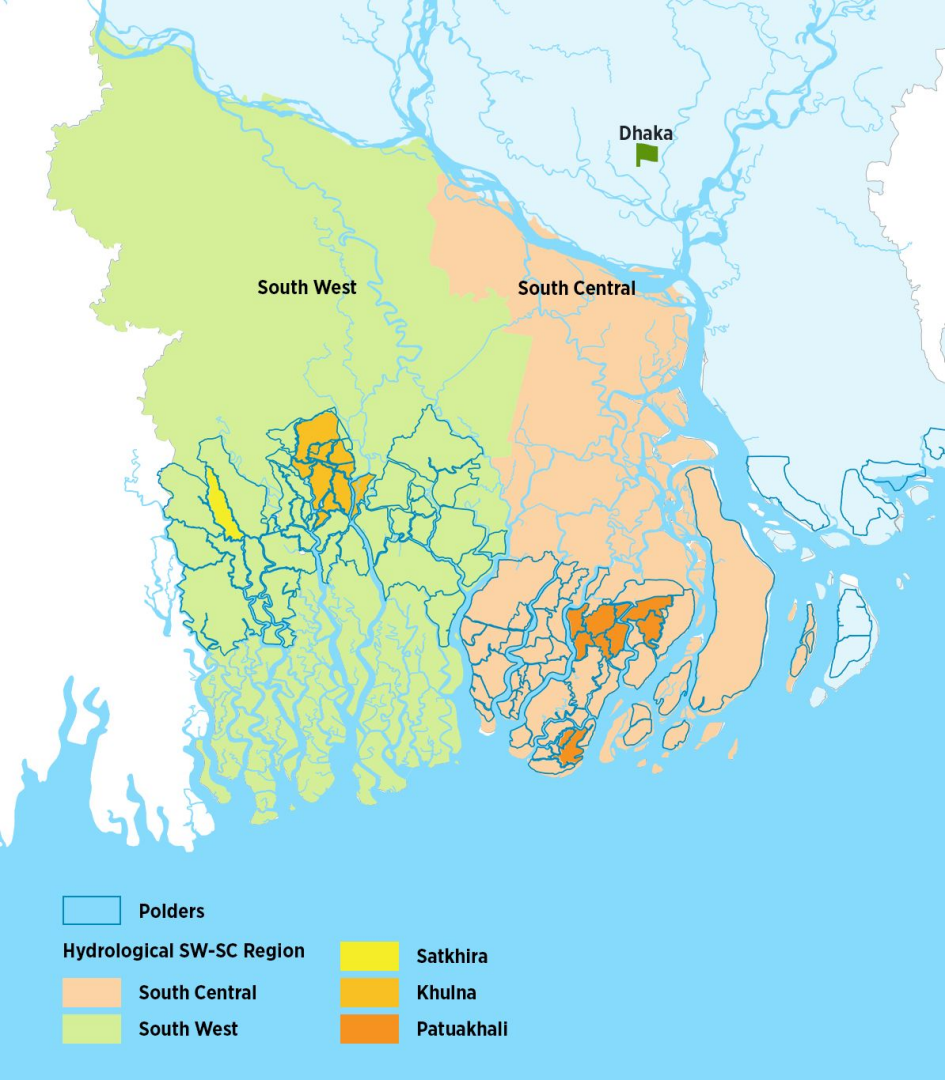
Small-scale infrastructure for In-Polder Water Management

IPWM under the Blue Gold Program

Objective: to discuss the further implementation of the Blue Gold Program

- Introduction to the Blue Gold Program
- In-polder water management (IPWM)
- Experience with small-scale infrastructure
- Action research with small-scale infrastructure
- How to scale implementation of small-scale infrastructure
- Interactive discussions
- Q&A

Kingdom of the Netherlands



The Blue Gold Program and the South West, South Central coastal zone

Polders
22

Upazillas
14

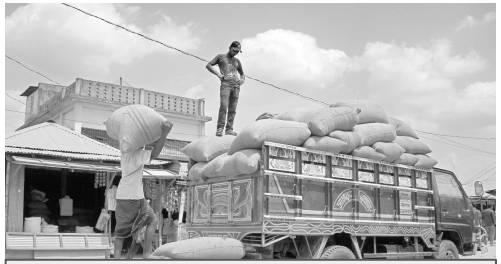
Districts
- Khulna: 11 polders
- Satkhira: 1 polder
- Patuakhali: 8 polders
- Barguna: 2 polders

