



West Bengal
Accelerated Development of
Minor Irrigation Project
SINCE 2012



An aerial photograph of a rural landscape in West Bengal, India. A prominent feature is a long, winding canal that meanders through the terrain, surrounded by lush green agricultural fields. The canal is bordered by earthen walls, and there are several small structures or gates along its length. The background shows a hazy horizon with more fields and trees under a bright sky.

PROJECT OBJECTIVE

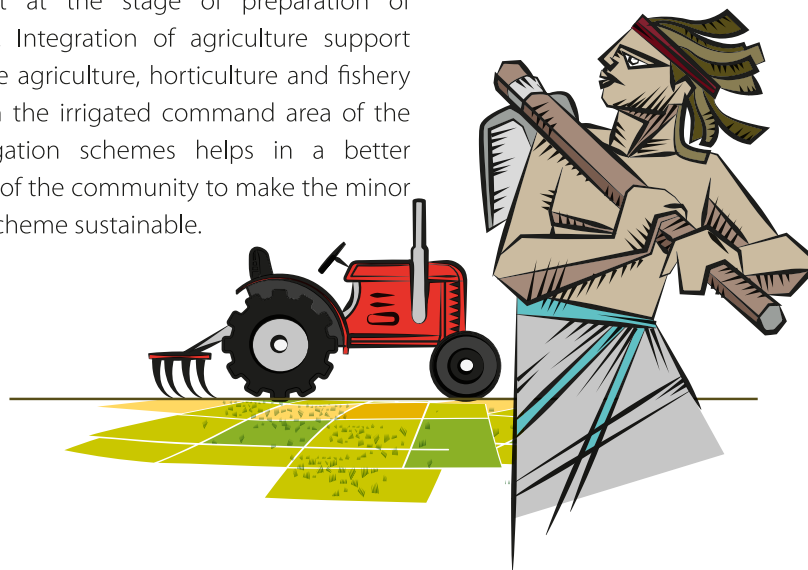
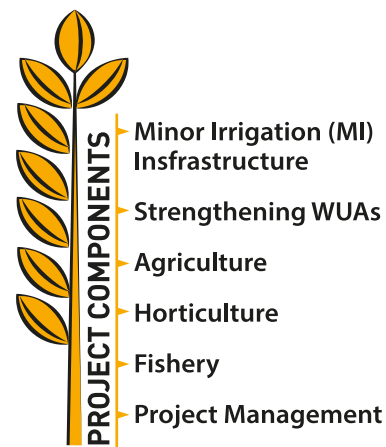
Enhancing the agriculture production of **1,00,000** Small & Marginal farmers of single cropped rain fed areas in West Bengal by providing assured irrigation potential in **75,000** Ha area and agriculture support services on Agriculture, Horticulture & Fisheries through Water User Associations (WUAs).

GROW WITH ITS FLOW

PROJECT COMPONENTS

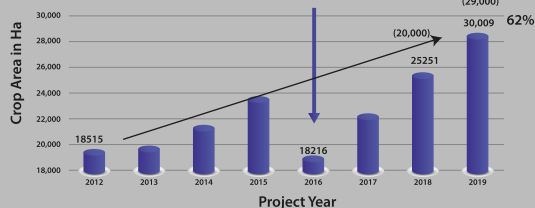
West Bengal Accelerated Development of Minor Irrigation Project (WBADMIP) has been designed to create minor irrigation infrastructure, mobilize community around the created infrastructure to ensure its sustainable use and provide agriculture and support services. The focus is on the ultimate outcome of increased productivity through a single window delivery of water availability as well as agriculture and support services to the Water User Associations (WUAs).

Any standalone irrigation infrastructure development without community involvement is not sustainable. In this project community involvement has been ensured through formation of Water User Associations and involve them right at the stage of preparation of micro-plan. Integration of agriculture support services like agriculture, horticulture and fishery activities in the irrigated command area of the minor irrigation schemes helps in a better ownership of the community to make the minor irrigation scheme sustainable.



