JCP Bangladesh Metamodel

End-user group

May 13, 2020

JOINT COOPERATION PROGRAMME

Bangladesh Netherlands

Knowledge development for a prosperous delta

Program

- Opening and introductions by moderator William Oliemans
- Introduction by Mohd. Enamul Haque (GED)
- Introduction to Bangladesh Metamodel (Marnix van der Vat)
- Use of the Metamodel in SIBDP (Farhana Ahmed)
- Demonstration of user interface of the Metamodel (Morsheda Begum)
- Discussion

Aim of the end-user group

Target audience is representatives of organizations that are expected to use the Bangladesh Metamodel at the level of practicioners - those who will work with the model

Objectives:

- To collect information on investment planning in different organizations and how the Metamodel could support this
- To inform on progress in development of the Bangladesh Metamodel
- To collect feedback from end-users to improve the Bangladesh Metamodel

Joint Cooperation Program

- JCP: Joint Cooperation Program between CEGIS, IWM, Deltares and Wageningen University & Research sponsored by the Embassy of the Kingdom of the Netherlands
- Goal: Long term knowledge sharing and capacity building, between Bangladesh and the Dutch knowledge institutes, in support of improved Integrated Water Resources Management (IWRM), Integrated Coastal Zone Management (ICZM), flood and drought management

Start of a 2-week training for supporting the development of the Bangladesh Meta-Model
Participants from IWM, CEGIS and SIBDP from Bangladesh

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What is a Metamodel?

The Bangladesh Metamodel

Objectives:

- To provide quantitative decision support information for investment planning within BDP2100
- To GED and ministries / agencies to submit projects / sector plans
- To support project definition, selection and phasing
- By comparing impact based on indicator values

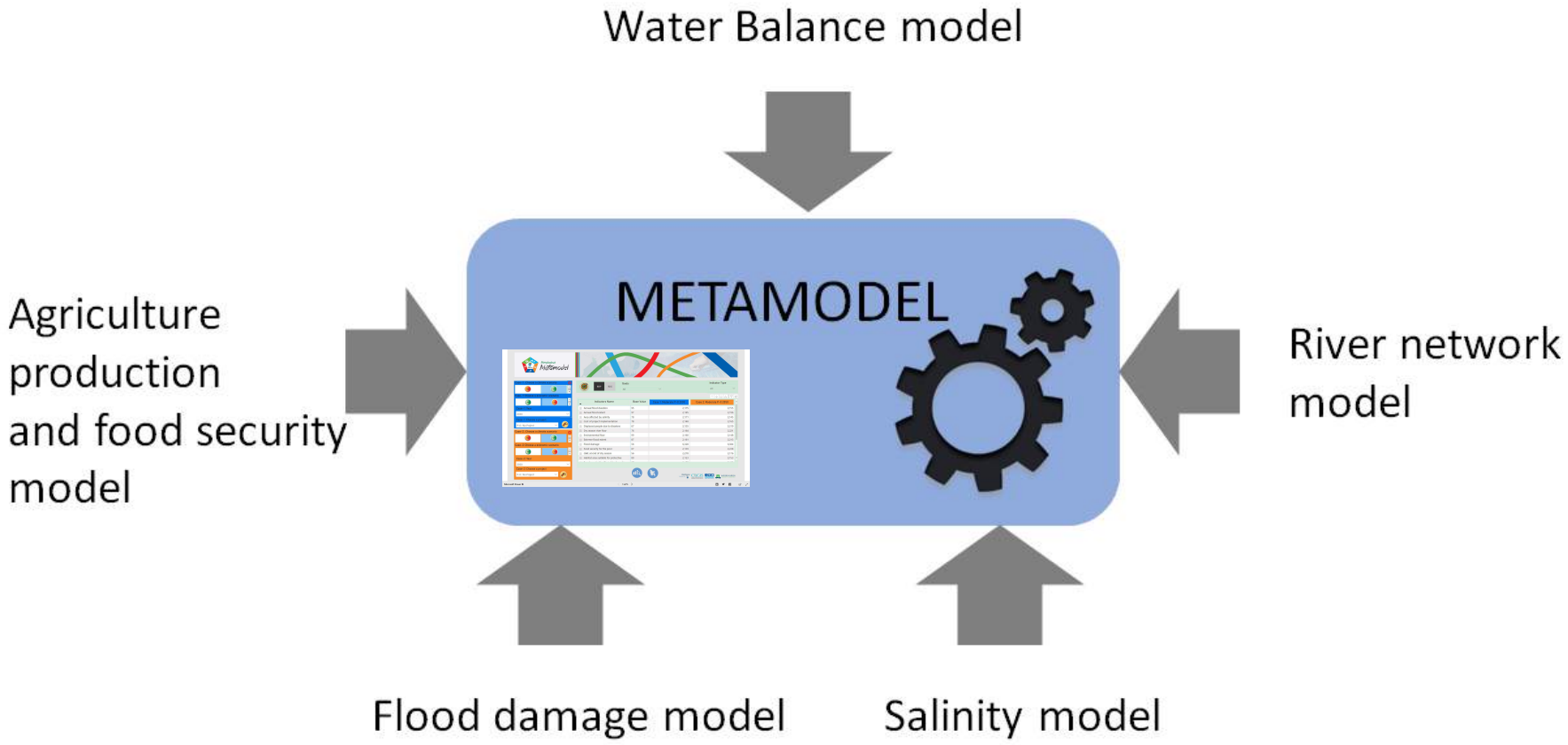
Participatory development:

- 2017 prototype with extensive user consultation, especially on selection of indicators
- 2019 consultations with GED, BWDB and WARPO
- 2020 end-user group & expert reflection sessions

Metamodel: In short

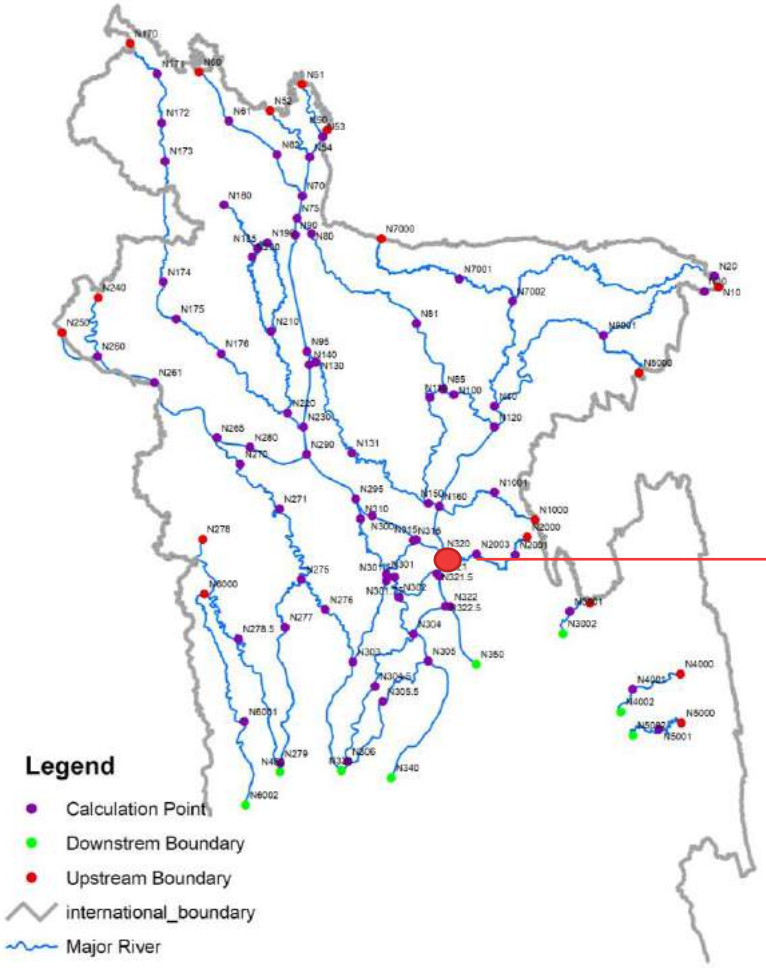
- Simplified simulation
- Based on results of detailed sectoral models
- Wide scope
- Short calculation time
- Less detail and accuracy in results
- No replacement for detailed models

Metamodel: A model of models

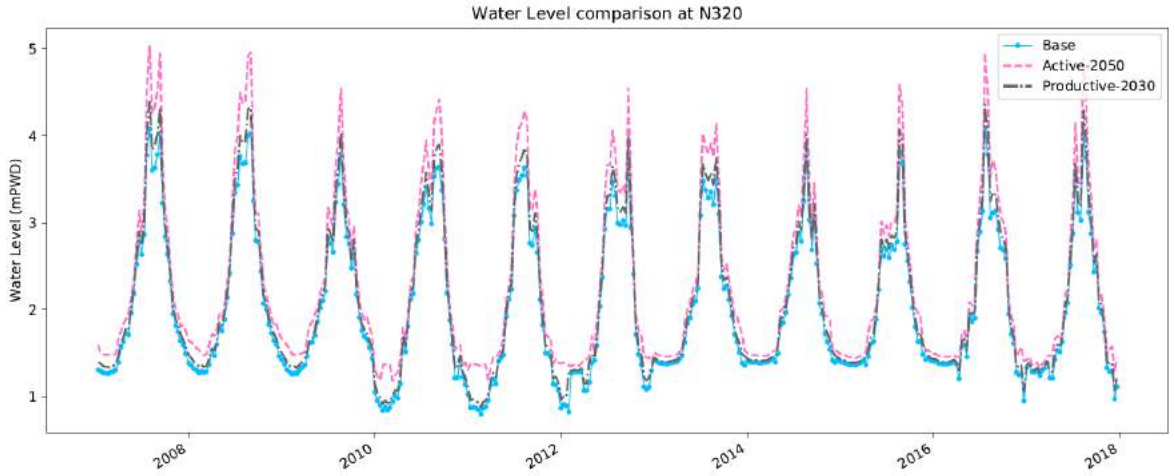


How does the metamodel work?