Divisions
Khulna and Barisal

Objectives of the Blue Gold Program

- Reduced poverty and improved food security
- Increased income and employment
- Intensified and diversified agricultural production complemented by market systems development
- Water security and improved water management

Infrastructure



Commercialisation

Institutions

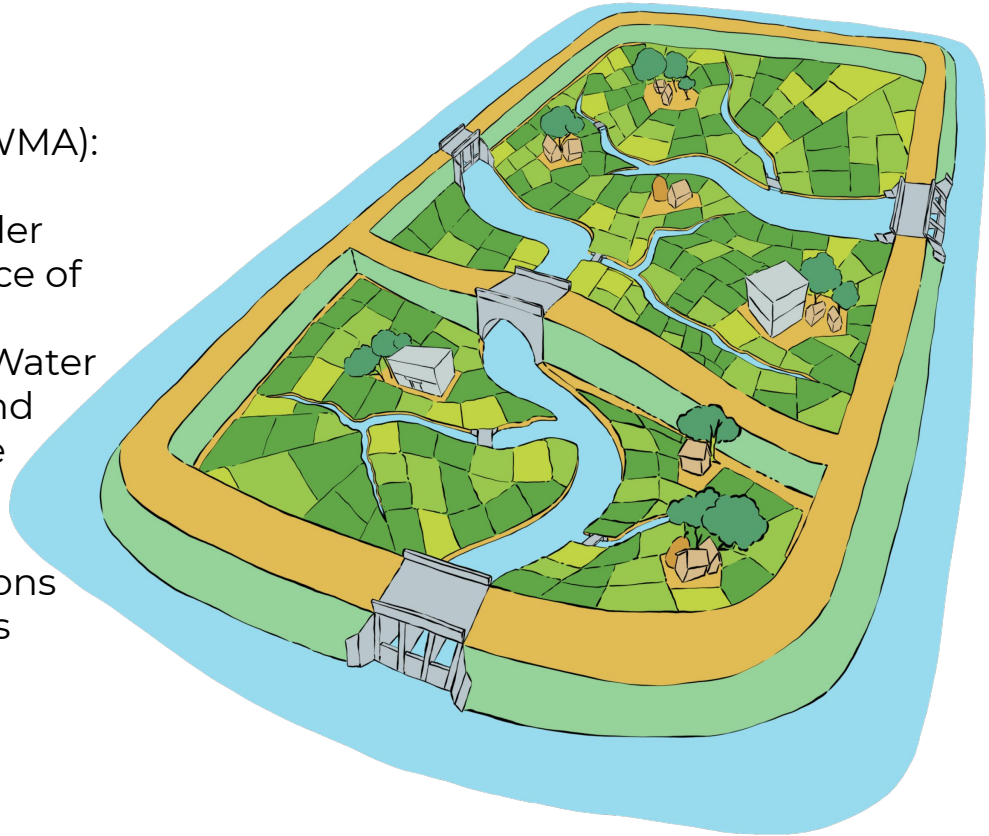
Overview of BGP polder systems

Polder

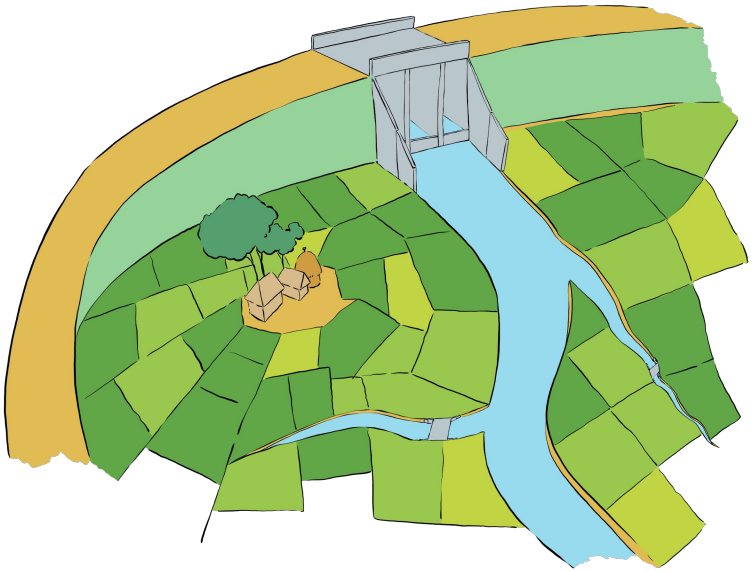
A Water Management Association (WMA):

- represents all WMGs in the polder
- coordinates routine maintenance of polder infrastructure
- interacts with the Bangladesh Water Development Board (BWDB) and others on matters related to the performance of the polder

BGP helps to develop polder operations and maintenance (O&M) agreements between the BWDB and WMAs.