**ACTUAL GROWTH OF CROPPED AREA
SINCE INCEPTION OF THE PROJECT [2012 to 2019]
IN RABI AND PRE-KHARIF SEASON (on field)**

Fall of crop area due to drought

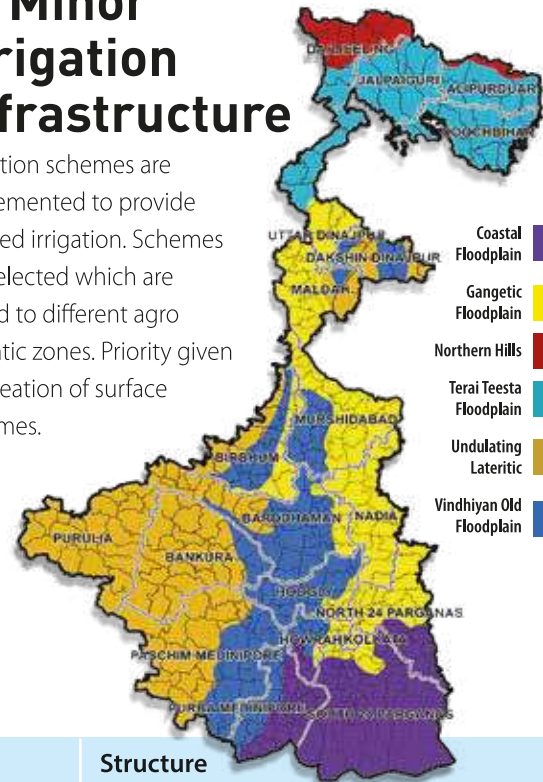


Note: Obtained through remote sensing analysis on Google Earth Engine

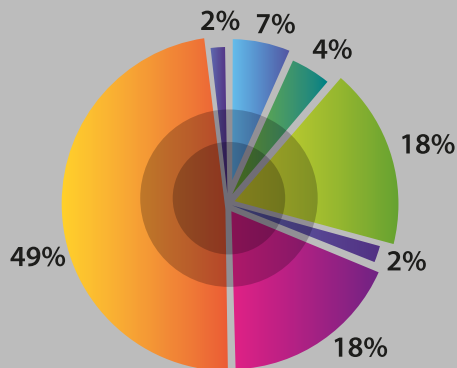
MAXIMIZING PRODUCTIVITY

Development of Minor Irrigation Infrastructure

Irrigation schemes are implemented to provide assured irrigation. Schemes are selected which are suited to different agro climatic zones. Priority given for creation of surface schemes.



Types of MI Schemes



CD LI PDW SFMIS TW WDS Others

Source	Structure
Surface Water	Check Dam (CD)
	Water Detention Structure (WDS)
	Re-evacuation of old creeks (canal)
	Jhora rejuvenation
Ground Water	Tube Well (TW)
	Pump Dug Well (PDW)
River/Water Bodies	Lift Irrigation scheme (LI)
	Hydrant on Jhora
Others	Sprinkler & Drip, Solar operated scheme

Cropping area progressively improving every year due to agriculture support services provided to the WUA members.

CREATION OF IRRIGATION INFRASTRUCTURE VISION 2050

IRRIGATION INFRASTRUCTURE
AREA BASED APPROACH

- ▶ Surface Flow Schemes
- ▶ Ground Water (judicious use)
- ▶ Groundwater Recharging - Jhora rejuvenation, Hapa etc.
- ▶ Drip & Sprinklers for Water use Efficiency



WATER USER ASSOCIATIONS (WUAs) ensure sustainability of MI schemes

All the water user farmers of the irrigation command area are organised in the form of Water User Associations (WUA) registered under Societies Registration Act 1961. WUAs take active part in the project implementation, water distribution, operation & maintenance, resolving conflicts and collecting water charges for the water services provided to its members. Women & tribal dominated WUAs generally showing better performance.

