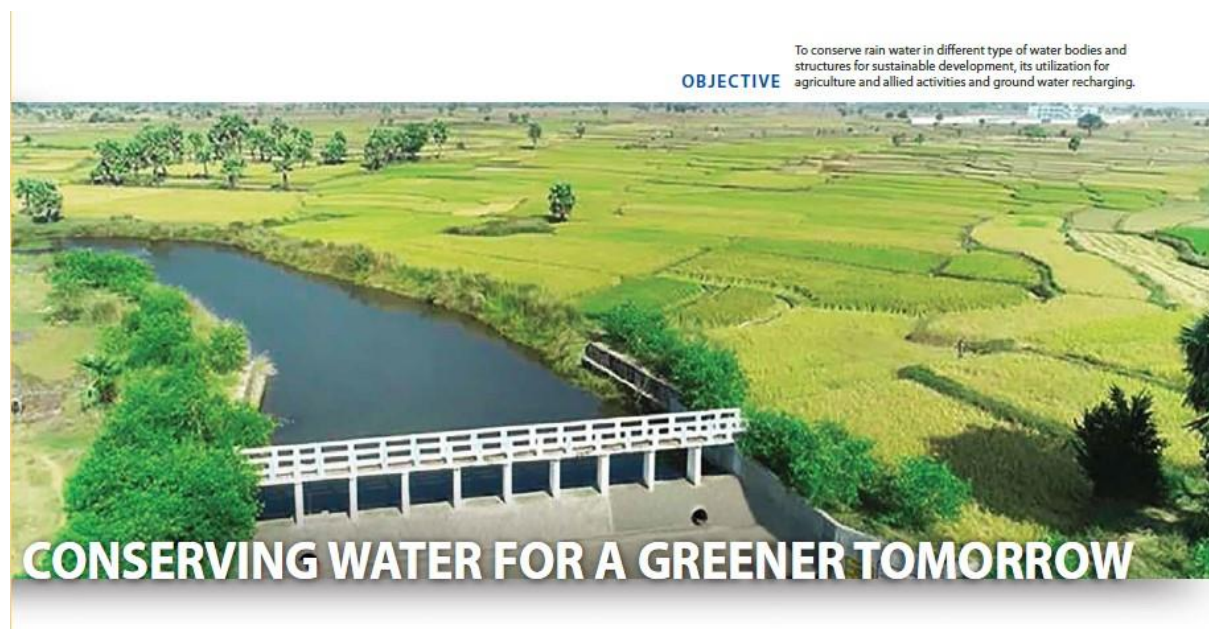


beneficiaries are small & marginal farmers. Women & tribal dominated WUAs showing better performance

More than 3021 WUAs are created and strengthened. About 2431 WUAs have started providing paid irrigation services to more than 131838 farmers with irrigation potential (IP) of 95000 Ha area. About 2360 such WUAs are already registered. 1363 (69.3%) WUAs are rated grade A/B are effectively functioning, able to meet their expenses and started taking new roles in the society.

B- Development of Minor Irrigation Schemes

The objective is to create minor irrigation infrastructure to provide assured irrigation facility to increase agriculture, horticulture & fisheries production & productivity. It will lead to increase income of the farmers in the command areas of MI schemes. Priority is given to surface flow schemes with a focus in Western lateritic zone, Coastal Saline zone and Hilly zone. In the other zones better water management practices are promoted under agriculture support services. *Minor Irrigation Scheme design, specifications, budget estimates are modified & upgraded with experience. Use of GIS systems made them more appropriate, robust, cost effective, better success rate & its impacts improved significantly. Cropping area is progressively improving every year due to agriculture support services provided to the WUA members.*



RE-EXCAVATION OF SILTED CREEKS : SUNDARBAN - A unique initiative helps in building climate resilience.



- 546 km of old silted creeks re-excavated
- Stored rainwater used for irrigation, fishery and domestic needs etc.
- Recharging of ground water
- Saline water Ingression reduced considerably in the nearby areas

- Stream banks are the walkways, planted with fruit trees
- Helps quick drainage of inundated water due to cyclones which saves standing crops.
- Fisheries emerging as the core economic activity for socio-economic development through rearing of fresh water giant prawns (Scampi) in a polyculture environment.

