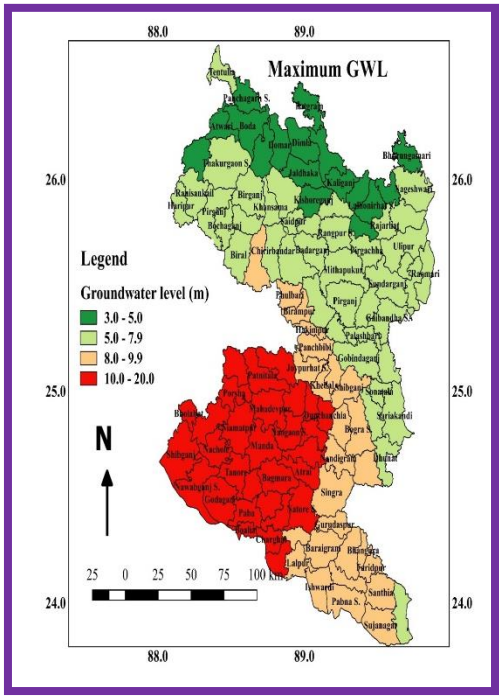
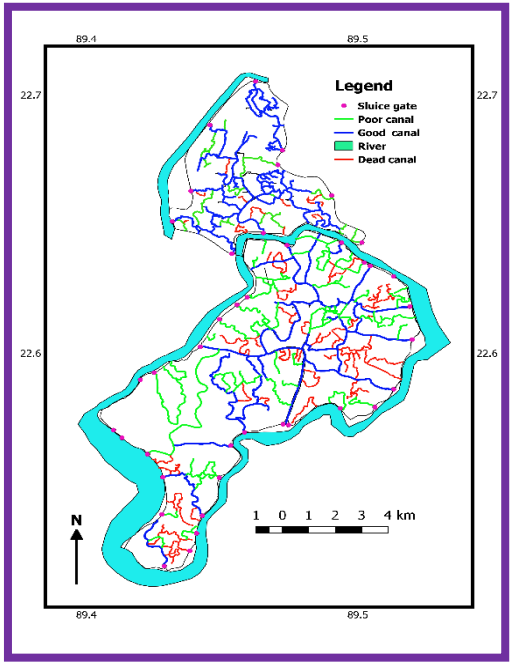
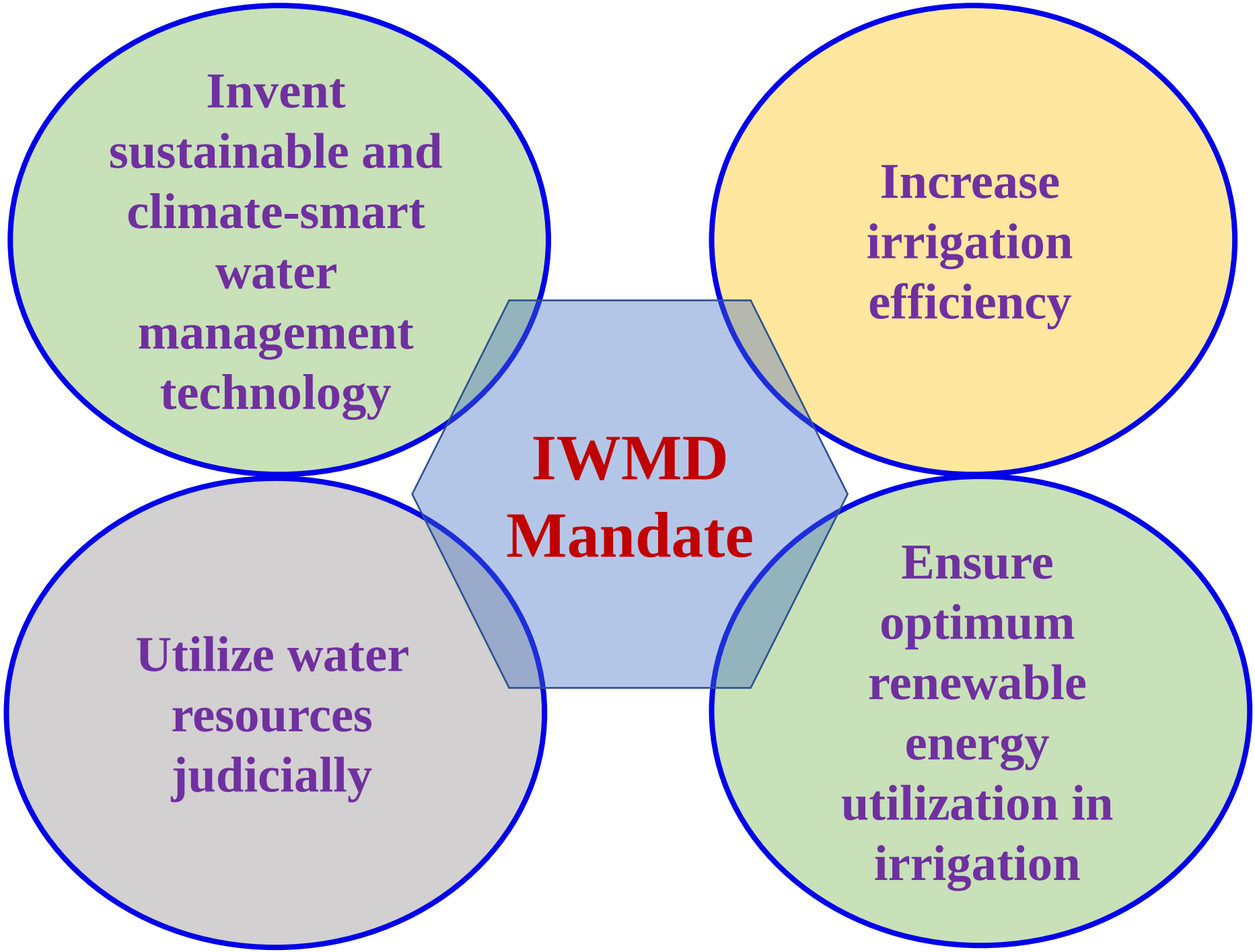