COME TOGETHER FOR THE BETTER

CLIMATE RESILIENT AGRICULTURE

- ▶ Demonstrations of best Agricultural Practices
- ▶ Appropriate Technologies (e.g. use of satellite imageries)
- ▶ Use of Drip/Sprinkler/Polyhouses
- ▶ Better Water Management (e.g. soil moisture meter)
- ▶ Organic/Indigenous Techniques/ Natural Farming
- ▶ Market Linkages

AGRICULTURE - PROMOTING
CLIMATE RESILIENT PRACTICES



HORTICULTURE

AREA BASE APPROCH



HORTICULTURE SUPPORT SERVICES

- ▶ Demonstrations
- ▶ Good Practices & Technologies
- ▶ Floriculture (Gerbera, Carnation etc.) and fruit plantation (Mandarin, Avocado, Apple etc.) in the hills
- ▶ Mixed fruit Plantation & Intercrop on fallow lands in Western Lateritic Zone
- ▶ Diversified vegetable production using Coco Pit, Shed Net Nursery etc.
- ▶ Spice hub in North Bengal - Ginger, Turmeric, Black Pepper etc. - IPM, INM etc
- ▶ Organic & Natural Farming, Indigenous Techniques
- ▶ Protected Cultivation - High Value Crop, Floriculture etc. in the Hills, Central & Southern Zone



FISHERY

A GAME CHANGER

FISHERY SUPPORT SERVICES

Demonstrations of best practices -
e.g. Spawn to Fish Fingerlings, Fish-feed,
Water Quality

Preserving Biodiversity - Hatchery for
Indigenous fish - Magur Mahseer, Koi,
etc; Hilsa conservation

Convergence - WUAs,
FIG, SHG & Line
Department

Developing area
specific need based
models – Convergence
with Fishery
Department

Production clusters and Fishery
entrepreneurs - Fresh water
giant Prawns – Export market,
Feed, Spawn, Fingerling etc.



WATER USER ASSOCIATIONS (WUAs)

Operations & Maintenance of
MI Schemes

Integration & Conflict
Management

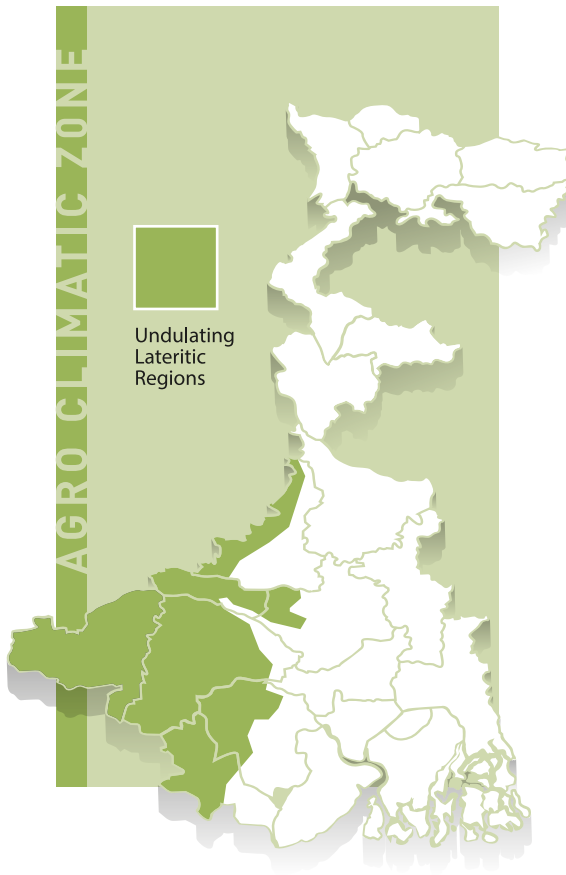
Agriculture
Support Services

Better Water
Management Services

Resource Creation
and Convergence

Planning, Implementation & Review





WESTERN LATERITIC ZONE

Community Group

WUAs (1295), Farmers Covered (58984)

Average WUAs Members (45)

Self Help Group (Women) & Fishery Interest Groups (FIG)

Minor Irrigation Schemes

Surface Water Schemes:

Check Dam (216), Pump Dug Well (378)

Water Detention Structure (1244)

Solar Schemes (413)

Agriculture

SARP (System of Assured Rice Production), Aromatic Rice (50 Ha)

Oilseed - Mustard & Groundnut (350 Ha)

Pulses - Arhar, Blackgram etc.