Series of eight check Dams are constructed under WBADMI Project covering Abadnagar, Bandi and Barshal villages of Rajnagar block in Birbhum District. It is a good example of increasing effectiveness year after year by WUA. Figure-2

Component C- Agriculture support services

CI- Agriculture component

Dissemination through on-farm demonstration.

- Promoting Good Agriculture Practices like seed, seed treatment, spacing, timely sowing, soil testing etc.
- Better water management practices like SRI (system of Rice intensification, use of flexible pipes, Drip & sprinkler, promoting less water demanding crops, tension-meter etc
- Crop diversification- promoting pulses, oilseeds in rice fallow areas
- Promotion of appropriate technologies on custom hire basis - farm equipment like Power tiller, Zero tillage machine, Paddy trans-planter, Drum seeder, reaper etc
- Promoting organic/indigenous practices- use of azotobacter, rhizobium culture, vermin compost, neem-based products, mulching, sticky card, pheromone trapetc
- Introduction of improved varieties- *Short duration Paddy Sahabhagi, GB1, PDM 539 for Green Gram, Subrata for Lentil, Sarada for Black Gram, K-6 for Groundnut etc.*
- Promotion of Organic farming, seed production, Aromatic rice production & green manure
- Regular Capacity building through training, exposure visits & experience sharing workshop

CII- Horticulture component

Project has introduced quality vegetable seeds as per different agro-climatic condition. It has promoted soil-free vegetable nursery using plug trays to get best quality saplings. Transplanting of vegetable seedlings were done on raised bed to get optimum growth. Balanced dose of nutrients like FYM & vermin-compost are used to reduce the chemical fertilizers. Used different biological IPM practices to control pest attack, as a result of which, application of chemical spraying was minimized. Sowing & transplanting of seedling with optimum population per unit area was done on time to get optimum production. Farmers are encouraged to make vermi-

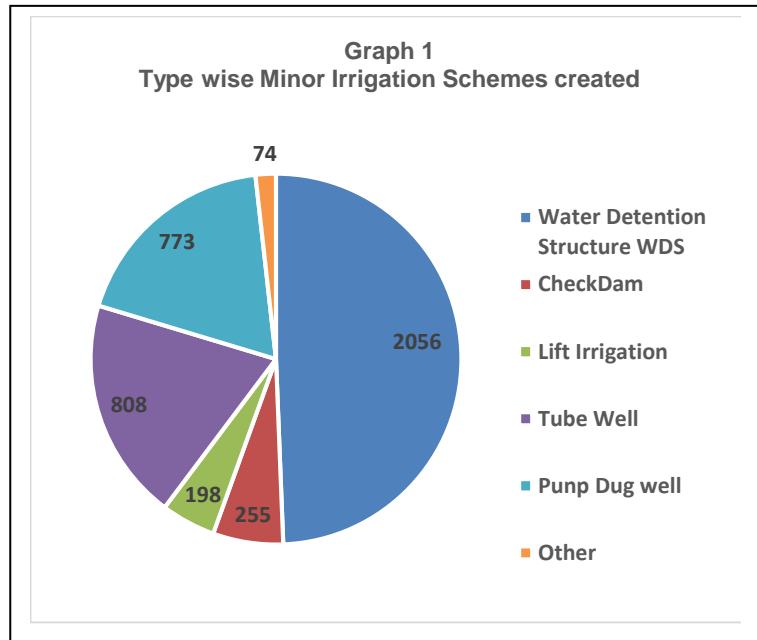
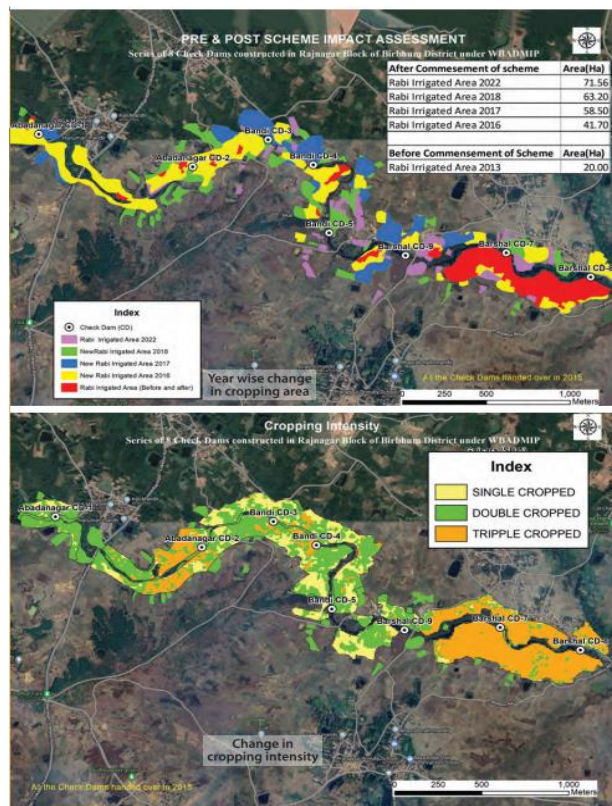