Overview of BGP polder systems



Catchment

WMGs jointly decide on the optimisation of water management within the sluice catchment. This is done, for example, by jointly removing water hyacinth or other obstructions from khals, or by enhancing water retention in the dry season with improved sluice operation.

BGP supports this through a structured approach of catchment planning. This enhances the problem solving abilities of the WMGs and WMAs and contributes to improved drainage and irrigation.

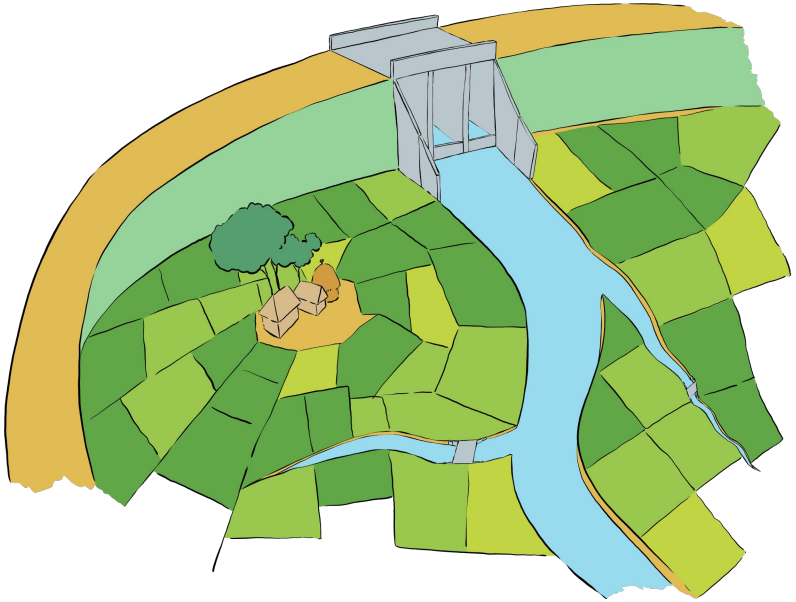
Overview of BGP polder systems

Sub-catchment

Improved water management at catchment levels does not always lead to improved conditions for all sub-catchments. BGP thus supports communities at the sub-catchment level with two approaches:

- Community-led Agricultural Water Management (CAWM) encourages communities to use collective actions and coordination among WMGs, sluice committees, and WMAs to improve agricultural practices with Farmer Field Schools and new crop varieties by the Department of Agricultural Extension (DAE). The 70 CAWM schemes function as convincing examples to farmers in other sub-catchments as their scale is considerable (20-50 hectares)
- As there is a large demand for gated culverts, (re-) excavation of small khals and small dykes, a fund for small-scale water management infrastructure (SSWMI-fund) was initiated under BGP. WMGs and WMAs are responsible for planning and construction of the infrastructure, to ensure swift implementation thereby making it a ‘hands-off’ approach for BGP. 200 WMGs have improved about 280 sub-catchments with the SSWMI- fund, or about 15,000 hectares

Overview of BGP polder systems



Fields

With the intention to show communities the benefits of fields with optimal drainage and irrigation conditions, the ambitious Cropping Intensification Initiative (CII) aims to achieve 300% or 400% cropping intensity with smart water management and crop planning. The CII demonstrations challenged local expectations and brought BGP's theory to field practice.