Green manure - Dhaincha (10 Ha)

Good Agriculture Practices & Agriculture Implements (>41000 Farmers)

Horticulture

Mix fruit plantation (>1000 Ha) on fallow land

Cashew, (260 Ha), Mango (225 Ha), Jackfruit (12 Ha),

Arjun (92 Ha) & Lemon (30 Ha) etc. with intercropping

Vermicompost (125 units)

Vegetable production

Nursery in Poly Tunnels

Fishery

Water bodies - project/public/private (1600 Ha & 20500 Farmers)

Hatcheries (indigenous species) (17 Nos.)

Spawn to fingerling production (85 FIG)

Culture of Indigenous Fish Species,

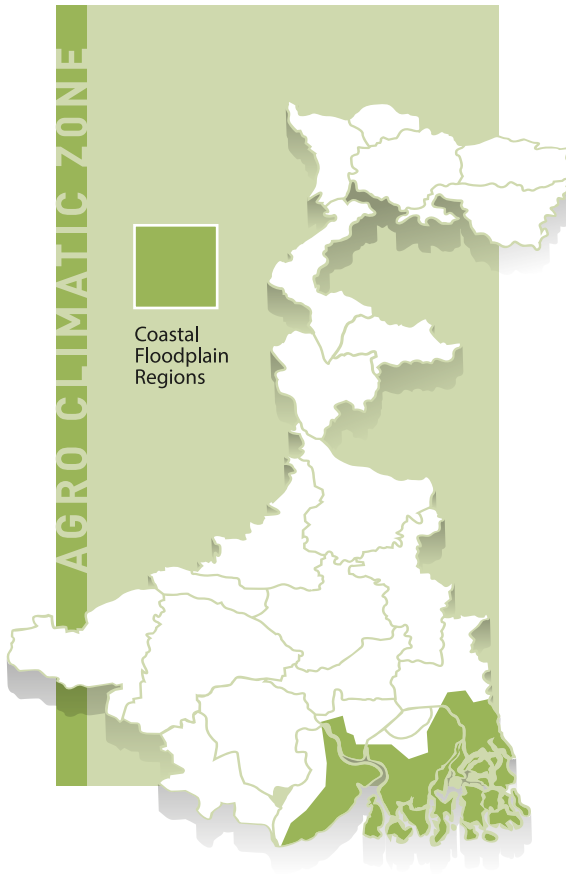
Chitala, Bhetki, Magur and

fresh water giant Prawn etc.

Monosex Tilapia in Water Detention Structures (WDS) (141 Ha)







COASTAL SALINE ZONE

Community Group

WUAs (276), Farmers Covered (>17000)
 Average WUAs Members (62)
 Multiple villages in a WUA
 Surface Scheme based WUAs
 Fishery Interest Group (FIGs)

Minor Irrigation Schemes

Surface Water Schemes - Creeks
 Re-excavation of old silted Creeks/Canals (410 Km)

Agriculture

SARP - (System of Assured Rice Production),
 Paddy followed by Boro-Paddy, Sunflower, Sweet Potato
 Aromatic Rice (65 Ha)
 Green manure - Dhaincha (15 Ha)
 Good agriculture practices (>11000 Farmers)