Irrigation and Water Management Division



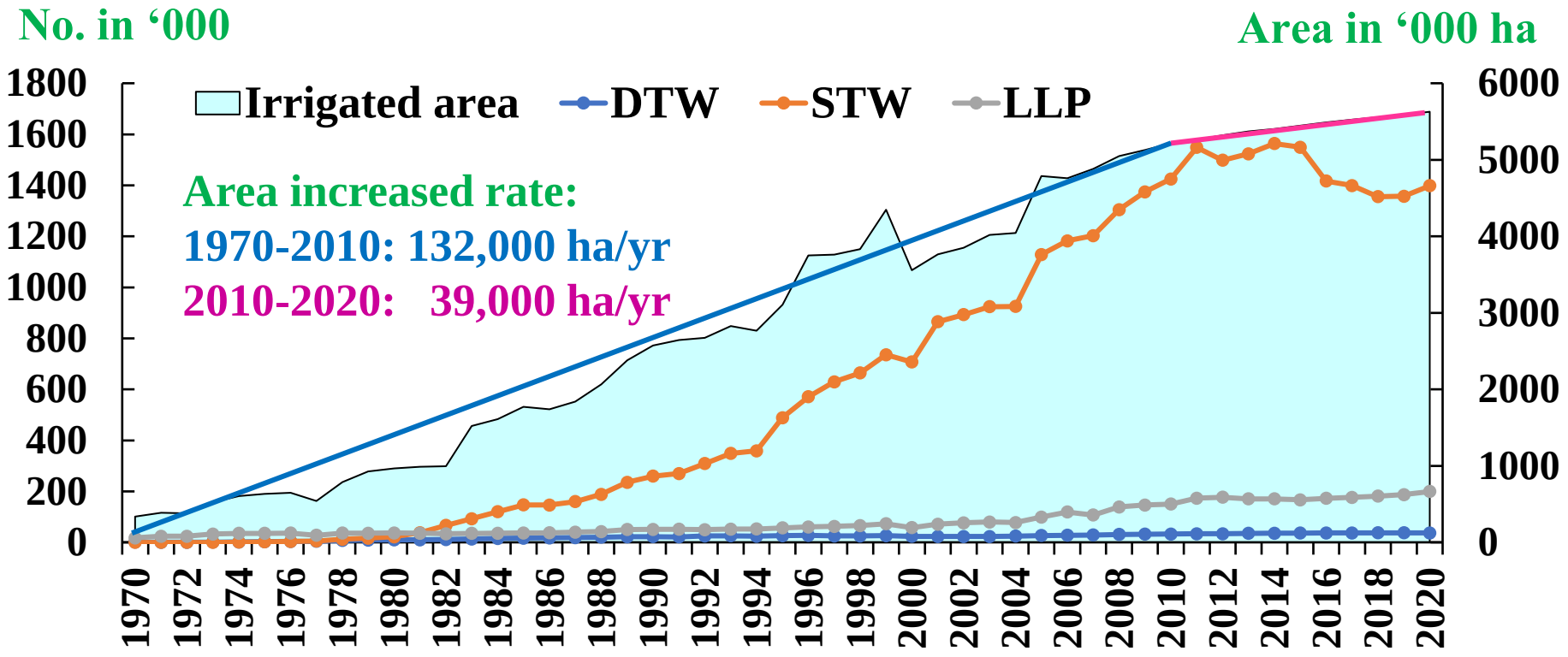
Irrigation and Water Management Division Timeline