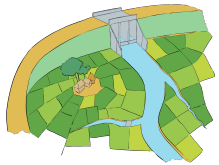
Water Management Organisations (WMOs) for the operation and routine maintenance of infrastructures

Water Management Groups (WMGs): 512
Water Management Associations (WMAs): 36

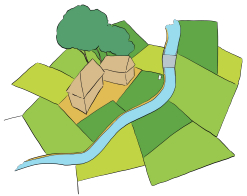
Polder water management infrastructure

- Embankment
  - Sluice/ regulator
  - Primary khal
    - Inlet/ outlet
    - Gated culvert/ mini regulator
    - Secondary khals
      - Gated pipe/ box culvert
      - Tertiary khals/ field channels

Polder



Catchment



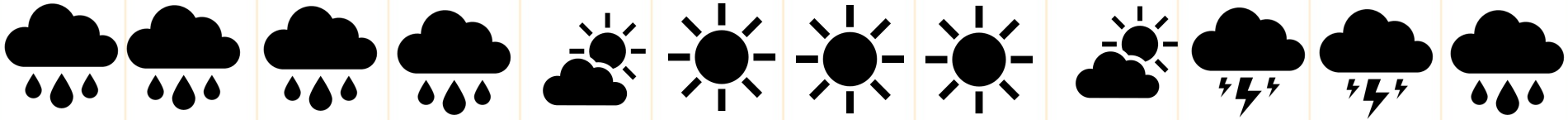
Sub-catchment

Fields

In-polder water management (IPWM)

Improving and making the best use of water management infrastructure *inside the polder* to maximise returns from agriculture

In-polder water management is necessary to increase cropping intensity



Aman: good water management is necessary for a new cropping pattern. Farmers should start with shorter duration High Yield Variety (HYV) T-Aman, which require improved drainage. However, short duration HYV Amar generally is more profitable and allows additional crops to be grown in Rabi season.

Drainage

2nd crop: the soil is still wet after Aman harvest. The moisture facilitates the growth of a second crop.

Soil moisture

3rd crop: branch khals can retain fresh water. With the help of gated culverts, the branch khal can release fresh water from the main khal.