Figure 2 Year wise change in command area



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compost production units in cement tanks, to use as manure in their fields to maintain the fertility of their soil. Drip irrigation, sprinkler & poly houses have been introduced for high value vegetables crops to get more yield & better price as off-season crop. Low cost poly houses were promoted for vegetable nursery raising. Area under vegetable cultivation is significantly increased in all agro-climatic zones. It has improved its consumption among marginal farmers resulting reduced malnutrition & better health. Project have recently started promoting various flower production units as per the potential in the hills and area around Kolkata.

Mix fruit plantation on private waste lands- The objectives is to make productive use of available current private fallow land in abundance specially in Paschimanchal & a few other districts. Majority of them are with marginal & poor farmers from tribal community. Mixed fruit tree plantation of Mango, Guava, Citrus, Jackfruit, Pineapple, Cashew, etc to ensure income round the year. Micro-Irrigation structures like “Hapa” small farm ponds are created for irrigation. Low/very low water requiring crops have been introduced as intercropping and seasonal fish production on available standing water in the plantation area are promoted under the project which not only provides additional income but keeps the plantation area protected & vibrant throughout the year.

During last three years mixed fruit tree and spices plantation has been taken up on 1837 Ha area Covering 1119 WUAs having 30655 farmers of which ST-25.4% and women-15.3% on “Current fallow” land. Total about 13.15 lakhs saplings were planted. 1211 Ha area of the mixed fruit plantation was covered by intercropping.

C-III- Fishery Component

Fisheries activity is an important component of Agriculture Support Service provided by the project proved as additional sources of seasonal income from standing irrigation water available. State being deficient in fish production (1.64 lakh ton/annum, Source – Hand of Fisheries Statics, 2015-16, Govt. of W.B), has greater scope for expansion of the activity. Huge water bodies created under the Project may be tapped to its full potential. There is scope for creating sustainable gainful employment for the farmers throughout the year.

From 1163 Demonstrations covered 38596 farmers includes 28.4% women and 40% tribal community in 3029 Ha water bodies.

Project Interventions:

Empowering Fishery Interest Groups (FIG) particularly women members of the WUAs:

- Arrangement of Inputs like Spawn, Fish fingerlings, fish-feed, Lime, Cage, Geothermal Sheet

etc

- Water quality management
- Feed management
- Periodical netting and
- Use of maximum water volume

Twenty four different type of models of fisheries activities were tested under the Project in the different climatic zones. Project Schemes fits



Table-3 Success Story
 Scampi Production Program
 South 24 Parganas District
 WUAs-56
 Farmers-3916
 Scampi breeding- 0.8 Ha
 Scampi rearing – 3.6 Ha
 Scampi culture – 125 Ha
 Fish production – 37.5 MT
 Income–INR 1.69 Crore @ 450/Kg