Horticulture

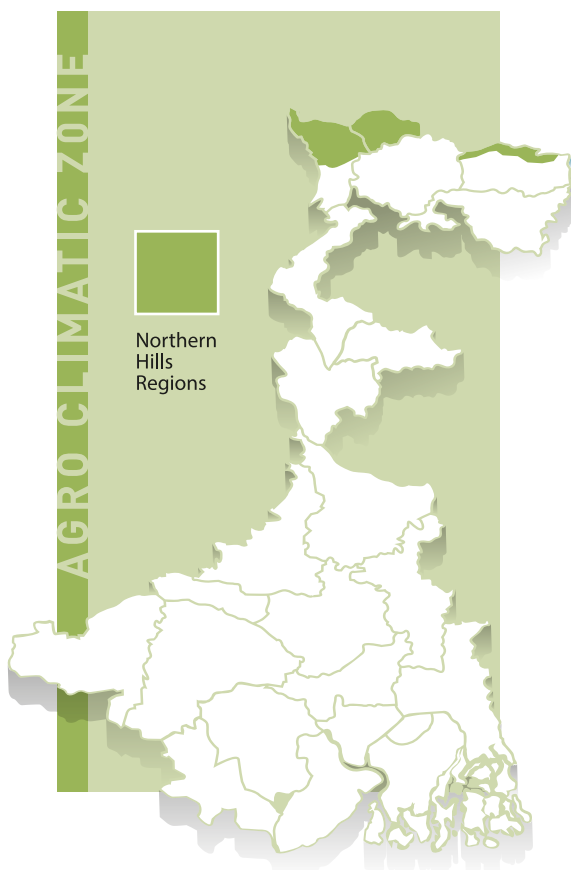
Mix fruit plantation on banks (190 Ha) - Coconut (60 Ha),
 Aricanut (5 Ha) etc.
 Vegetable production on banks
 Chilli, Cabbage, Cauliflower, Tomato etc.
 Capsicum & Beetle (>175 Ha)

Fishery

Canal fishery (216 Ha & 3400 Farmers)
 Poly culture of IMC
 Bhetaki, Fresh water giant Prawn/Scampi & Guppy
 Mass production of IMC
 Spawn to Fingerlings (16 FIG)
 Fish production clusters emerging
 Pond based seed rearing of Scampi -
 9 lakh post larvae to Juvenile produced by 180 farmers
 Pond based breeding & seed rearing of Scampi -
 1.5 lakh post larvae produced by 20 farmers







NORTHERN HILLS

Community Group

WUAs (41), Farmers Covered (1561)
 Average WUAs Members (38)
 Spring/Jhora based WUAs

Minor Irrigation Schemes

Surface Water Schemes
 Jhora/Spring development (1)
 Jhora/Spring rejuvenation (17)

Agriculture

Paddy, Mustard & Maize
 Organic practices/Natural farming
 Agriculture implements
 Micronutrient
 Aromatic Rice (90 Ha)
 Green manure - Dhaincha (5 Ha),
 Good agriculture practices (>750 Farmers)

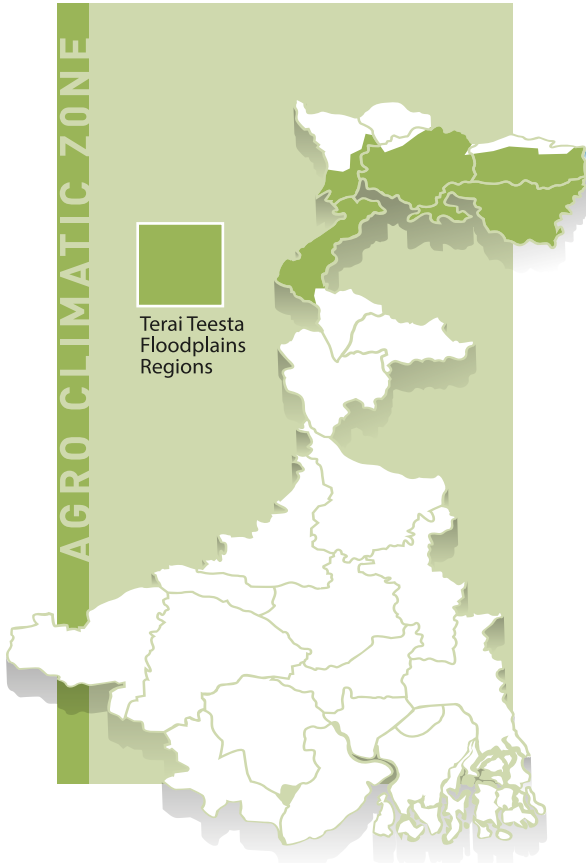
Horticulture

Protected cultivation -
 Flower cultivation (24 polyhouses) - Gerbera & Carnation
 Spice hub (105 Ha) -
 Garlic, Ginger (50 Ha), Turmeric (29 Ha), large Cardamom (12 Ha),
 Black Pepper (18 Ha), Chilli etc.
 Mix fruit plantation (>140 Ha) -
 Apple (4 Ha), Mandarin (15 Ha), Avocado (9 Ha), Lemon (36 Ha),
 Black Pepper (18 Ha), Banana (32 Ha), Papaya (16 Ha) etc.
 Vegetable production (110 Ha) and High value crops (10 units)