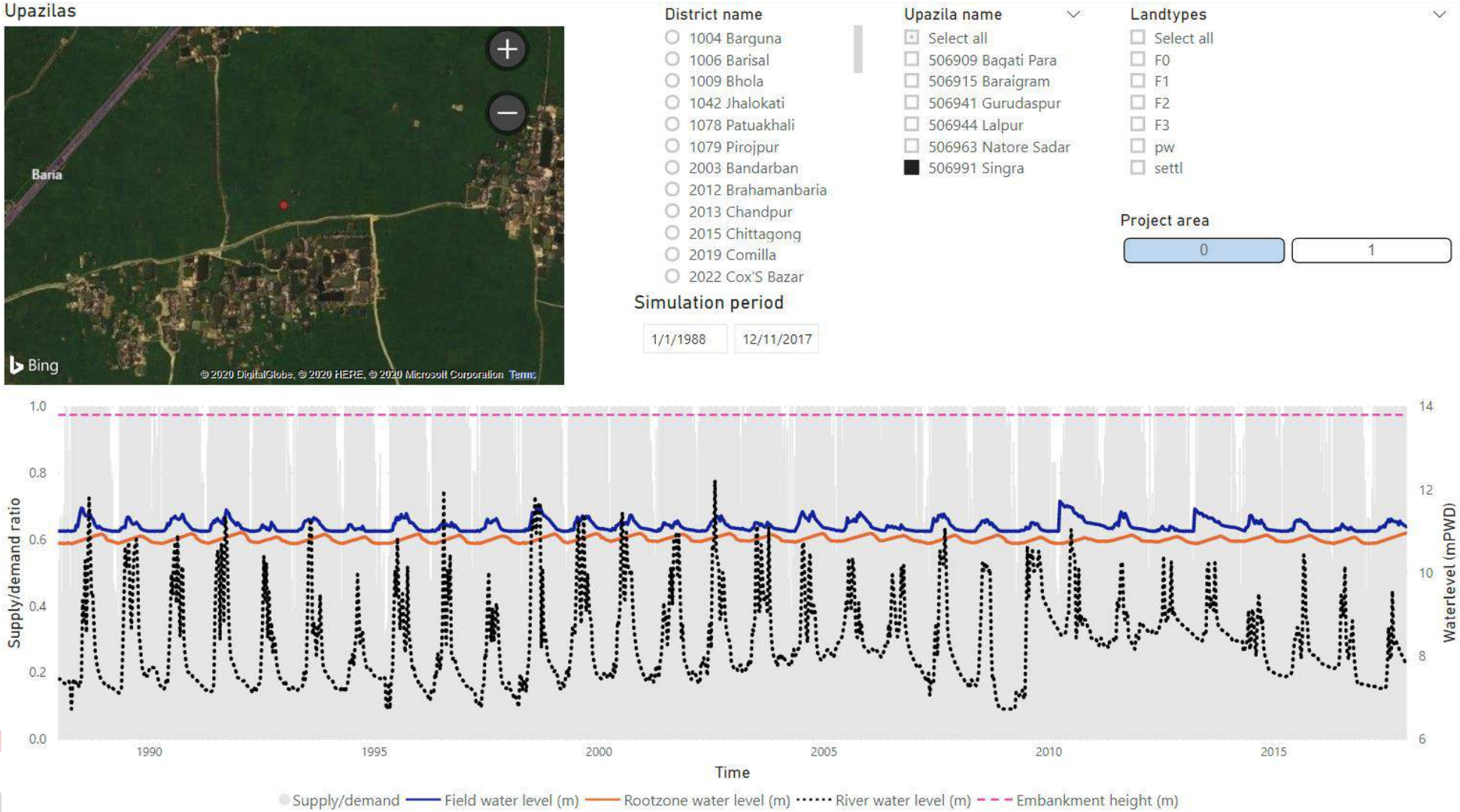
Network module: Impact climate change scenario



Meghna River, Chandpur

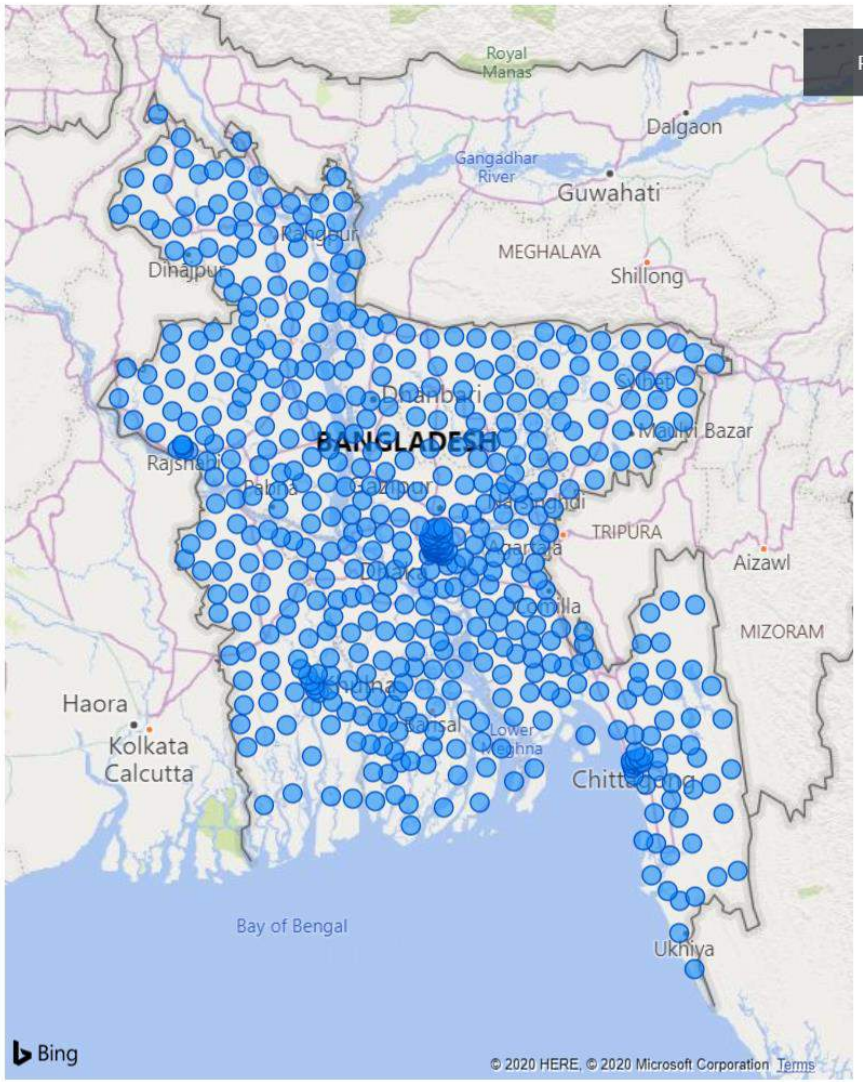


Impacts of rainfall flooding, river flooding and droughts



Agricultural production

Y and X



Press F11 to exit full screen

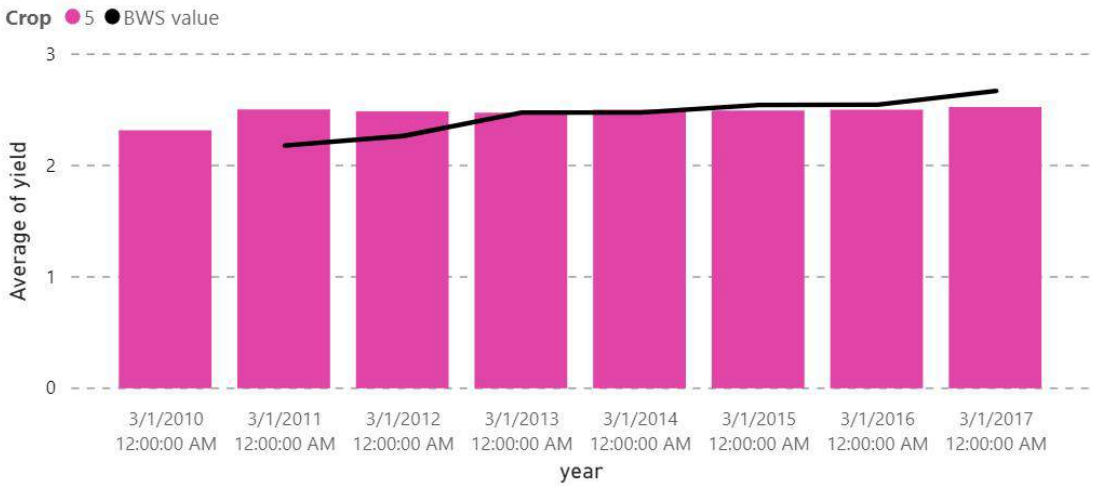
Distname

- Select all
- 1009 Bhola
- 1042 Jhalokati
- 1078 Patuakhali
- 1079 Pirojpur
- 2003 Bandarban
- 2012 Brahamanbaria
- 2013 Chandpur
- 2015 Chittagong

Crop

- 13 Sugarcane
- 14 Vegetables_S
- 15 Vegetables_W
- 2 T Aman
- 3 B Aman
- 4 Boro
- 5 Wheat
- 6 Pulses
- 7 Maize_Rabi
- 8 Maize_Kharif
- 9 Jute

Yield (tonnes/ha)



1/21/2010 12/1/2017

Microsoft Power BI

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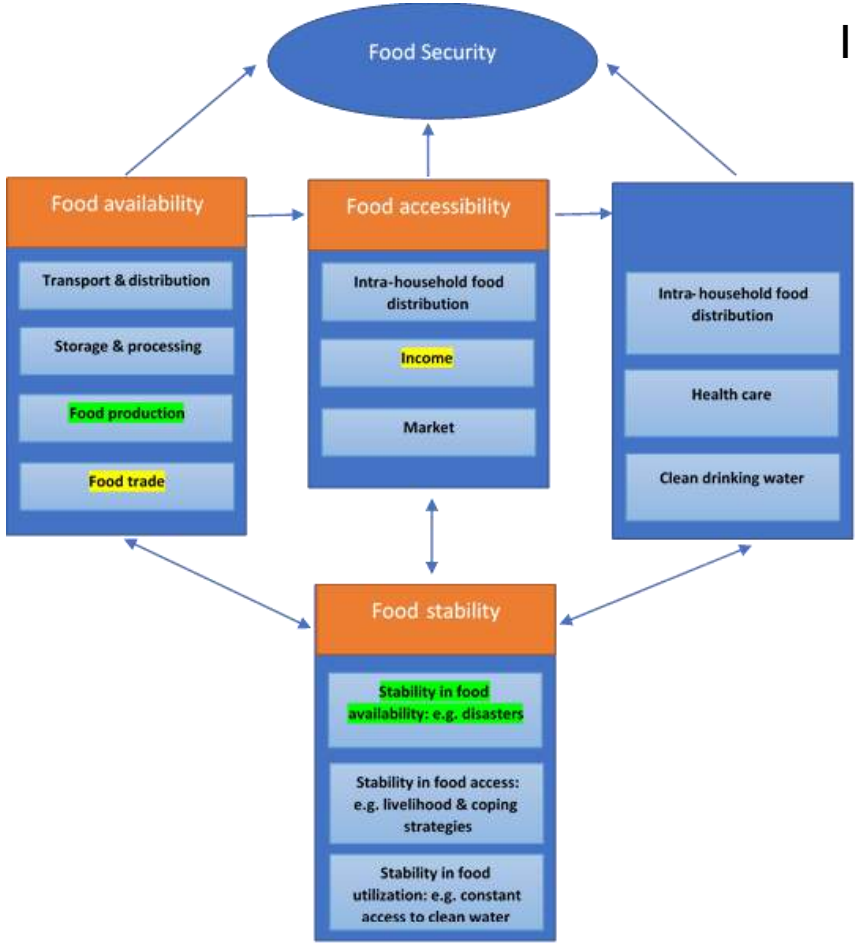
Food security