Activities	Demonstrations	Beneficiaries	Area Ha
Agriculture	28481	53813	7068
Horticulture	25840	25840	3400
Fishery	1163	38596	3029

to water area varying from 0.065 to 2 ha. Culture period varies from 3 to 9 months. Unit cost ranges from about INR. 25000 to 2.75 Lakhs per hectare. Spawn to fingerlings, small Cage fish culture and deshi magur hatchery scheme are exclusively carried out by women fishery Interest Group (FIGs). Project is promoting culture of indigenous fish species specially to maintain biodiversity e.g. Magur, Mahasheer, Tilapia etc. Previously private ponds were taken on lease by the FIGs for pisciculture and now all water Detention structures created under the Project are also taken up. This has created additional employment opportunity and income for WUAs, thereby contribution to WUA corpus is improving. More than twenty-one hatcheries have been set-up for conservation of germ-plasm of indigenous fish species like Deshi Magur, Singhi, Koi, Tangra, Mahasher etc. Its cultivation is economically very profitable and gradually adopted by the neighbouring farmers also.

Figure-3 Krishikatha

BRIDGING THE LAST MILE
KRISHI KATHA
 MOBILE BASED FREE ADVISORY SERVICES
 on Agriculture, Horticulture, Fishery and institutional aspects

TO THE WUA FARMERS WITHIN 48 HOURS
 Give a missed call to 033 68 11 66 66

- IVR based audio message service for preferred crops
- Question based audio advisory service on all the crops
- WhatsApp group message service - text, audio and video
- WUA level information service
- Language - Bangla/Hindi
- Specific - Agro climatic zone specific advisory
- Activities - Agriculture, Horticulture, Fishery, WUA and Irrigation Schemes
- On practices, technologies, weather, disaster, remedial measure, market, news etc.
- 1,00,000 WUA farmers to be covered
- Value added services through smart phone users

ASK & QUESTION Listen the answered call within 48 hours Press 1 Record your Question Press 1 to submit your Question

WEEKLY ADVISORY Listen to weekly Advisories of your preferred crops Press 2 Listen to the weekly Advisories again

FREQUENTLY ASKED QUESTION (FAQ) Listen FAQ by other farmers Press 3 Listen top 5 FAQ and answers

YOUR QUESTION & ANSWER Listen your own Questions & Answers Press 4 Listen all your question & answers

43000 farmers receiving advisory services | Messages sent - 29.57 Lakhs
 Questions asked - 14000 | Unique questions - 8510 | Call Pickup rate - 62.4%

WBADMIP initiated innovative Mobile based advisory services “Krishi-Katha” to provide IVR based audio messaging services on agriculture, horticulture, fishery activities. Standard weekly advisory messages, weather alerts are sent to the registered farmers and farmers queries were addressed within 48 hours. Presently it has reached 91,590 farmers across the state in Bangla & Hindi languages covering variety of crops and fishery practices throughout the year. More features are getting included with time. It has been proved very useful during COVID period.

Table 5
“Krishikatha”
Mobile based advisory service
Since April 2019
24 Hour IVR facility for farmers
033-68 11 66 66
Farmers covered – 91,590
Messages sent- 87,30,992
Questions asked – 27,145
Unique questions – 9,675
Call pickup rate – 52.72%

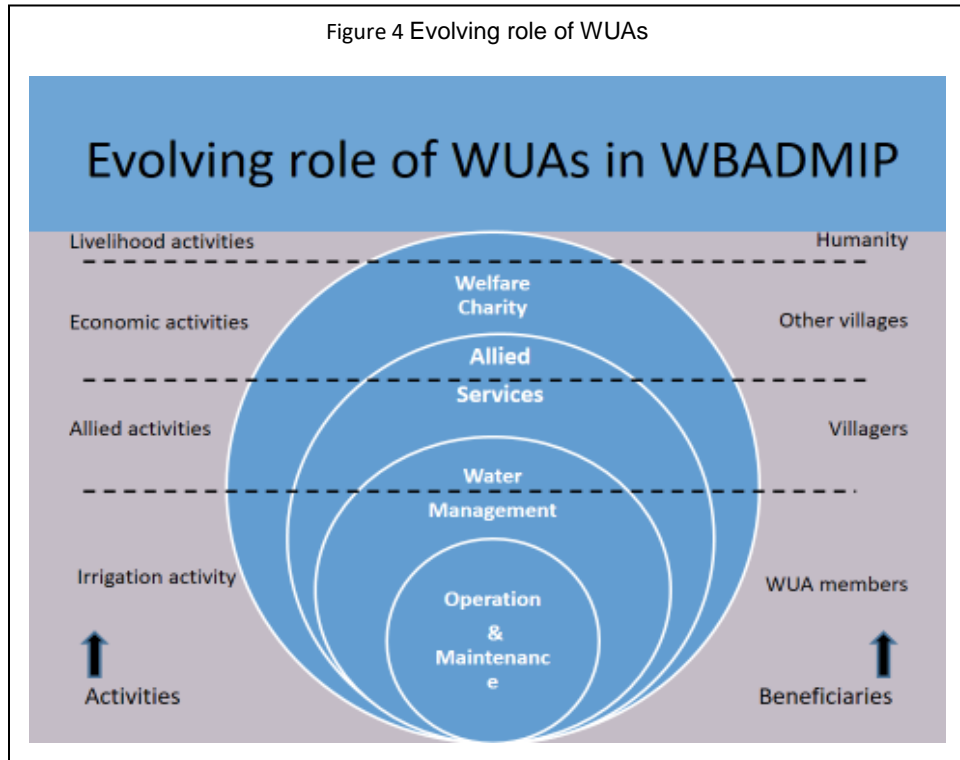
Evolution of WUAs for water security & sustainable development -