- **1973: Established as a part of Agricultural Engineering Division**
- **1974: Mass scale collaboration project under the umbrella of BWDB-BRRI**
  - **Field level research**
  - **Demonstration and Extension**
- **1990: Irrigation and Water Management Division formed**

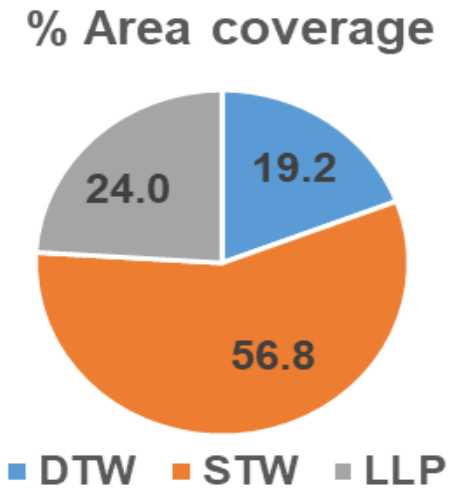

Invent sustainable and climate-smart water management technology
Increase irrigation efficiency
IWMD Mandate
Utilize water resources judicially
Ensure optimum renewable energy utilization in irrigation

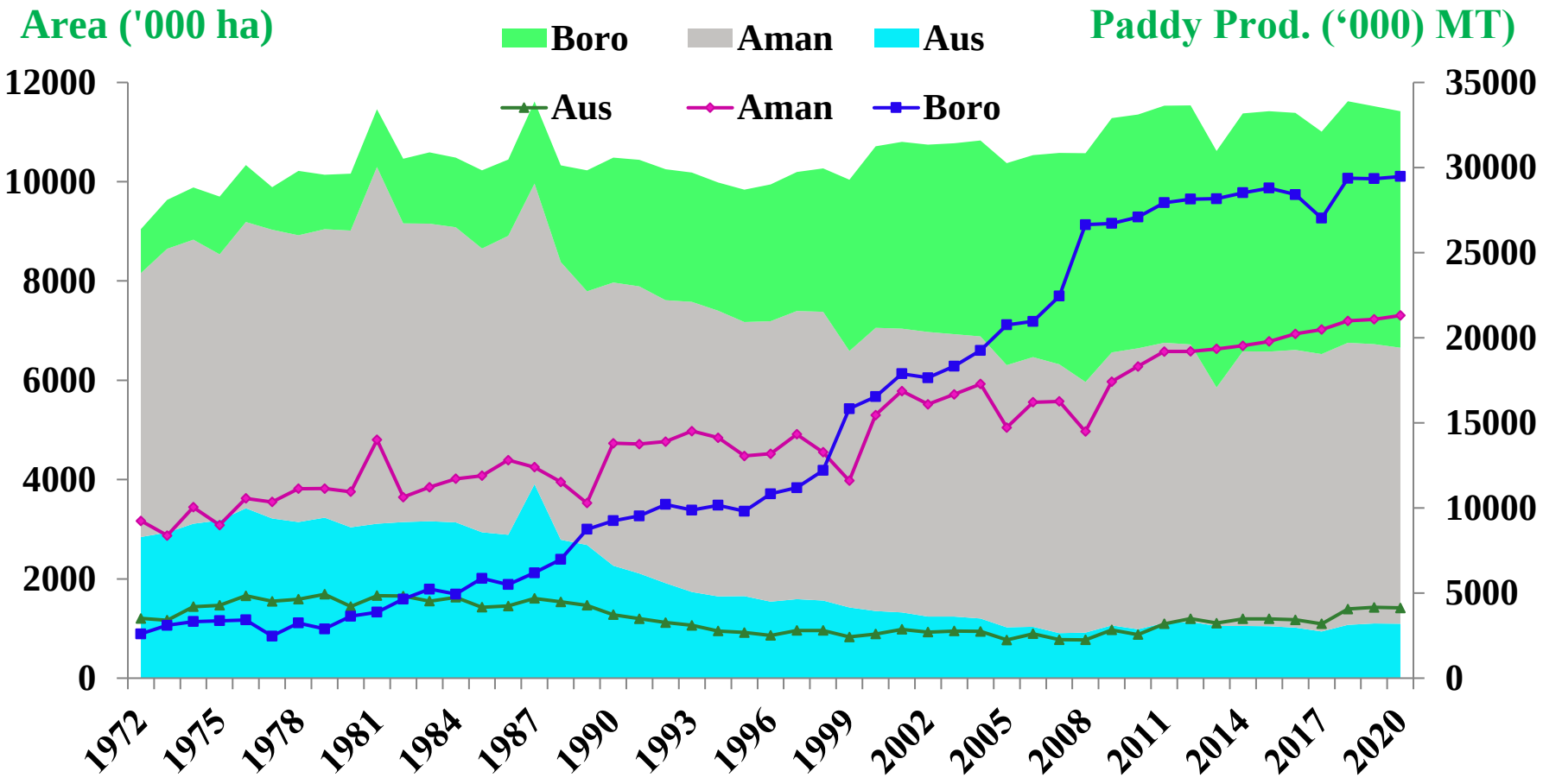
Irrigation Equipment Transformation

Before 1970 → **1970 - 2000** → **Beyond 2000**



- **Boro rice is the highest consumer of irrigation water**





- About 4 folds increase in rice production
- Expansion of irrigated *Boro* rice is the reason
- *Boro* rice contributes 54% of total production

Irrigation Distribution System Transformation

Earthen Canal → **Lined Canal** → **Plastic pipe Surface laid PVC pipe** → **Buried pipe Pivot system**

RESEARCH PROGRAM AREA

I. Water Use Efficiency Improvement in Irrigated Agriculture

II. Utilization of Water Resources in Rainfed Environment

III. Land productivity improvement in the Coastal Environment

IV. Sustainable Management of Water Resources

V. Renewable Energy for Irrigation

VI. Climate Change Impact Assessment and Adaptation Techniques Development

VII. Technology Validation in the Farmers' Field

RESEARCH TRANSFORMATION

Irrigation and Water Management Division

1970-1980

Irrigation Scheduling
Supplemental Irrigation

LLP introduced

1981-2000

Rainwater harvesting