Fishery

Public/individual water bodies
 Backyard fishery - individual Hapa with poly lining (1047) No.
 Culture of Grass carp, Deshi Magur & Common carp
 Spawn to fingerlings program (1 FIG) & Hatchery (1 FIG)
 Breeding of indigenous cold water fish (Chocolate Mahseer)
 (16000) fingerlings produced by (10 farmers)





TERAI TEESTA FLOODPLAINS

Community Group

WUAs (477), Farmers Covered (22285)
 Average WUAs Members (47)
 Ground Water based WUAs
 Fishery Interest Groups (FIGs)

Minor Irrigation Schemes

Ground Water Schemes
 Tube Well (348)
 River Lift Irrigation Schemes (46)
 Pump Dug Well (82)
 Solar operated Tube Well (129)

Agriculture

Crop-diversification - Hybrid Maize,
 Mustard, Lentil, Sesame, Green Gram
 Aromatic Rice (30 Ha)
 Agriculture implements
 Good practices (16000 Farmers)

Horticulture

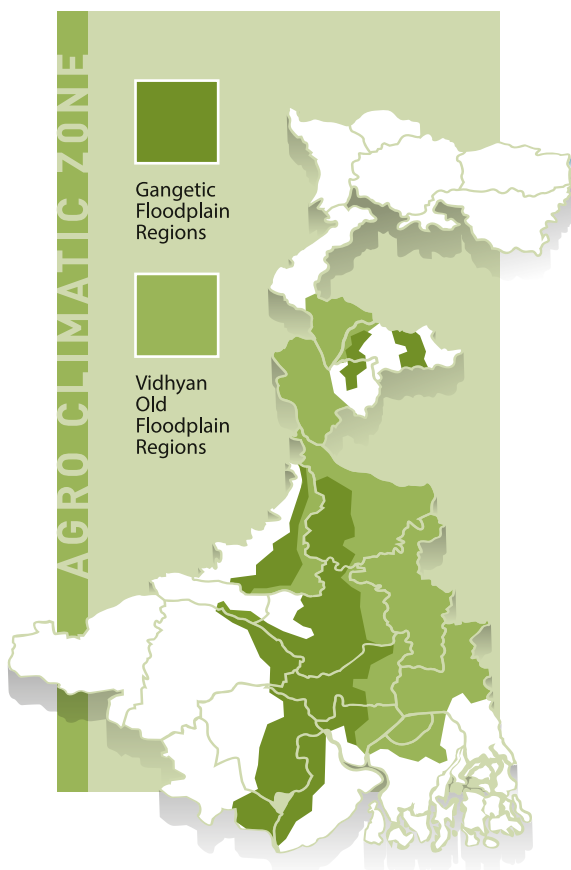
Protected cultivation - Polyhouse (16 units)
 High value crop vegetable production
 Spices hub (27 Ha)
 Black Pepper (25 Ha), Bay leaf (6 Ha) etc.
 Mix fruit plantation (130 Ha)
 Betel nut (27 Ha), Banana (25 Ha), Papaya (18 Ha) etc.

Fishery

Public/individual water bodies - 770 Ha & 8857 Farmers
 Grass carp, Common Carp Catfish Culture
 (Deshi Magur, Singhi, Pabda)
 Hatchery (10 FIG)
 Spawn to fingerlings (29 FIG)
 Mass production







GANGETIC & VINDHYA FLOODPLAIN

Community Group

WUAs (440), Farmers Covered (39000)
 Average WUAs Members (88)
 All type of WUAs (Surface/Ground/Lift based)

Minor Irrigation Schemes

Ground Water Schemes - Tube well (219)
 River Lift Irrigation Schemes (86)
 Water Detention Structure (112)
 Solar based Schemes (33)

Agriculture

SARP - (System of Assured Rice Production), Aromatic Rice (70 Ha)
 Diversification to less water intensive crop - Oilseed and Pulses
 High value crop - hybrid Maize
 Oat (7 Ha)
 Green manure - Dhaincha (20 Ha)
 Good Practices (>27000 Farmers)

Horticulture

Polyhouse -
 High value all season vegetable production (25 Ha)
 Flower cultivation (40 Ha)
 Mix fruit plantation (<100 Ha) - Mango, Lemon etc.