-Explaining-

2 Determinants for food security

- Physical determinant which is the food flow: *Availability, Accessibility, Utilization. Availability*
- Temporal determinant: Stability of food security and affects all three physical elements



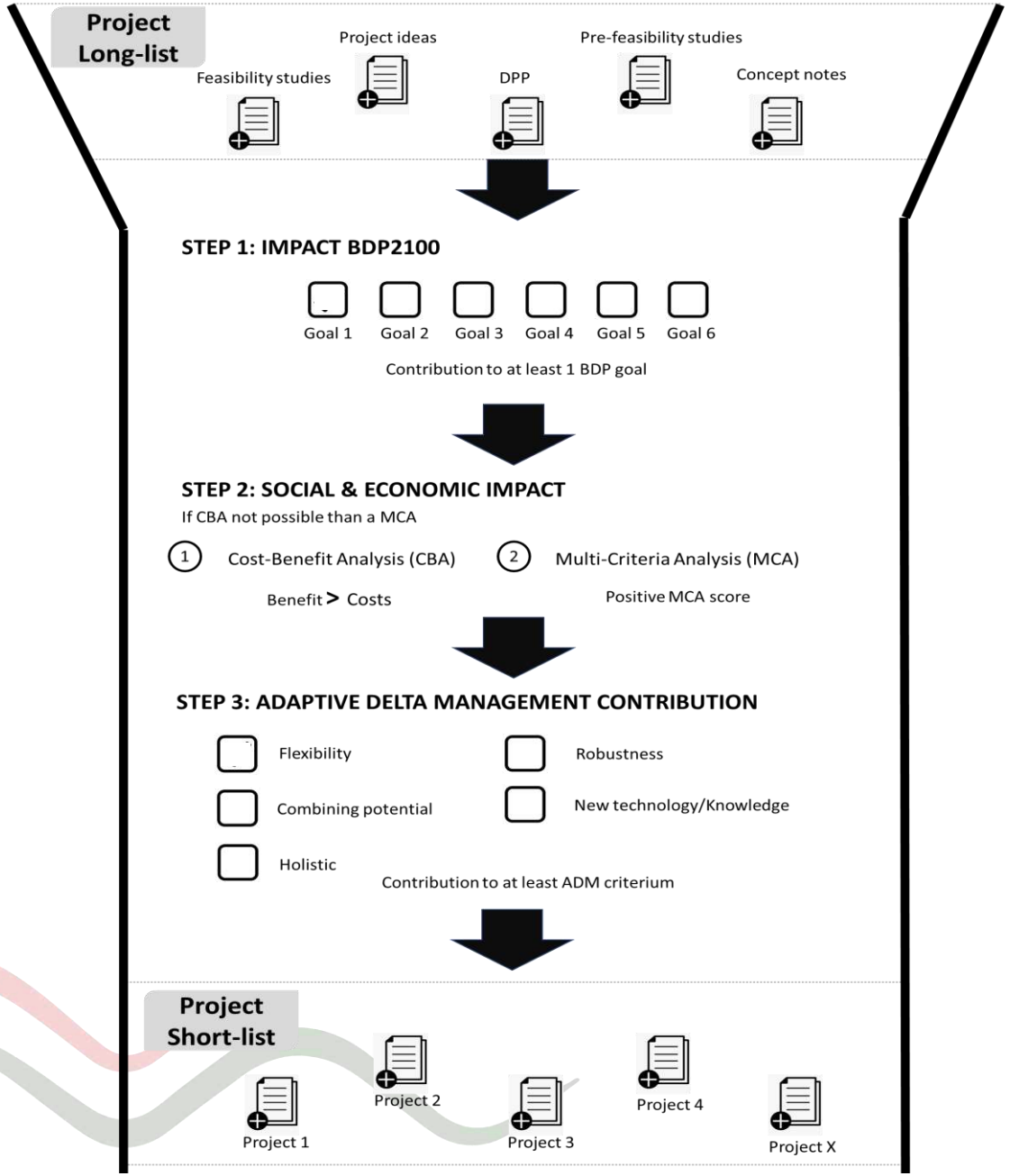
Composite indicator for the metamodel

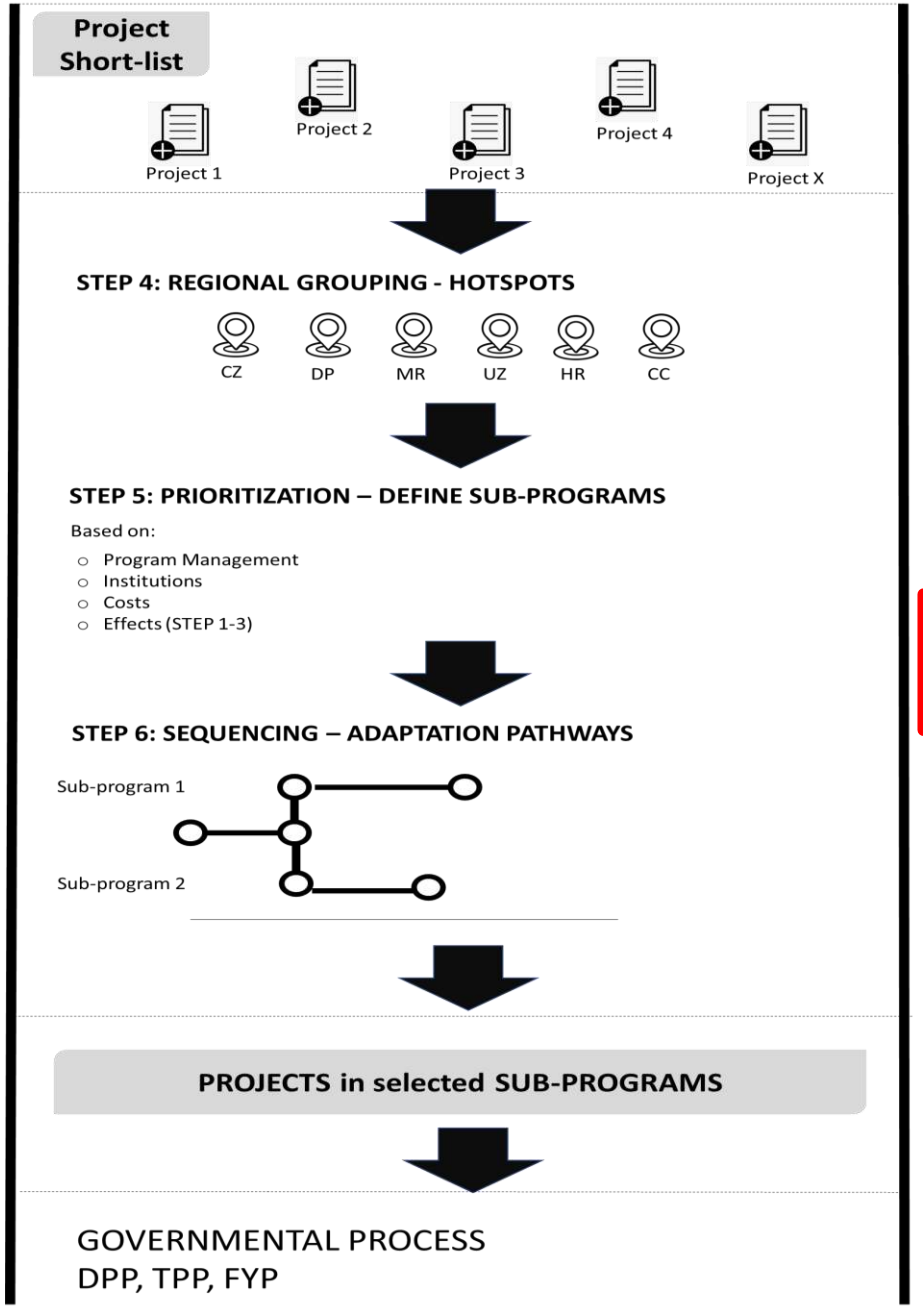
Food Security for Low Income

The Average Dietary Energy Supply Adequacy (ADESA) for the lowest income quartile of each Upazila for the lowest rice yield quantile

Use of the Meta Model

Project Screening for Adaptive Delta Management Programme





The Metamodel is developed to support the decision-making process as described in:

BDP2100, Volume 2, Chapter 1.