Improved distribution system
Groundwater monitoring
Irrigation Efficiency

STW/DTW introduced

Groundwater declination
Climate change

2000-2010

Groundwater management
Water-saving technology
AWD
Drought management

Irrigation water scarcity

2010 onward

Solar energy
Surface water source exploration
Zone-based water resource management
Precision water management

Drought management in Rainfed rice cultivation (1970-80)

- T. Aman rice suffers from drought
- 1-2 supplemental irrigation can increase 40-45% Rainfed Aman production
- A mini-pond having conserve sufficient rainwater to apply supplemental irrigation
- 15 cm bund height can conserve 80-90% rainwater

Supplemental irrigation

Mini pond

Bund management

Saving irrigation water by improved distribution system (1980-2000)

Plastic pipe

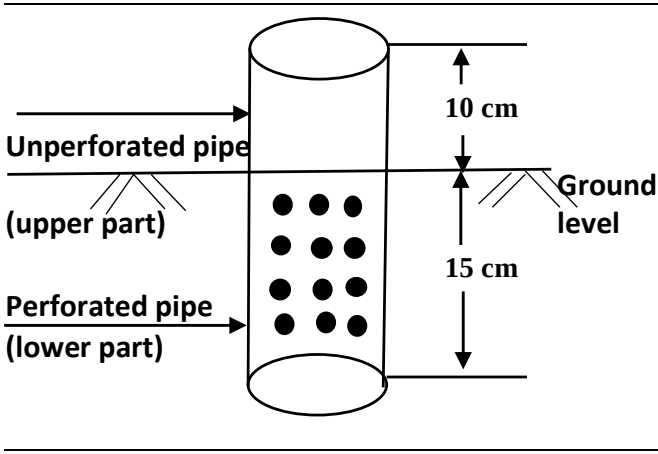
Surface laid PVC pipe

Improved earthen Canal

- **Traditional distribution systems have huge irrigation loss**
- **Improved earthen canal reduces 25-30% conveyance loss**
- **Hose or Plastic pipe saves 90% irrigation water and increases 20% irrigated area**
- **PVC pipe minimizes 80-90% irrigation water loss and increases about 40-50% of irrigated area**

AWD Technology for saving irrigation water and cost (2000-2010)

- Farmer preferer standing water in Boro field
- Continuous standing water is not necessary
- AWD starts at 15-20 days after transplanting
- But maintain standing water at flowering stage
- It saves about 20-30% of irrigation water
- It reduces fuel requirement and irrigation costs
- Reduces production costs by Tk. 2500-3000 per hectare.