Fishery

Public/private water bodies - 77 Ha & 719 Farmers
 IMC fish production
 Spawn to fingerlings program (17 FIG)
 Hatchery (1 FIG)





WOMEN INVOLVEMENT IN THE PROJECT

- Directly involved women >21300
- Women Members in WUA 18%
- As WUA executive committee member and normal member
- As activity group member FIG/SHG etc.
- Key activities - Spawn to fingerlings, hatchery, guppy fish, nursery, mixed fruit plantation and intercropping etc.
- Performing in challenging situation and innovative activities
- Utilizing their (WUA/SHG) own resources
- Proven vibrant entrepreneurial group, adopting & scaling up
- Vibrant cohesive group with values, transparency & integrity
- Bringing new hopes for women, village community and beyond



WUA (FIG/SHG etc.) INVOLVED IN



EMERGING ENTREPRENEURIAL ACTIVITIES

- Fishery – Hatchery, Spawn to fingerlings, Guppy, Fish feed etc.
- Implements - Custom hire basis, seed production/ prevention, aromatic/ commercial paddy
- Vegetable production
- Production of remunerative crops – watermelon, spices etc.
- Nursery, Vermicompost, organic farming, floriculture, high value crop in polyhouse

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



43000 farmers receiving advisory services | Messages sent - 29.57 Lakhs

Questions asked - 14000 | Unique questions - 8510 | Call Pickup rate - 62.4%



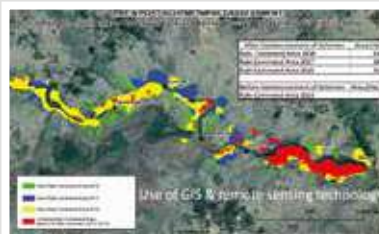
IN HOUSE REMOTE SENSING & GIS TECHNOLOGY FOR PLANNING MONITORING & IMPACT ASSESSMENT

- Reaching the real needy areas & communities in a focused manner
- Agro Climatic Zone and watershed based planning
- Planning (scheme identification, selection & approval), implementation and monitoring
- Improved design, estimation and integration with allied activities
- Data integration and better representation/interpretation on maps
- Interactive and transparent system (open public access 24X7)
- Quick analysis of environmental impact assessment
- Impact assessment - Change in cropping area, cropping intensity based on vegetation indices, crop productivity before & after MI scheme based on time series satellite imageries & corrective action
- GIS based advisory services on scheme performance, residual moisture based on live remote sensing data

Change in cropping intensity



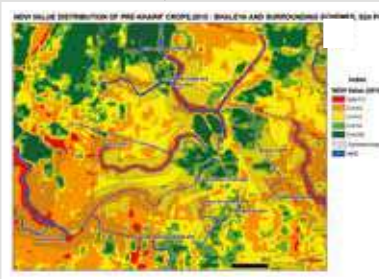
Year wise change in cropping area



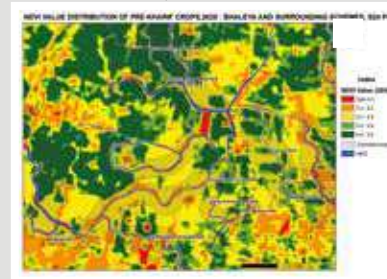
After & Before project



Before Project Intervention



After Project Intervention



TECHNOLOGY SHOWS THE WAY

- TECHNOLOGICAL INTERVENTIONS**
- ↳ GIS - In-house facilities
 - ↳ Solar based pumping system
 - ↳ Mobile based advisory services "Krishi Katha"
 - ↳ Soil moisture meter based irrigation practices
 - ↳ Polyhouse – floriculture and high value crop
 - ↳ Introducing agriculture implements & machineries
 - ↳ Promotion of appropriate technology & practices
 - ↳ Digital technology using mobile – Google Meet, WhatsApp