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Use of Meta Model: Scenario exploration

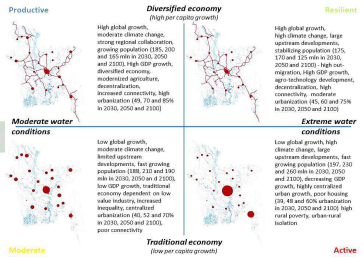
Select BDP scenarios

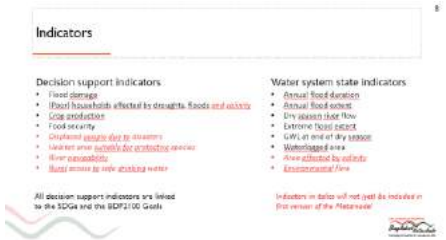
Run Metamodel Check and Store results

Assess impact of scenarios on indicators

Supports problem definition

- Climate change scenarios
- Socio-economic scenarios



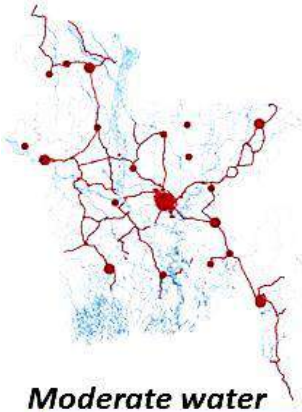


BDP2100 Scenarios

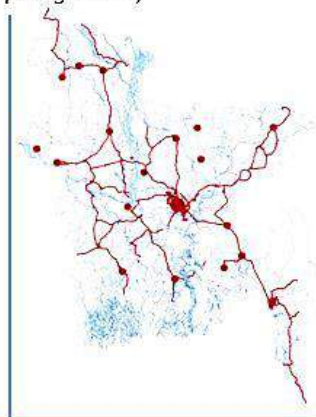
Productive

Diversified economy
(high per capita growth)

Resilient



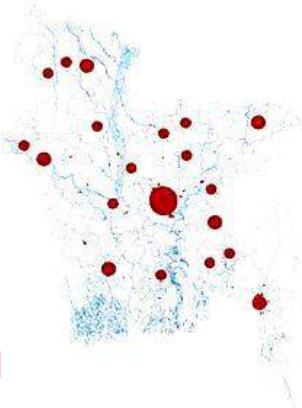
High global growth, moderate climate change, strong regional collaboration, growing population (185, 200 and 165 mln in 2030, 2050 and 2100). High GDP growth, diversified economy, modernized agriculture, decentralization, increased connectivity, high urbanization (49, 70 and 85% in 2030, 2050 and 2100)



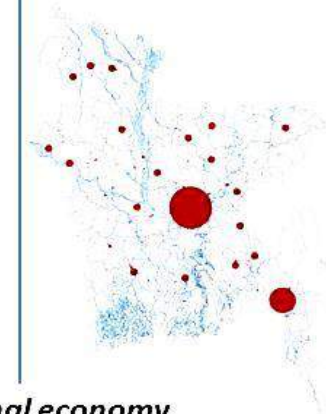
High global growth, high climate change, large upstream developments, stabilizing population (175, 170 and 125 mln in 2030, 2050 and 2100) - high out-migration, High GDP growth, agro-technology development, decentralization, high connectivity, moderate urbanization (45, 60 and 75% in 2030, 2050 and 2100)

Moderate water conditions

Extreme water conditions



Low global growth, moderate climate change, limited upstream developments, fast growing population (188, 210 and 190 mln in 2030, 2050 an d 2100), low GDP growth, traditional economy dependent on low value industry, increased inequality, centralized urbanization (40, 52 and 70% in 2030, 2050 and 2100), poor connectivity



Low global growth, high climate change, large upstream developments, fast growing population (197, 230 and 260 mln in 2030, 2050 and 2100), decreasing GDP growth, highly centralized urban growth, poor housing (39, 48 and 60% urbanization in 2030, 2050 and 2100) high rural poverty, urban-rural isolation

Moderate

Traditional economy
(low per capita growth)

Active

Indicators

Decision support indicators

- Flood damage
- (Poor) households affected by droughts, floods *and salinity*
- Crop production
- Food security
- *Displaced people due to disasters*
- *Habitat area suitable for protective species*
- *River navigability*
- *Rural access to safe drinking water*

All decision support indicators are linked to the SDGs and the BDP2100 Goals

Water system state indicators

- Annual flood duration
- Annual flood extent
- Dry season river flow
- Extreme flood extent
- GWL at end of dry season
- Waterlogged area
- *Area affected by salinity*
- *Environmental flow*

Indicators in italics will not (yet) be included in first version of the Metamodel

Use of Meta Model: Explore impact of projects

BDP project or Formulate new project

Fill in Project form

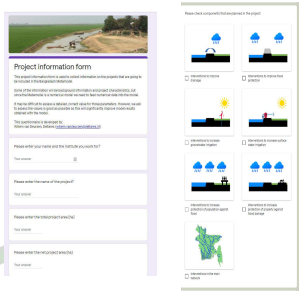
Run Meta Model

Check and store results

Assess impact of project on indicators

Compare impact with impact other projects

Concept note



Project Form

Project information form

This project information form is used to collect information on the projects that are going to be included in the Bangladesh Metamodel.

Some of the information will be background information and project characteristics, but since the Metamodel is a numerical model we need to feed numerical data into the model.

It may be difficult to assess a detailed, correct value for those parameters. However, we ask to assess the values is good as possible as this will significantly improve model results obtained with the model.

This questionnaire is developed by:
Willem van Deursen, Deltares (willem.vandeursen@deltares.nl)

Please enter your name and the institute you work for?

Your answer

Please enter the name of the project?

Your answer

Please enter the total project area [ha]

Your answer

Please enter the net project area [ha]

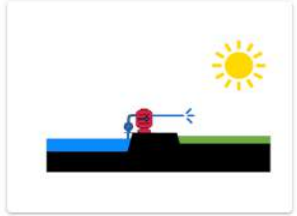
Your answer

Please check components that are planned in the project

☐ Interventions to improve drainage

☐ Interventions to improve flood protection

☐ Interventions to increase groundwater irrigation



☐ Interventions to increase surface water irrigation

☐ Interventions to increase protection of population against flood

☐ Interventions to increase protection of property against flood damage

☐ Interventions in the main network

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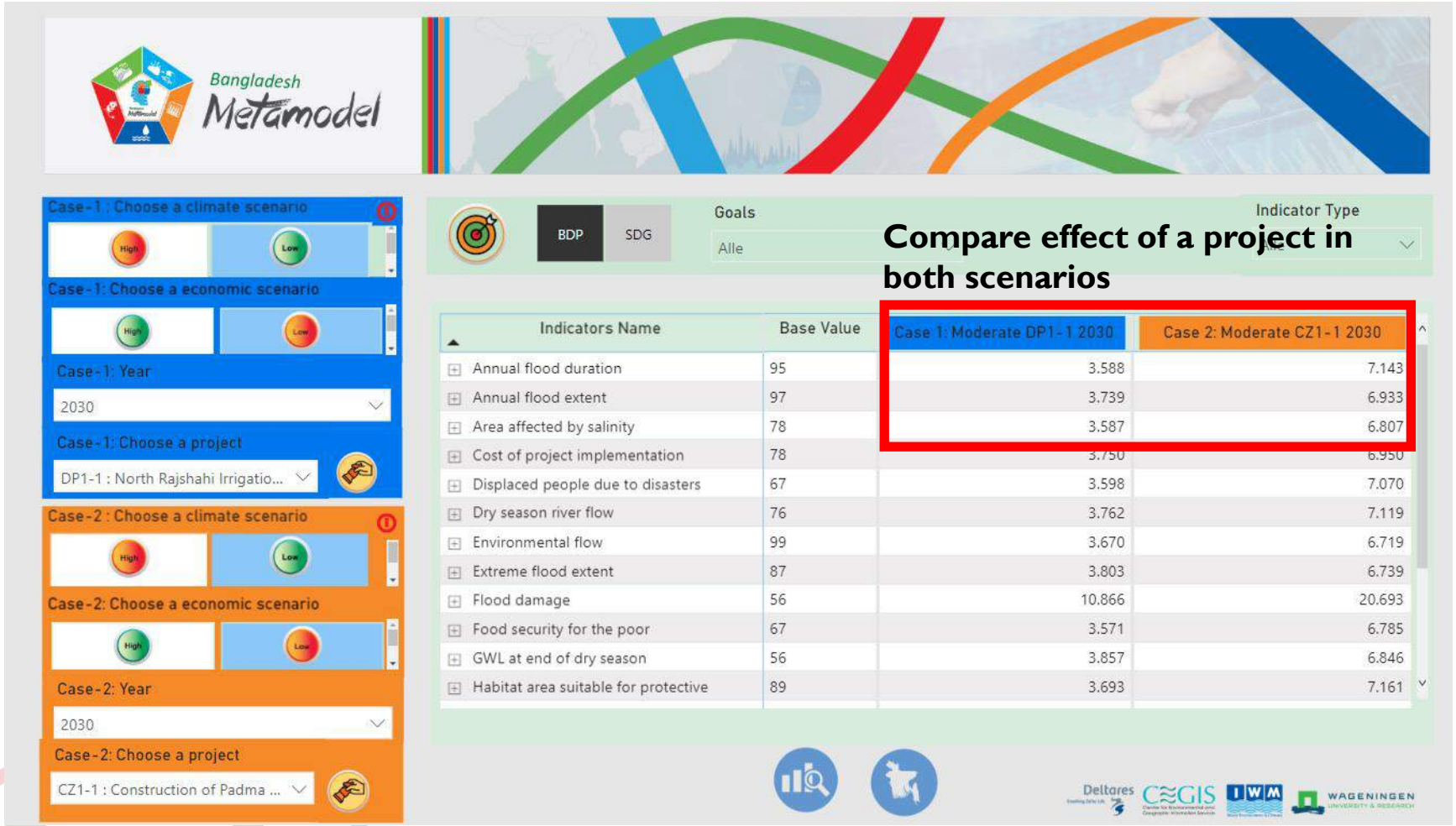
Assess and Compare of impact projects



Use of Meta Model: Explore impact of programs

Explore costs and impacts of projects on indicators, BDP goals & SDGs

Select a program (combination of projects)