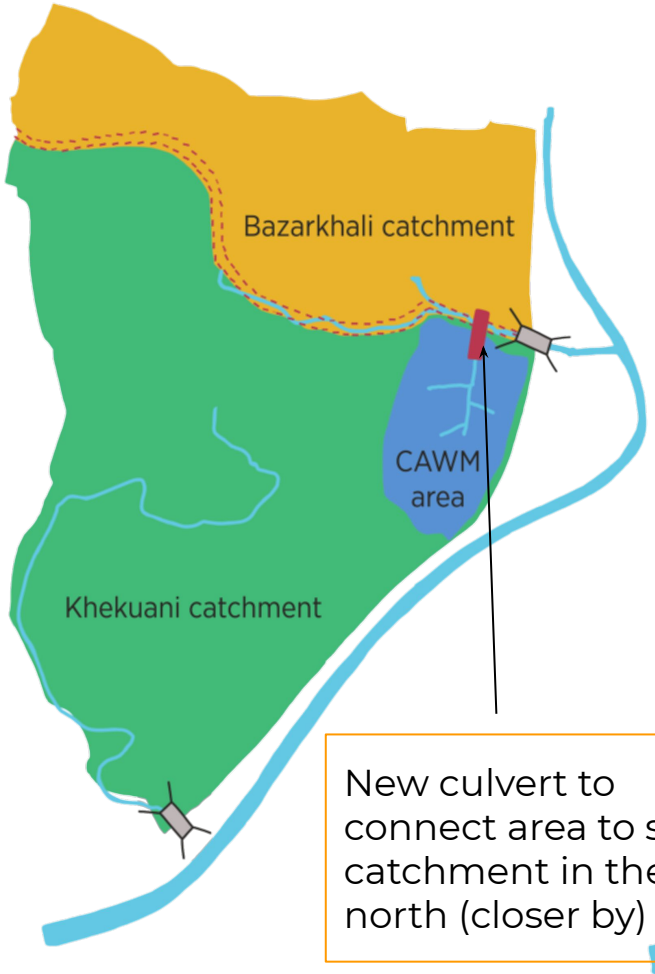
Water retention: irrigation

Changes in cropping calendar

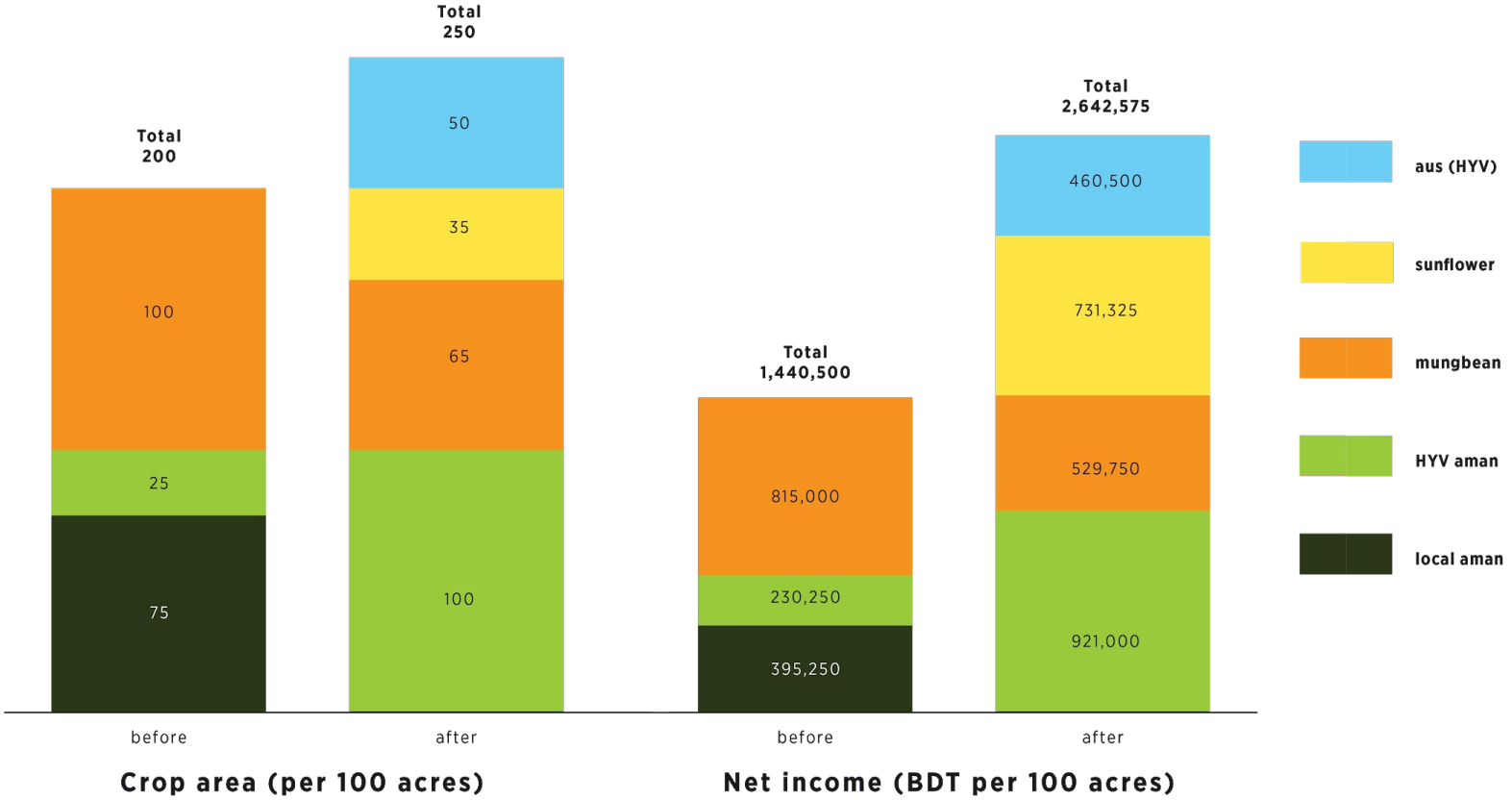
Case study: polder 43/2 B at Uttar Khekuani