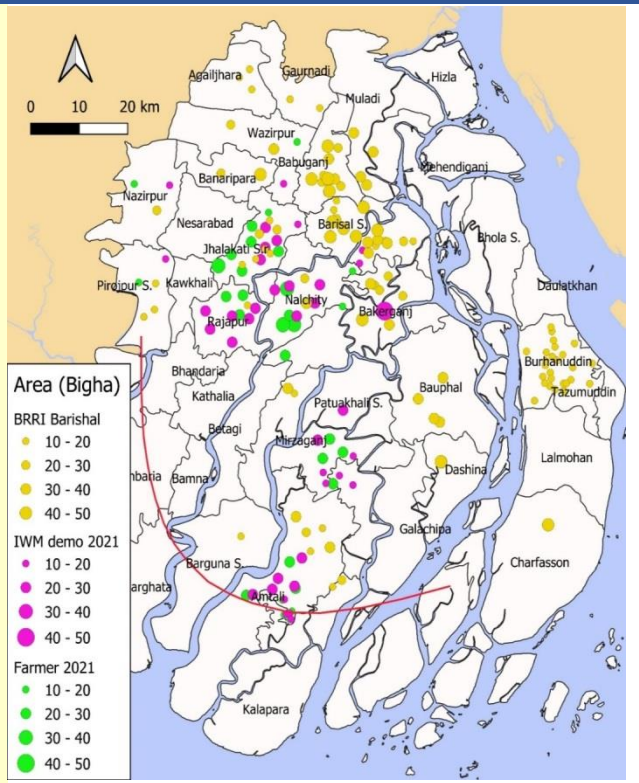


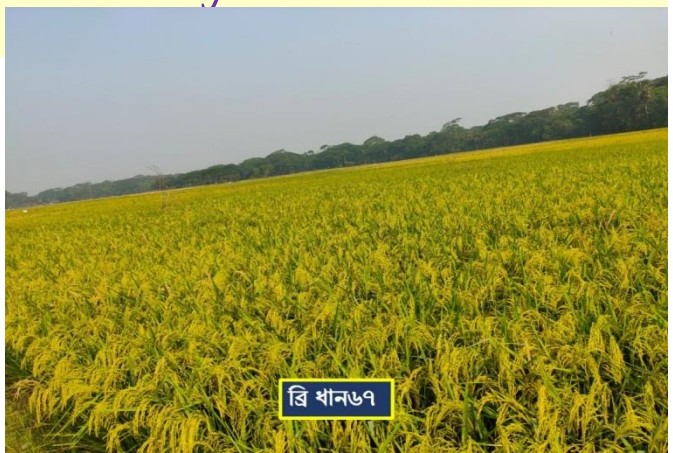
Delineation of freshwater resources for Boro rice cultivation in tidal Barisal region (2010- to date)

- Huge surface water is available
- Land remains fallow in the dry season
- A fresh and saline water interface is identified
- Water is suitable for Boro rice irrigation

Delineation of freshwater resources for Boro rice cultivation in tidal Barisal region (2010- to date)

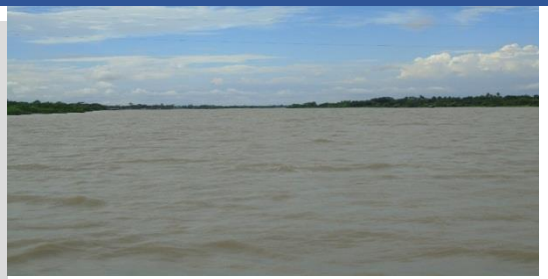
- **Boro area expanded through:**
  - **Introducing LLPs**
  - **Distribution systems and**
  - **Modern high yielding rice varieties**
- **Farmers are now highly interested to grow Boro rice**
- **Increases the cropping intensification and achieves food security**