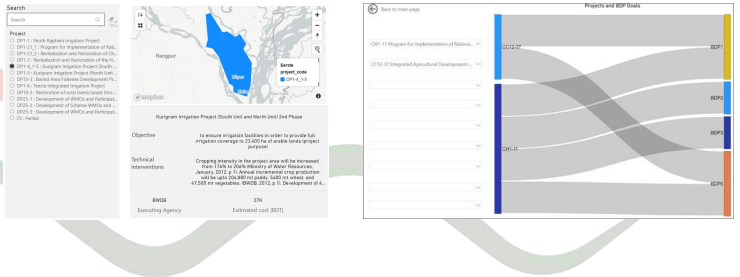
Run Meta Model

Check and store results

Assess impact of programs on indicators

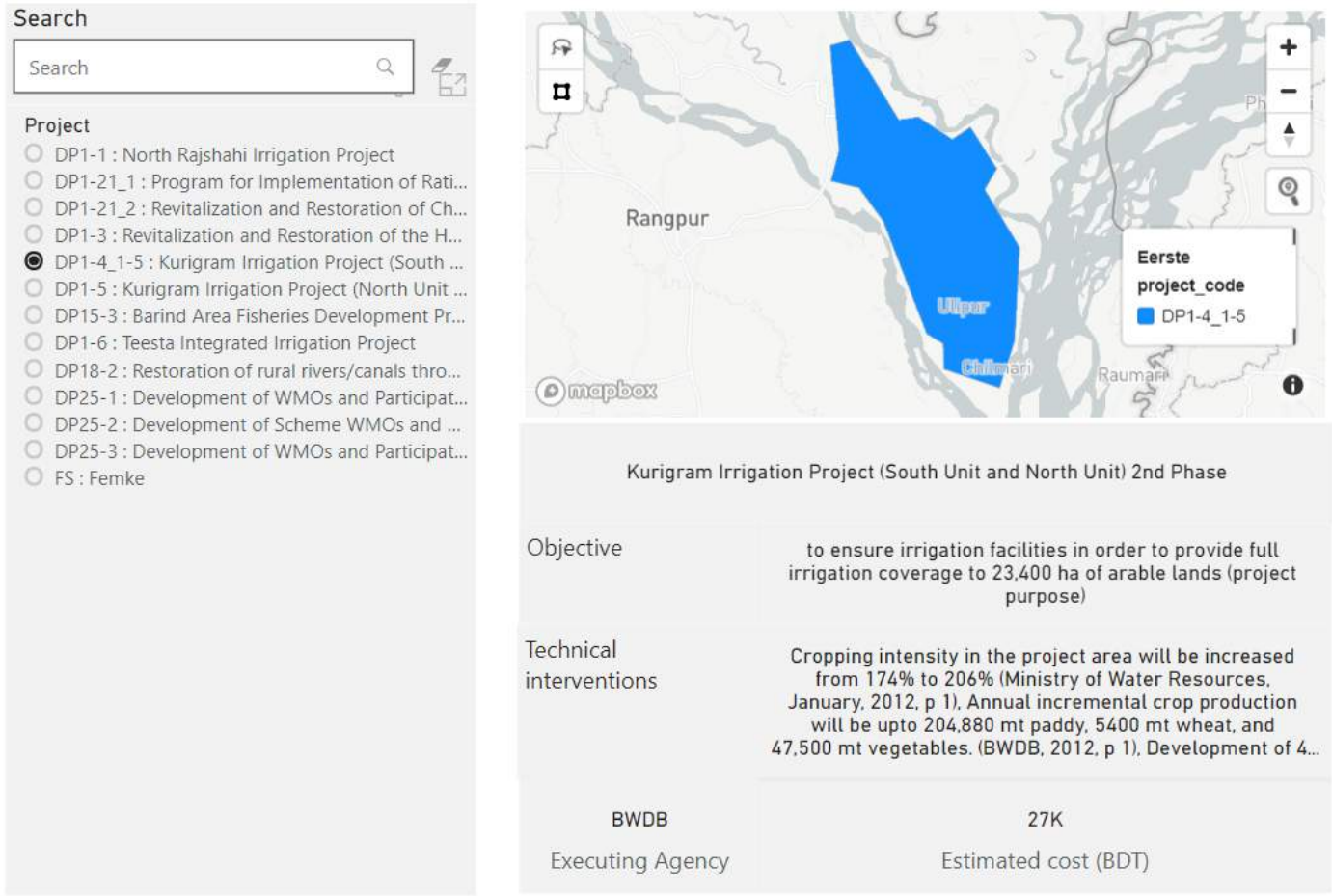
Compare impact with impact other programs

Sectoral, Annual Development or 5-year plan

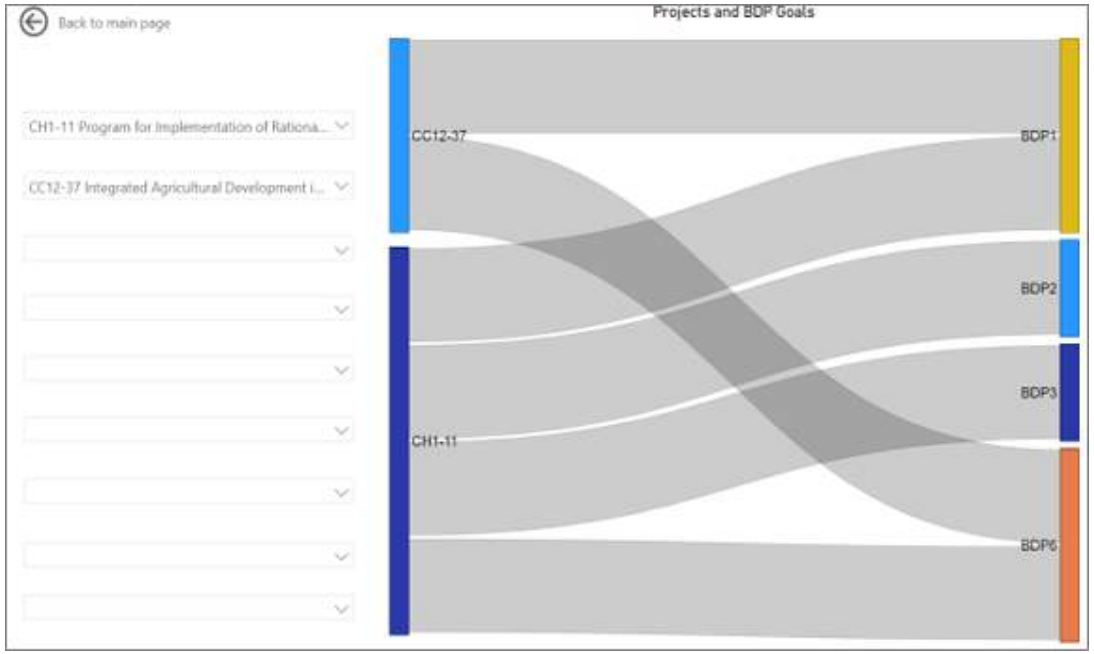


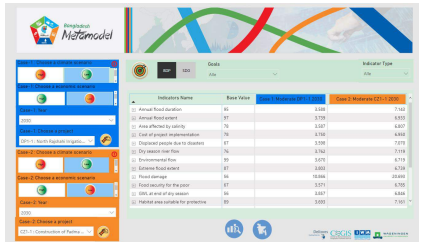
Explore project information and impacts

Assess project information



Impact BDP goals





Impact of projects

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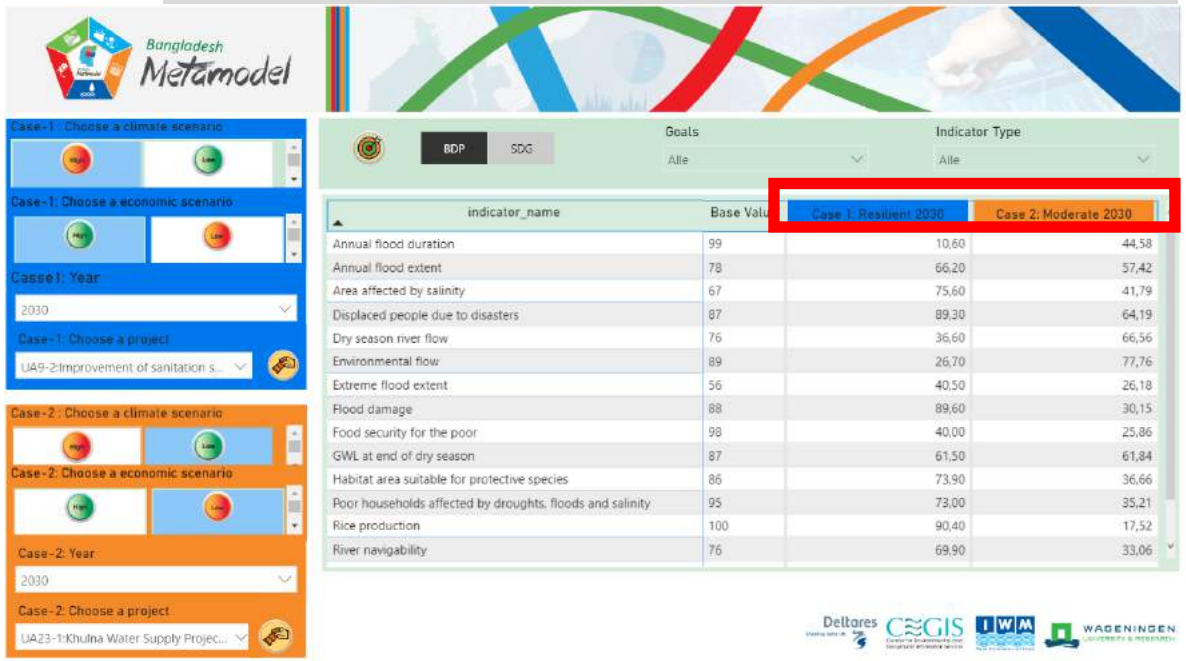
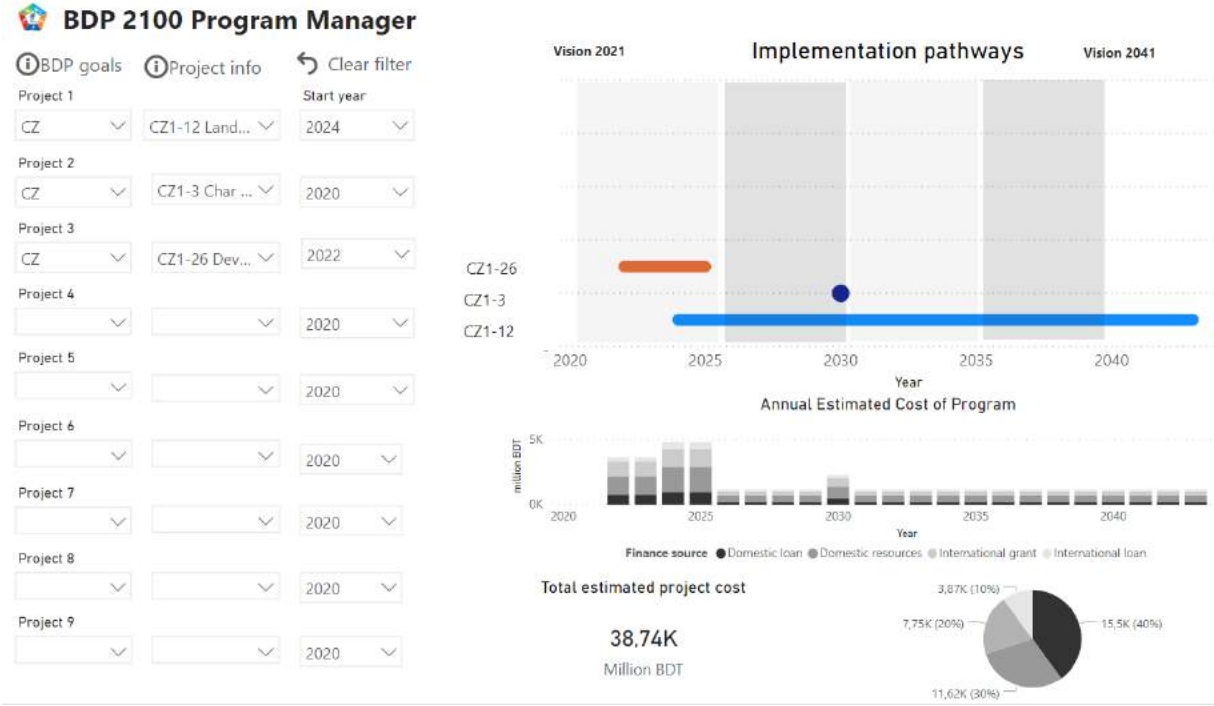
Compare programs