WUAs are performing as single window delivery system for all project interventions in a sustainable manner. Project has facilitated gradual growth of each WUAs as per their interest and commitment. All necessary training, inputs and handholding support was timely extended through local NGOs. The WUAs are demonstrating effective & efficient functioning of Irrigation scheme, innovations, technology adoption and their diversified role. Project is facilitating watershed approach to treat their wastelands. WUAs have created enough financial resources to sustain their Irrigation scheme coming through membership fees, water charges, plantation, fisheries, and custom hire charges from agriculture machineries etc. These WUA are timely paying electricity bill, pump operator and operation & maintenance charges etc. and proactively coming forward to expand irrigation & other services to maximise the coverage and benefits of available water resource. They are able to bring the benefits of other various departmental schemes through convergence activities includes Drip & Sprinkler, high Tech Poly house, Solar Pumps and NREGS activities. The WUA have taken up initiative to adopt various better water management practices, high

Table 6 Key Achievements		
Indicator	Unit	Achievement
Change in produce	%	182
WUA members	Nos.	131838
WUA members - female	Nos.	17.3
Minor irrigation schemes constructed	No	4164
WUAs providing irrigation services	Nos.	2431
Small and Marginal Farmers	%	88.8
Tribal farmers	%	15.8
Irrigated area (Irrigation potential created)	Ha	95000
Increase in water harnessed	Ha-M	24280
Area diversified -less water Intensive crops*	%	30
Change in cropping intensity**	%	192
<i>Baseline value * 5% **122</i>		

Table 7 Financial resources with WUAs
WUAs formed & strengthened – 3025
WUA providing irrigation service - 2431
Corpus fund - Six Crore (after meeting the regular operation & maintenance expenditure) used for
Asset created - 88.8 Lakh
Investment for effective functioning of scheme - 45.4 Lakh
Welfare & support services - 20.9 Lakh
WUA self-Assessment - 69.3% A/B Grade