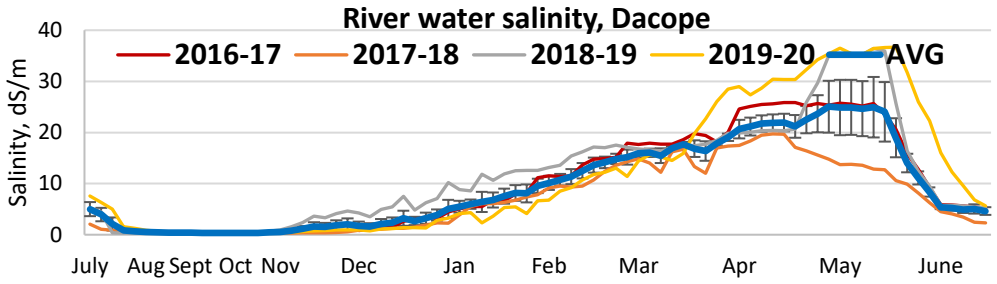


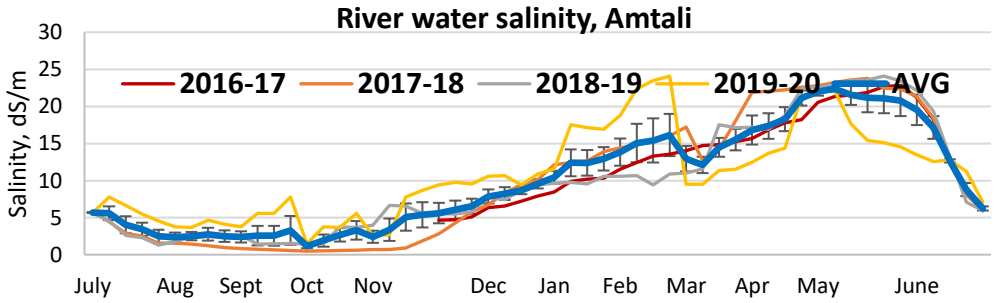


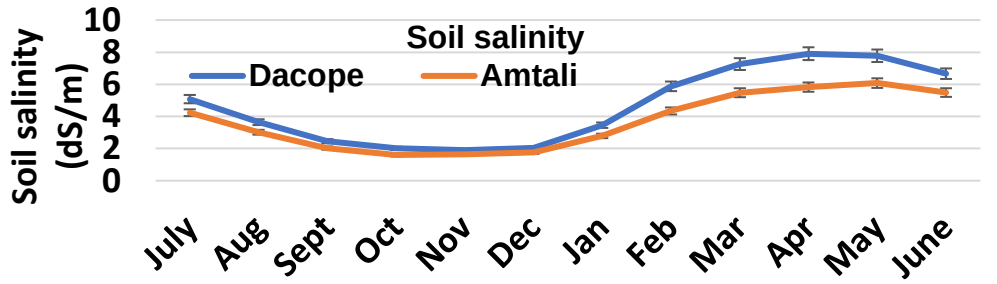
Cropping intensification in saline prone coastal areas of Khulna & Barishal region (2000- to date)

- Huge surface water is available in both the seasons (wet & dry)
- Most of the farmers grown local T. Aman in wet season
- Vast lands remain fallow due to shortage of fresh water in dry season
- River water is fresh from July-Dec and after that salinity start to increase.
- Soil salinity also follow the similar trend









Cropping intensification in saline prone coastal areas of Khulna & Barishal region (2000- to date)

- **Fresh river water is trapped within the canal**
- **Boro, Rabi crops, and T. Aus rice are cultivated**
- **Create job opportunities and high benefit**

Introduction of HYV in T. Aman for improving land productivity & timely establishment of Rabi crops (2000- to date)

- Short duration high yielding rice varieties are introduced (5-20 days short)
- Timely establishment of Rabi crops is now possible
- Block cultivation could minimize the bird and rat problem
- It increases the cropping intensification & land productivity

Growing vegetables with T. Aman rice under waterlogged lowland condition (2000- to date)

- Aman rice is the only crop in coastal areas
- Waterlogging is the problem for vegetable production
- Vegetable production in the bag is introduced
- Opportunity for extra cash during the lean period
- Serves family nutritional requirements