Compare programs



Develop implementation pathways



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Different roles in using the Metamodel

End-users

- Select projects
- Fill in project form
- Combine investment projects into programs
- Assess project and program impacts
- Create adaptation pathways

MM team

- Run Meta Model （Model Engine） based on project description given in project form
- Check Model results
- Store results
- Visualize results in dashboard

Question:

What does your organisation need to perform these activities?

Metamodel Dashboard

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Web based dashboard link with JCP web site

Brief on Bangladesh Meta Mod

...RM ...y of ...ent. ...ject ...0)", ...be ...cts and programs. Another important objective of the programme is to build capacity at different agencies in Bangladesh for developing, using and owning the Metamodel, and develop a structure to embed its maintenance and operation in an effective way.

BD METAMODEL

Sl. No.	Description	Data	Dashboard
1	SIBDP Program Manager	Data	Dashboard
2	Network module dashboard	Data	Dashboard
3	Impact explorer light	Data	Dashboard
4	Impact explorer full	Data	Dashboard

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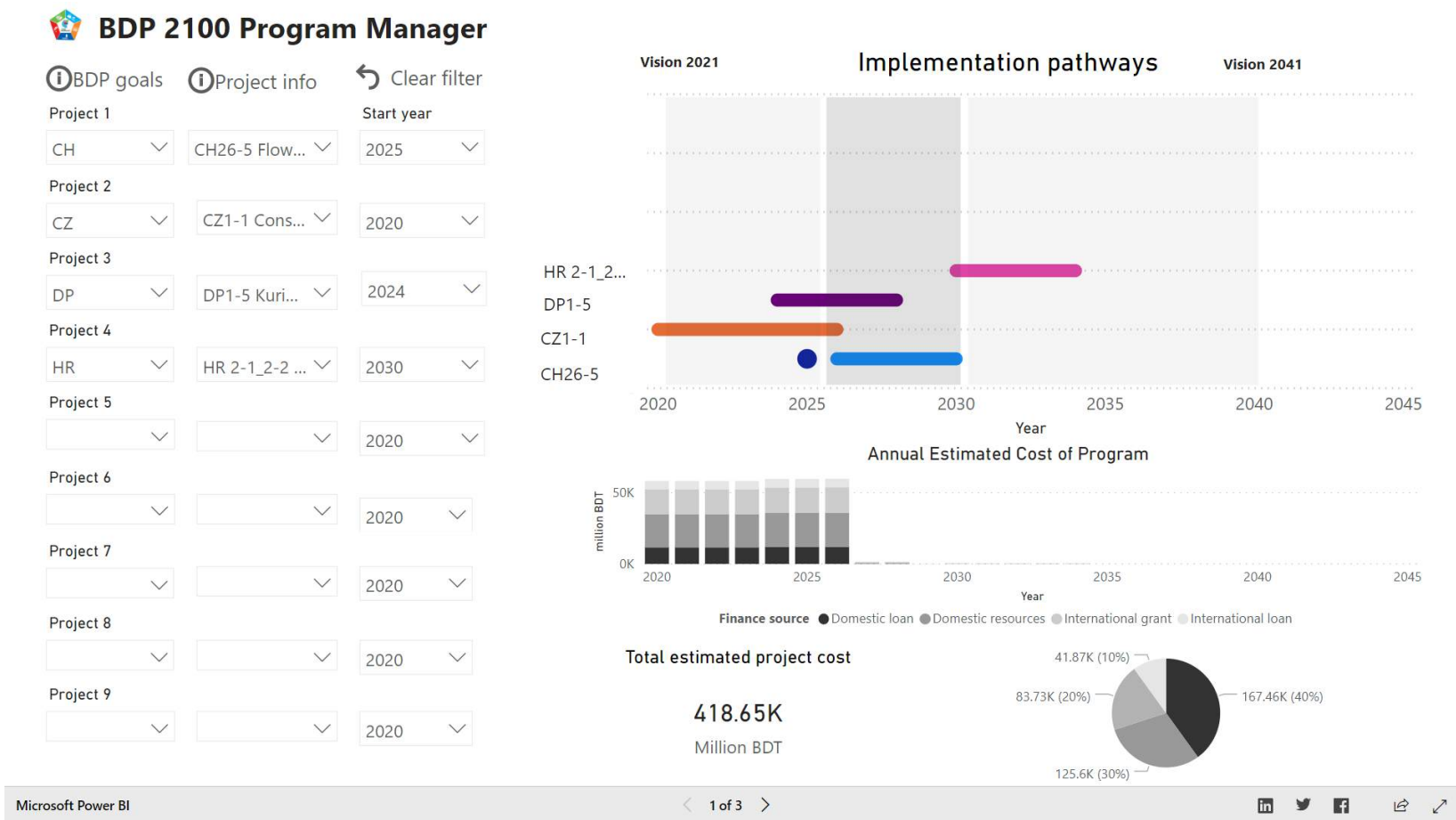
Knowledge development for a prosperous delta

Program Manager

- Combines information from concept notes
- No evaluation
- To assess for individual and combined projects:
  - BDP2100 goal contribution
  - Impact of phasing on annual investment budget required

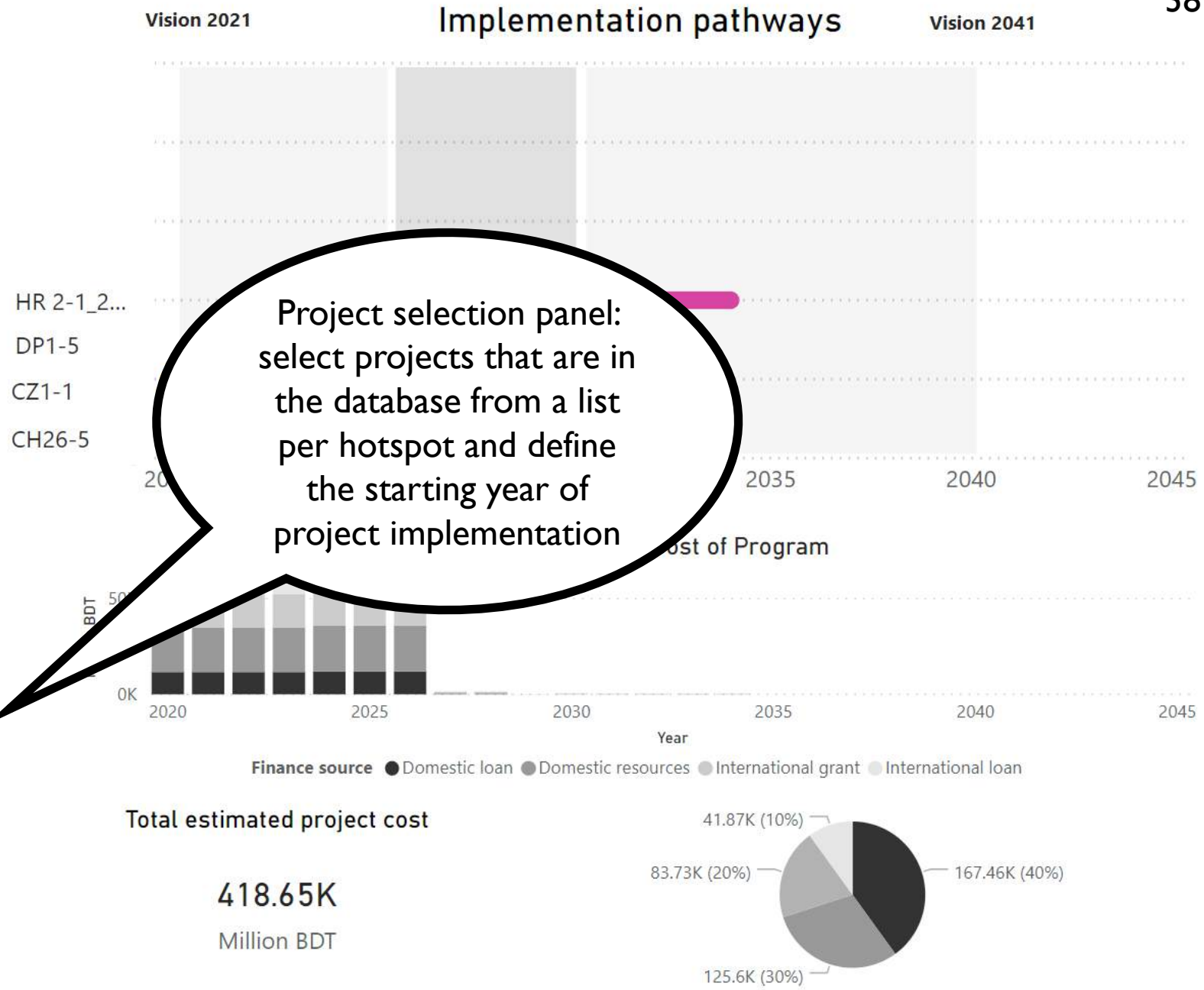


BDP 2100 Program Manager

BDP goals | Project info | Clear filter

		Start year
Project 1		
CH	CH26-5 Flow...	2025
Project 2		
CZ	CZ1-1 Cons...	2020
Project 3		
DP	DP1-5 Kuri...	2024
Project 4		
HR	HR 2-1_2-2 ...	2030
Project 5		
		2020
Project 6		
		2020
Project 7		
		2020
Project 8		
		2020
Project 9		
		2020