WBADMI - PROJECT AT A GLANCE

Minor Irrigation Schemes

(MI) - Check Dam (CD)-195, Water Detention Structure (WDS)-1436, Pump Dug Well (PDW)- 450, Tube Well (TW)-750, Lift Irrigation (LI)-198 and Jhora-18 Nos. Numbers. **Solar operated schemes** - 563 schemes with 9345 Ha irrigation potential

WUAs - 64% WUAs are rated grade A/B. Corpus funds of INR 2.80 Crore. Corpus used as a revolving fund to meet the development needs and about 22 Lakhs to help needy people during corona & other pandemic situations Approximately INR 2 Lakh donation to Relief funds.

Agriculture - 49244 number of demonstrations carried out to facilitate adoption of good technology & practices

Indicator	Unit	Achievement
Change in value of outputs	%	182
WUA members	Nos.	123339
WUA members - Female	Nos.	21301
Minor irrigation schemes constructed	No	2945
Operational WUAs	Nos.	2028
Small and Marginal Farmers	%	83.6
Tribal farmers	%	13.7
Irrigation potential created	Ha	75000+
Increase in water harnessed	Ha-M	2028
Area diversified-less water Intensive crops*	%	30
Cropping intensity**	%	192
<i>Baseline value * 5%, **122 Status as on 01st May 2021</i>		

on agriculture. Assured lifesaving irrigation facility made available for kharif paddy. Bio-inputs- to reduce use of chemical fertilizers & pesticides Integrated pest management demonstrated at 960 sites in 2335 Ha area.

Horticulture - More than 40000 demonstrations carried out to facilitate adoption of good

technologies & practices on vegetables, high value crops, plug tray nurseries etc. Mixed fruit tree plantation of 16+ Lakhs in 1623 Ha cultivable fallow land (924 Ha with intercropping of pulses/vegetables) by 850 WUAs benefited 27,895 farmers including ST (26.87%) & women (14.49%). Polyhouse-138 (including 24 floriculture), Vermicompost pit- 977 units.

Fisheries - 6600 water bodies covering 2352 Ha demonstrations with more than 30000 farmers.

- 18 Hatcheries and 148 FIGs producing various spawn to fingerlings for mass production.
- Darjeeling- Breeding of indigenous cold water fish (Chocolate Mahseer), fingerlings produced- 16000 in last two years involving 10 farmers
- Purba Medinipore- Pond based breeding & seed rearing of Scampi 1.5 Lakh post larvae produced involving 20 farmers
- South 24 Pgs.- Pond based seed rearing of Scampi (post larvae to Juvenile) produced 9 Lakh juvenile by 180 farmers

Since inception in 2012 total 1282 Crore (One thousand two hundred and eighty two crore rupees only) spent under WBADMIP till 31st March 2021.

Krishi Katha (Mobile based advisory services) - 43000 farmers receiving advisory services on agriculture, horticulture and fishery activities.

Messages sent - 29.57 Lakhs, Questions asked - 14000, Unique questions - 8510, Pickup rate - 62.4% **(on missed call-033 68 11 66 66)**

AWARDS & RECOGNITION

- Best Community Project of the year in Water Sector- Government- 2018-19 by The Water Digest in Association with UNESCO India and supported by Ministry of Jalshakti, GOI.
- “Durlavpur MDTW WUA of North 24 Parganas District” received 3rd Prize under Best WUA category, National Water Award 2019 by Ministry of Jalshakti, Government of India. It includes One Lakh cash prize along with certificate and a citation.
- Best Water Efficient Project of the year in Water Sector-Government 2019-20, by The Water Digest in Association with UNESCO India and supported by Ministry of Jalshakti, GOI.
- Association of Geospacial Industries (AGI) India Water Award 2020 recognized WBADMIP for exemplary work in Water Sector using GIS.
- “Digital India Handbook” by IIM Lucknow. Collection of 100 best projects in India as an e-project using WEBGIS.





Supported by
THE WORLD BANK

Implemented by
Water Resources Investigation & Development Department
Government of West Bengal

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