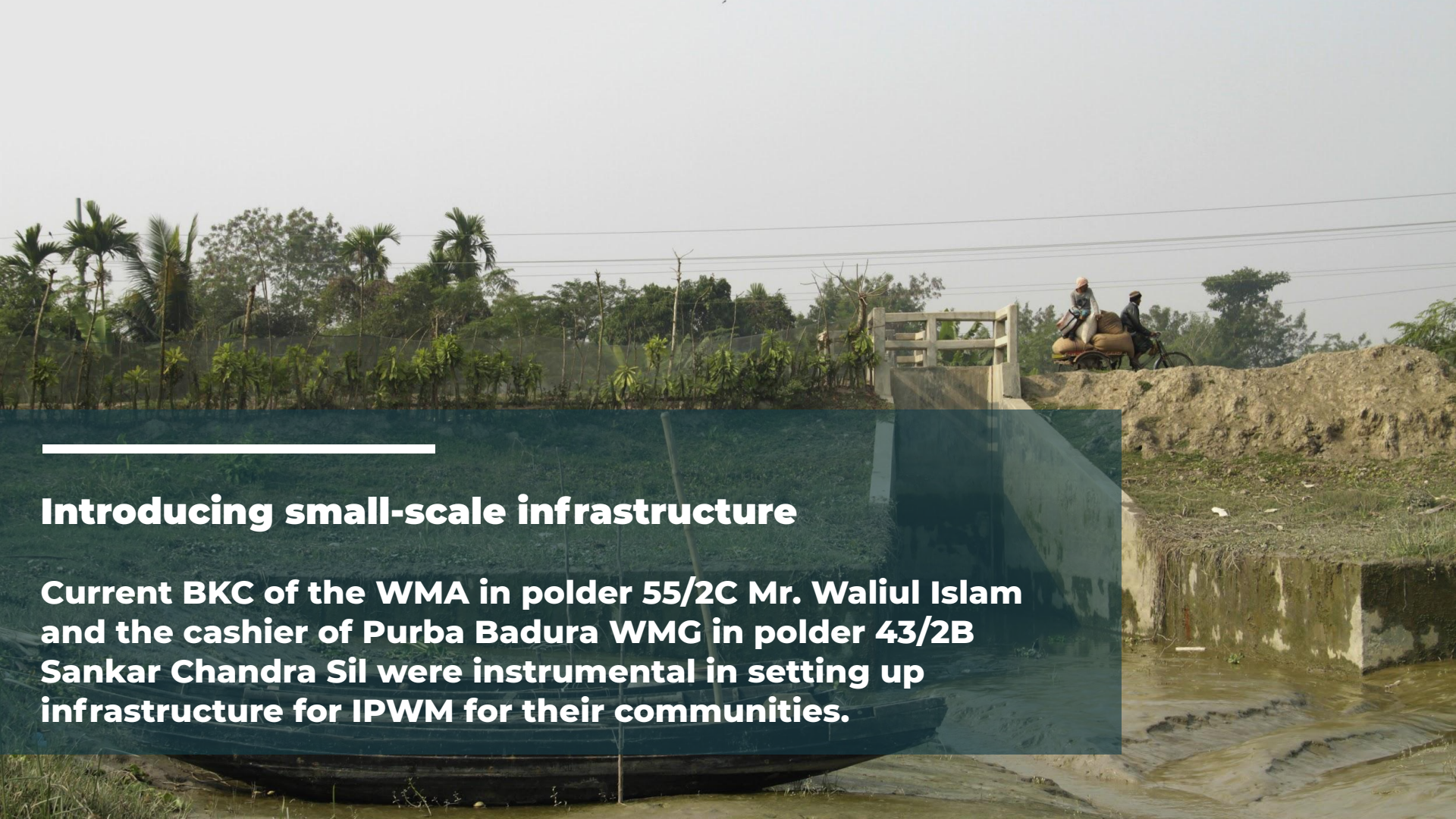
Problems before IPWM:

- Stagnant water made farmers choose local varieties of T-Aman, which resulted in low productivity and incomes
- Damage to T-Aman seedbeds, further reducing productivity
- Late seedling transplantation and slow and late drainage suspended Aman harvests and Rabi planting
- Late Aman harvests limited options in the Rabi season to mung bean
- Late Rabi planting and harvests made crops vulnerable to droughts and erratic pre-monsoon rains



Changes to cropping system after IPWM





Introducing small-scale infrastructure

Current BKC of the WMA in polder 55/2C Mr. Waliul Islam and the cashier of Purba Badura WMG in polder 43/2B Sankar Chandra Sil were instrumental in setting up infrastructure for IPWM for their communities.