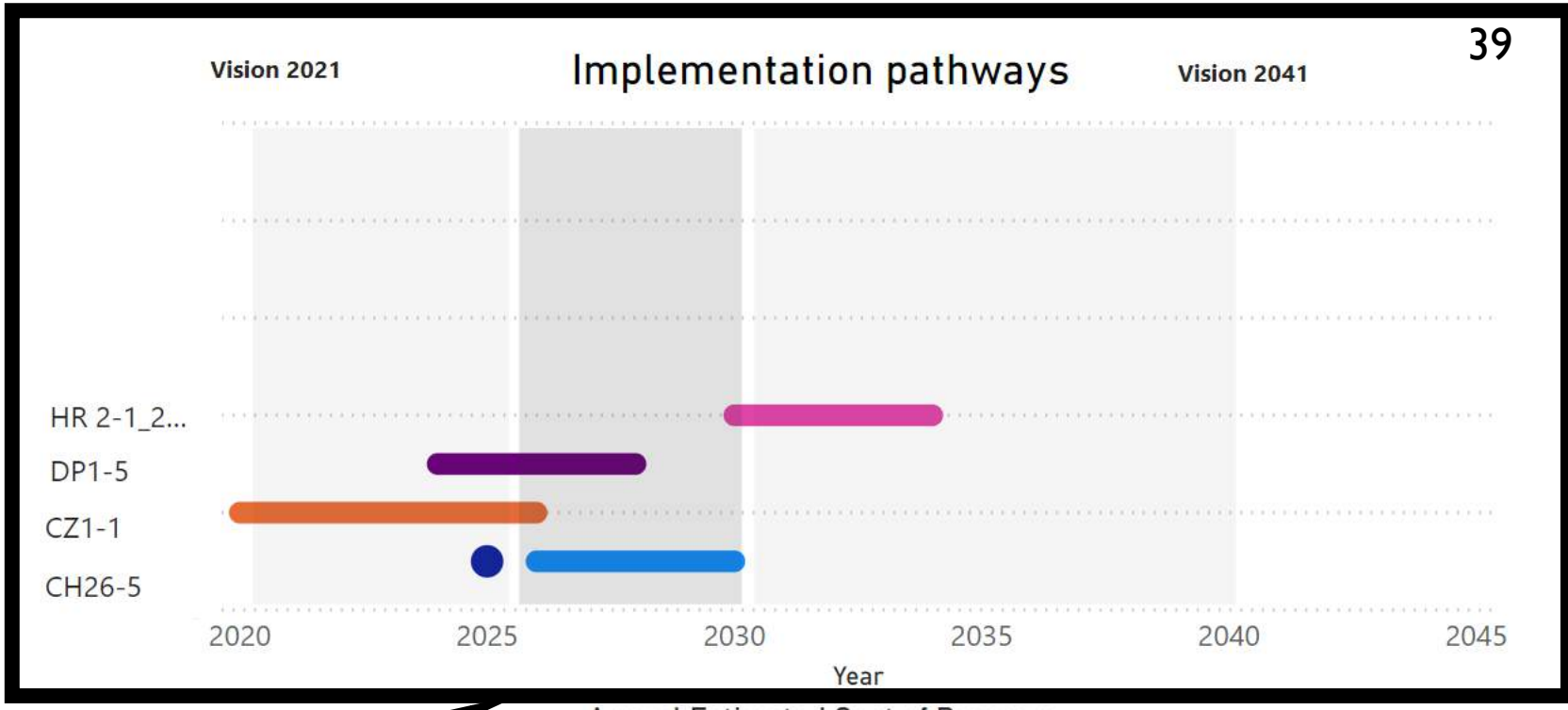
Project selection panel: select projects that are in the database from a list per hotspot and define the starting year of project implementation



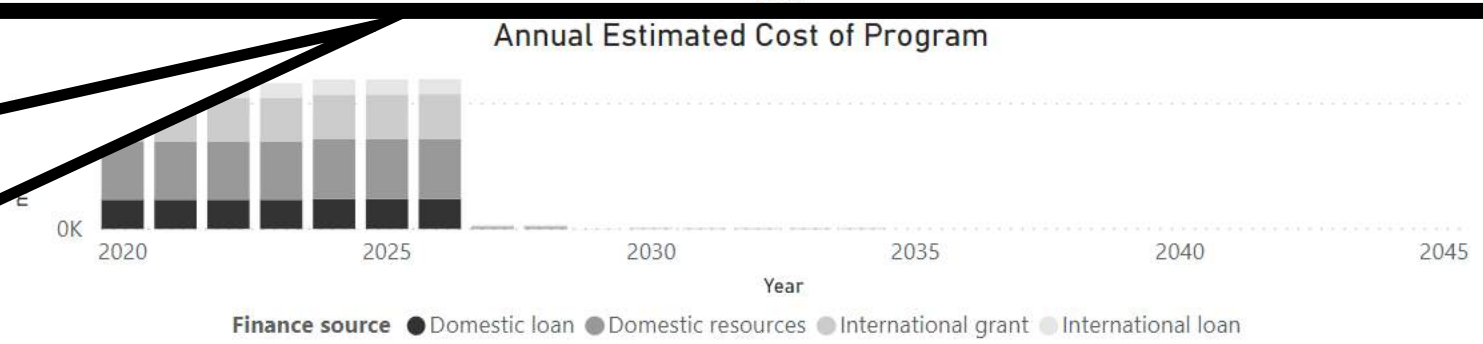
BDP 2100 Program Manager

BDP goals | Project info | Clear filter

			Start year
Project 1	CH	CH26-5 Flow...	2025
Project 2	CZ	CZ1-1 Cons...	2020
Project 3	DP	DP1-5 Kuri...	2024
Project 4	HR	HR 2-1_2-2 ...	2030
Project 5			2020
Project 6			
Project 7			
Project 8			
Project 9			



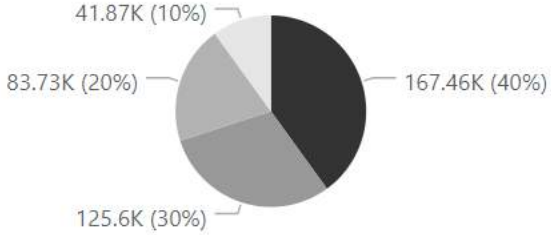
Implementation pathway: shows implementation of selected projects divided over coming 25 years



Total estimated project cost

418.65K

Million BDT



BDP 2100 Program Manager

BDP goals | Project info | Clear filter

Project 1 — CH — Start year 2025

Project 2 — CZ

Project 5 — 2020

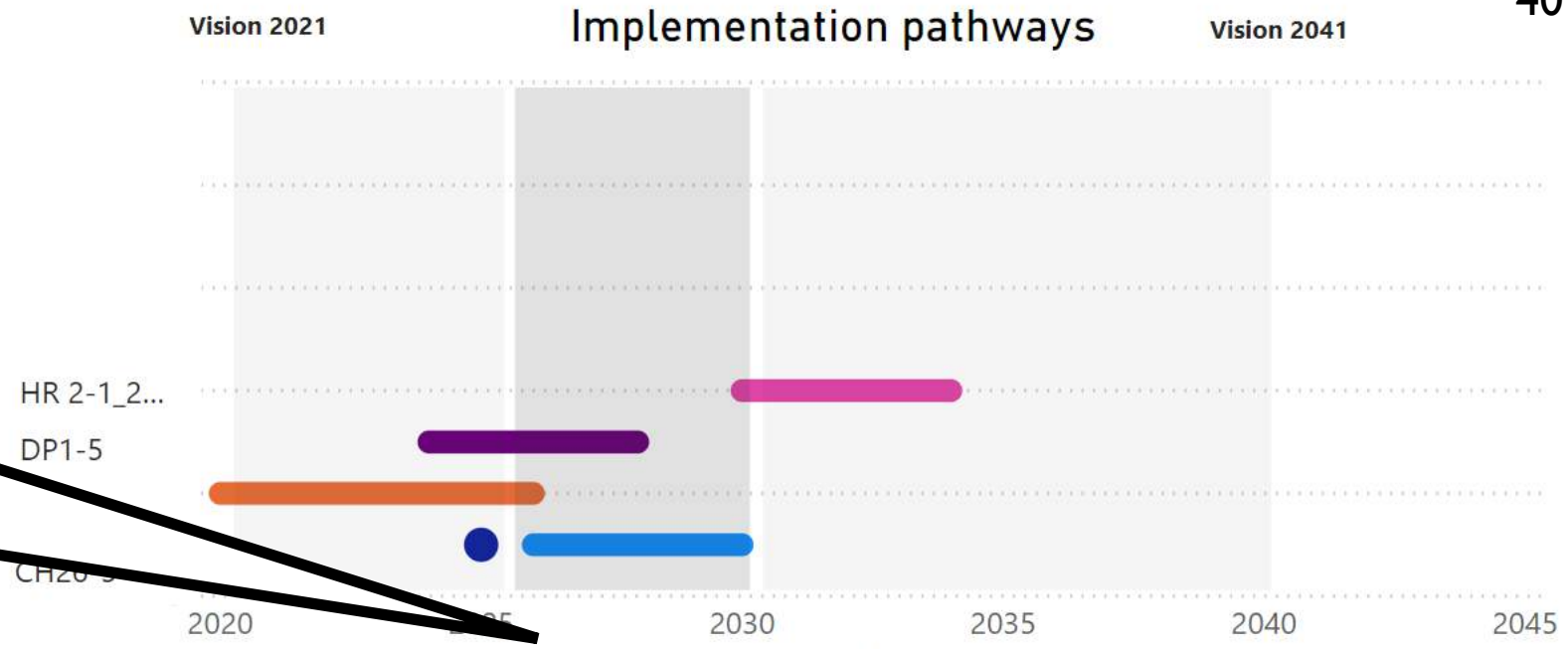
Project 6 — 2020

Project 7 — 2020

Project 8 — 2020

Project 9 — 2020

Investment requirement: shows total and annual budget requirement divided over different sources