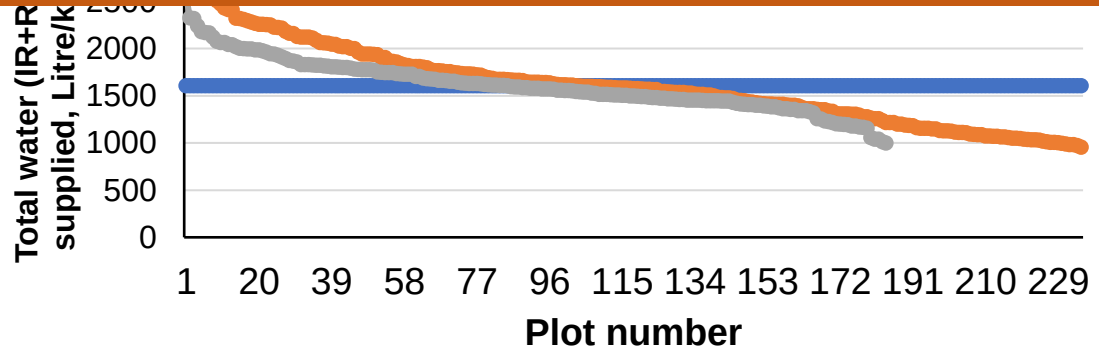
Multipurpose use of portable solar panel driven surface water irrigation system (2000- to date)

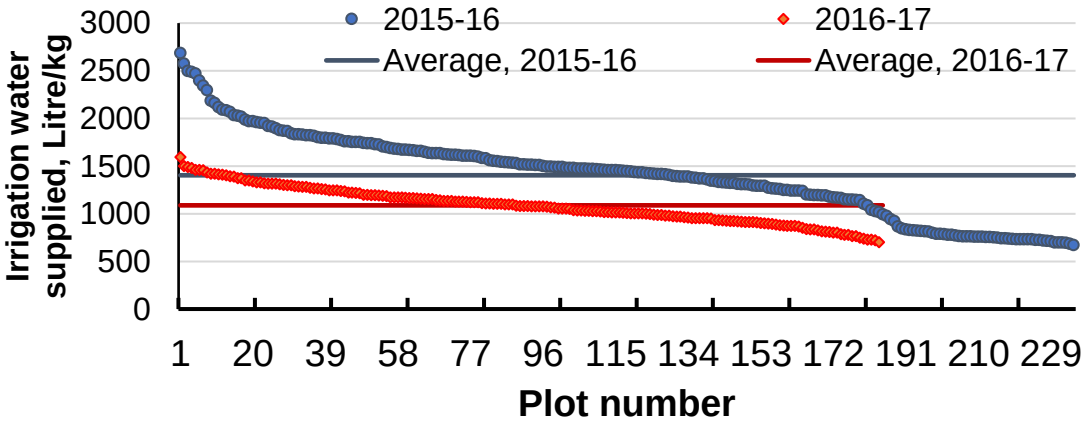
- Portable solar panels system can operate 1.5 kW LLP for surface water withdrawn at 10-12 liter/sec
- Two labour can thresh 250-350 kg paddy per hour by a 1.5 kW open drum thresher
- Solar produced electricity can be supplied to 3-4 households.

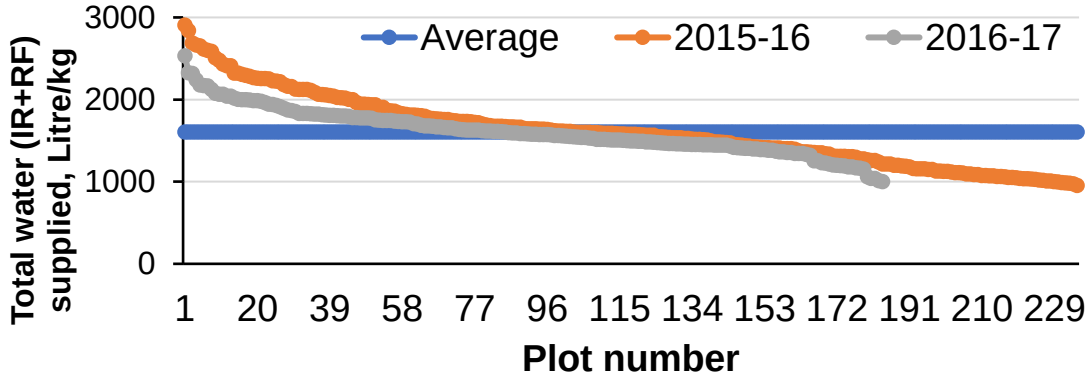
How much water required for Boro rice production? (2000- to date)

misperception is 3000-5000 lit/kg

- The real water use: 584-661 lit/kg
- Irrigation water requirement (ET+S&P): 951- 1671 lit/kg
- Total water requirement (RF + Irrigation): 1500-2000 lit/kg rice production