Branch khal

Box culvert

Pipe culvert

Internal dyke

Types of infrastructure

IPWM: from pilot to scale

Pilot phase: 2015- 2016

67 hectares covered

Pilot led by the International Rice Research Institute (IRRI)

Involved an ambitious plan to improve local drainage and irrigation with small-scale infrastructure

Introduced new rice varieties (high-yielding and short duration) and new Rabi crops

Results

- New Aman varieties have improved overall cropping patterns
- The success served as a valuable demonstration for other farmers
- Not all local infrastructure could be implemented due to a lack of social cohesion

Community-led Agricultural Water Management (CAWM)

Covers 20-80 hectares

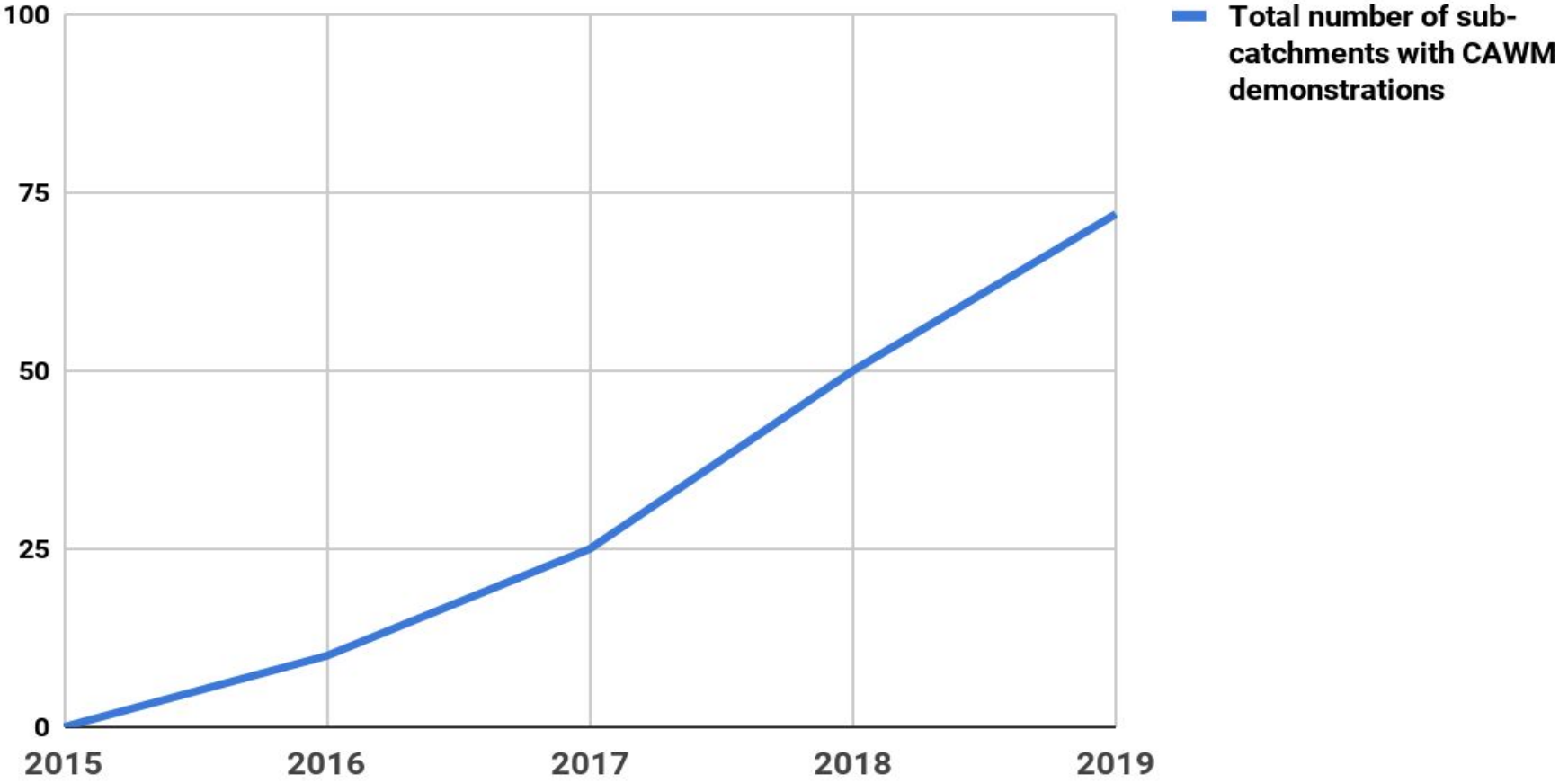
Community-led, circumventing social conflict

Involves drainage engineers

DAE led with Farmer Field Schools (FFS)

Introduced new crops

CAWM scale-up



Scale-up

- 71 schemes of approximately 35 hectares
- Can be applied in 60% of the project area of around 120,000 hectares
- 2,500 out of 75,000 hectares
- 3.3%

More resources are required in the event of scaling up the same approach.