Figure 4 Evolving role of WUAs



value horticulture crop production and mix fruit plantation in the unused private waste lands. Vibrant Fishery Interest groups (FIGs) are earning from various type of fish production practices hatchery, spawn-fry, fry-fingerlings and Mass production. Some of these FIGs are becoming entrepreneurs. Villagers are motivated and started adopting different fishery practices in the available water bodies in the villages. WUA have started taking up implementation responsibility of project activities mainly for plantation activities resulting into timely, better quality of work and savings by doing their own works. The systems and processes evolved in different WUAs are unique, transparent and serving not only the WUA members but also started benefiting the villagers and beyond. These WUAs have built the corpus of about Six Crore after meeting their regular operation & maintenance charges. The Corpus amount is generally kept as Fixed Deposit in the Banks. INR 45.4 lakh was used to keep the irrigation scheme effective & efficient to serve the existing WUA members by purchasing of pump set, flexible pipes, replacement of damaged parts etc INR 88.8 Lakh was used for creation of Machine house for better upkeep of Agriculture machineries, purchase of additional pump sets & pipes, Soil moisture meter (Tensio-meter) etc are bought to extend the available excess water/related chargeable services to other members of the village. WUA demonstrated addressing social responsibilities during the COVID-19 by helping their fellow farmers by spending INR 20.9 Lakh for awareness campaigns, camps, competitions, providing food and food materials e.g. Rice, Oil & potato etc to the needy community. They have come forward to contribute in the Relief fund also. It is the beginning; they are now coming forward to further diversify their role as a Farmer Producer Organization (FPO). Concept is depicted in figure-4. One of such FPO of federated WUAs already came in to action three years back in Hooghly district and the results are very encouraging. They are currently having annual turnover of around one crore by aggregation of agri-inputs and selling of agriculture produces of selected items. They are now coming up to take the responsibility to provide handholding support on project activities in their neighbouring village areas. Project has identified about 300 such clusters throughout the state to nurture them during WADMIP phase-II. WUAs are facilitated for their annual self-assessment i.e. WUA grading. Success stories of these WUA have been documented by International Water Management Institute (IWMI) & Institute of Rural Management Anand (IRMA) as part of their third party impact study. Some of these WUAs are becoming the light house WUAs of the Project.

Table 8 Farmer's testimonials

<i>"I can leave my husband but never leave my Samiti, It has given me everything"</i>
-MangaliMandi, Gokulnagar village, Purulia District
"I have been able to buy a gas connection
- Padmavati Tudu, Amtore village, Purulia District
<i>"Now my son is with me in the village enjoy doing agriculture & fishery"</i>
- Aklima Molla Bhaleya village, Canning-I, South 24 Parganas District
<i>"Price of agriculture crops fluctuates but fish price always goes up"</i>
- Sudhir Gayen, Kailashnagar, Canning block, South 24Parganas District.
<i>"Earlier i had only 8 beegha land now i have 18 bigha land due to project interventions"</i>
- Tarashankar Mondal, Birbhum District.
<i>"Earlier we could hardly manage to have vegetable with rice but now we can afford variety of fresh vegetables and having good health"</i>
-Kalipada Murmu, Amtore village, Purulia District

Impact studies-

Third party impact studies were conducted by International Water Management Institute (IWMI) and Institute of Rural Management Anand (IRMA)

"Results indicate that community involvement in the form of WUAs and agricultural support services will definitely add critical value towards similar minor irrigations schemes of the government"-Abstract of 3rd Party Impact assessment by International Water Management Institute (IWMI)

IRMA impact study provides empirical evidence of major debates in collective action theory concerning resource and member heterogeneity by conducting a survey on 63 randomly selected water-user associations promoted by the West Bengal state government of India. The functioning and governance of these institutions were evaluated by efficiency in resource mobilization (collection of membership fees), members' perception of transparency and democratic decision-making, and dependency on third-party involvement in the future. The study finds that a larger command area,

larger proportion of smaller farmers, optimum membership fee, frequent general body meetings, certain documentation, and power structure improve the functioning and governance indicators. "The Project has demonstrated appropriate models for different agro-climatic regions ... Use of GIS technology in planning, implementation & impact assessment and Watershed based approach for promotion of different project activities. I have visited many projects around the world and never came across any such integrated & quality work. These works need to be shared across so that others can also be benefited."- Dr Yoro Sidibe, Water Management Specialist, World Bank Group, Washington DC USA and Team leader for Project Evaluation. (12th Sept 2019)

Awards & recognition-

WBADMIP promoted WUAs received all the three awards under Best WUA category in 3rd National Water Award by Ministry of Jalshakti, Government of India. One of the WUA received 3rd Prize in the 2nd National Water Award for Best WUA by Ministry of Jalshakti, Government of India.

Way forward –

WBADMI Project phase-II is now in the pipeline. The plan is to increase the income of 2,50,000 small & marginal farmers of the state in relatively under developed areas by creating additional irrigation potential of 1,25,000 Ha and providing agribusiness support services on agriculture, horticulture fisheries by empowering WUAs & Farmer's producer organizations (FPOs).



ACKNOWLEDGEMENT

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