Present Research Activities

Upscaling of Improved Water Management Practices for Sustainable Productivity in the Haor areas

- AWD irrigation practice
- Wet direct-seeded rice
- Lay-flat hose-pipe water distribution system
- Test Boring for groundwater exploration
- Check valve in STW

Surface water utilization for escalating water and land productivity in coastal region

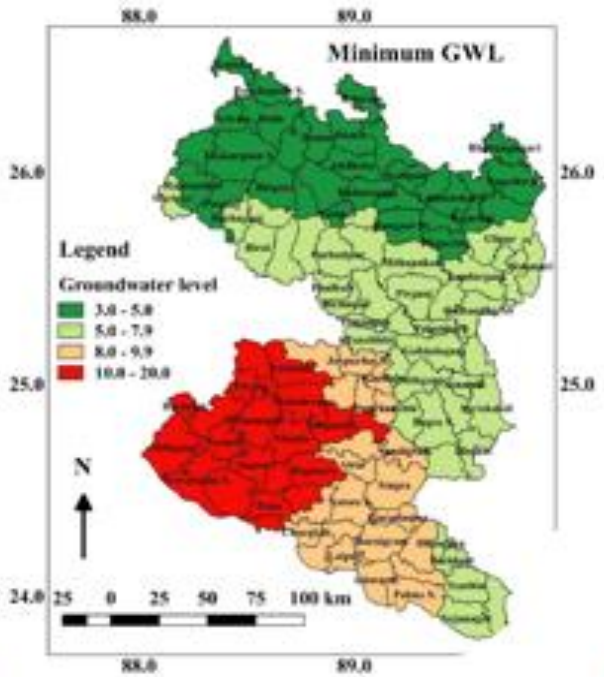
- location specific minor irrigation schemes establishment
- Water efficient cropping pattern identification
- Transplanting window of Boro rice cultivation
- Feasibility testing of mini-sprinkler/drip irrigation system

Cropping Intensification in Coastal Barishal and Khulna Region

- Block demonstration of Aus/Aman/Boro rice
- Improved agricultural practices
- Water efficient cropping pattern identification
- Impact of Alternate Wetting and Drying irrigation in the coastal saline area.
- Ionic stress assessment on rice shoot and root due to saline water irrigation

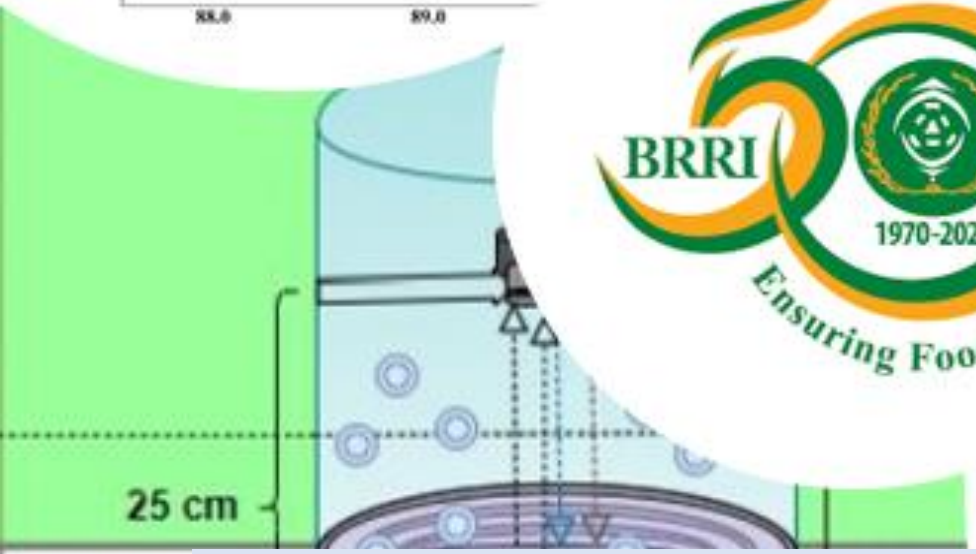
Optimization of Water Use Efficiency Through Subirrigation and Mini-sprinkler Irrigation System

- Increase water use efficiency
- Precision water management technology
- Sub-irrigation and sprinkler irrigation system installed
- Performance will be evaluated



BRRI 1970-2020

Ensuring Food Security



THANK YOU VERY MUCH