How can this be done substantially?

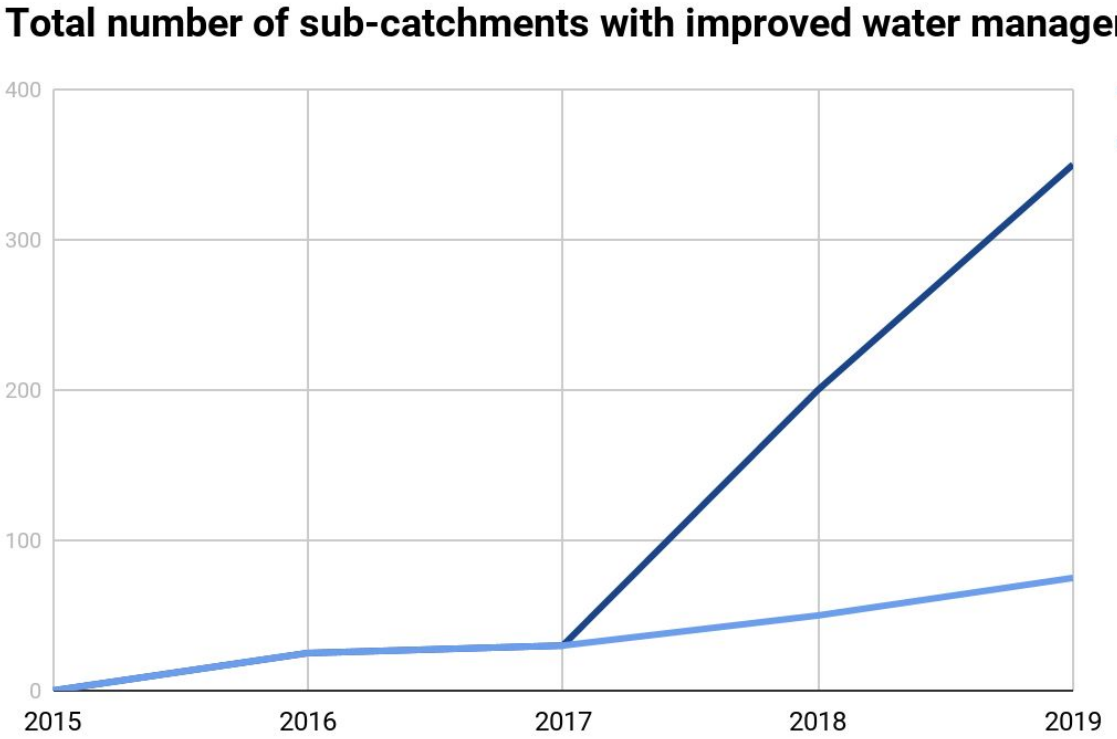
A new approach to scale-up

- Local experience available to design and construct
- Water Management Organisation (WMO) manages conflicts
- Communities are willing to co-finance the initiative
- Local farmers take the responsibility of improved quality of programme and agricultural production management
- Exemplary cropping patterns demonstrated in neighbouring fields

“Hands-off” fund for small-scale water management infrastructure

- All construction-based responsibilities lie with local communities (WMOs)
- One application at a time
- Sub-catchment or fields are less than 20 hectares
- Investment is based on the improvement of cropping patterns
- Investment is less than BDT 200,000, i.e. less than USD 2,500

Successful scale-up with a “hands-off” fund



2018-2019:

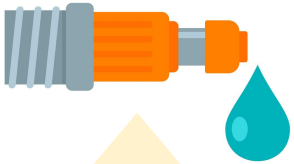
- 150 sub-catchments
- 250 infrastructures

2019-2020:

- 140 subcatchments
- 200 infrastructures

- **360 schemes**
- **15,000 / 75,000 hectare**
- **20%**

Questions to consider



Can we ensure high quality water infrastructures without an engineer?

What is the most effective way to organise funds for small-scale infrastructure?

Should the government be responsible for the implementation of small-scale infrastructure? Why?

Conclusion

- **IPWM is important to improve agricultural incomes in polders**
- **Small-scale infrastructure strongly impacts local drainage and irrigation conditions**
- **Scale-up requires a “hands-off” approach**

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