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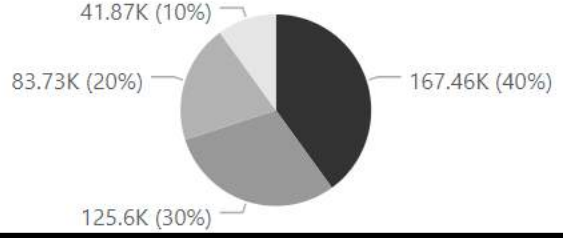


Back to main page

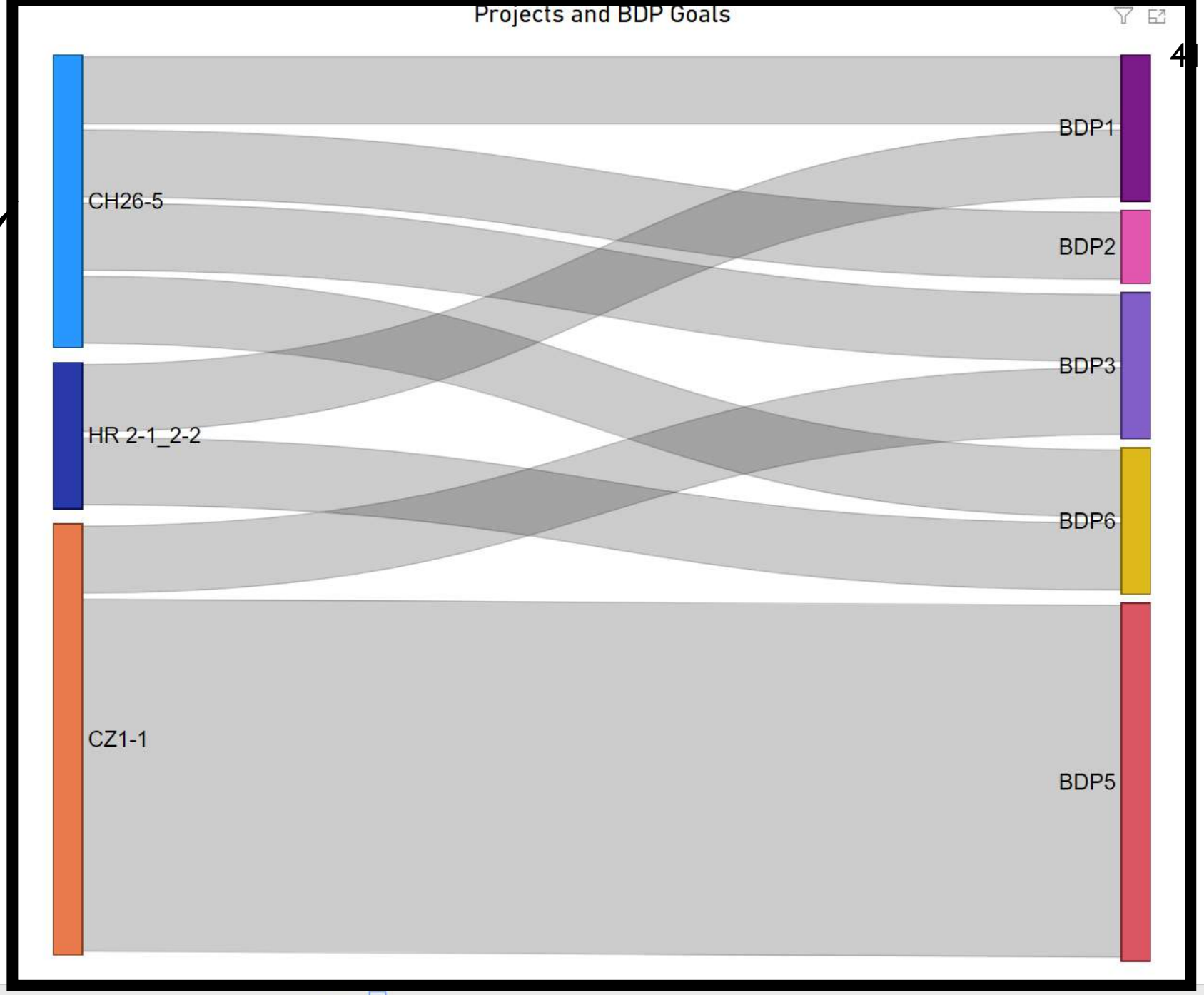
CH26-5 Flow control and water storage structur...

CZ1-1 Construction of Padma Barrage and Anci

DP1-5 Kurigram Irrigation Project (N hit) ...

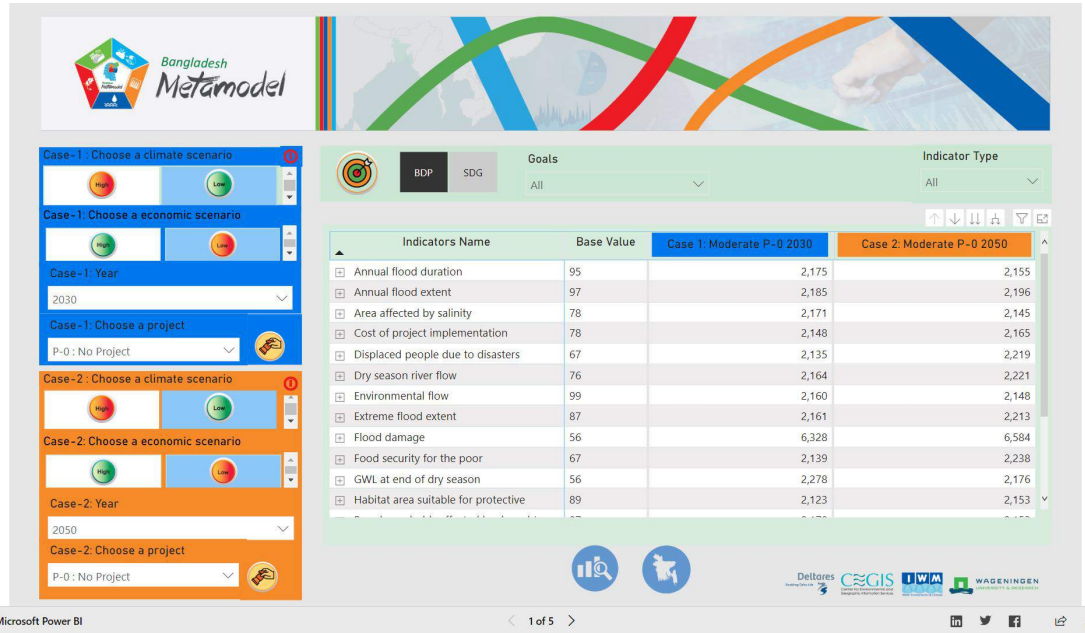
HR 2-1 ement in Ha...

BDP goal contribution: shows for the selected project the BDP goals to which they contribute



Impact Explorer

- Present results of the Bangladesh Metamodel
- Indicator values for selected combination of
  - Project / program
  - Scenario
  - Time horizon
- Comparison between different combination provides insight for:
  - Selection
  - Prioritization
  - Robustness



Bangladesh Metamodel

Case-1 : Choose a climate scenario

High | Low

Case-1: Choose a economic scenario

High | Low

Case-1: Year

2030

Case-1: Choose a project

P-0 : No Project

Case-2 : Choose a climate scenario

High | Low

Case-2: Choose a economic scenario

High | Low

Case-2: Year

2050

Case-2: Choose a project

P-0 : No Project

BDP | SDG

Goals

All

Indicator Type

All

Indicators Name			Case 2: Moderate P-0 2050
[illegible]			2,155
Annual flood[illegible]			2,196
Area affected by salinity			2,145
Cost of project implementation			2,165
Displaced people due to disaster[illegible]			2,219
Dry season river flow			2,221
Environmental flow			2,148
Extreme flood extent		[illegible]61	2,213
Flood damage		6,328	6,584
Food security for the poor	67	2,139	2,238
GWL at end of dry season	56	2,278	2,176
Habitat area suitable for protective	89	2,123	2,153

Selection box for case 1: select scenarios for climate change and economic development, time horizon and projects / programs

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Bangladesh Metamodel

Case-1 : Choose a climate scenario

High | Low

Case-1: Choose a economic scenario

High | Low

Case-1: Year

2030

Case-1: Choose a project

P-0 : No Project

Case-2 : Choose a climate scenario

High | Low

Case-2: Choose a economic scenario

High | Low

Case-2: Year

2050

Case-2: Choose a project

P-0 : No Project

BDP | SDG

Goals

All

Indicator Type

All

Indicators Name			Case 2: Moderate P-0 2050
Annual flood duration			2,155
Annual flood extent			2,196
Area affected by salinity			2,145
Cost of project implementation			2,165
Displaced people due to disaster			2,219
Dry season river flow			2,221
Environmental flow			2,148
Extreme flood ext		61	2,213
Flood dam		6,328	6,584
Fo y for the poor	67	2,139	2,238
GWL at end of dry season	56	2,278	2,176
Habitat area suitable for protective	89	2,123	2,153

Selection box for case 2: select scenarios for climate change and economic development, time horizon and projects / programs

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Result box: values for the indicators for the select case 1 and case 2 to allow comparison (*here fake numbers)*

BDP | SDG

Goals: All

Indicator Type: All

Case-1: Choose a project

2030

P-0 : No Project

Case-2 : Choose a climate scenario

High | Low

Case-2: Choose a economic scenario

High | Low

Case-2: Year

2050

Case-2: Choose a project

P-0 : No Project

Indicators Name	Base Value	Case 1: Moderate P-0 2030	Case 2: Moderate P-0 2050
Annual flood duration	95	2,175	2,155
Annual flood extent	97	2,185	2,196
Area affected by salinity	78	2,171	2,145
st of project implementation	78	2,148	2,165
ced people due to disasters	67	2,135	2,219
Dry s on river flow	76	2,164	2,221
Environmental flow	99	2,160	2,148
Extreme flood extent	87	2,161	2,213
Flood damage	56	6,328	6,584
Food security for the poor	67	2,139	2,238
GWL at end of dry season	56	2,278	2,176
Habitat area suitable for protective	89	2,123	2,153

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Questions

- What functionalities of the metamodel will you use in your work?
- Would you like to explore the dashboard on your own?
- Would you like a follow-up session?
- What should be the focus of such a session?

Planning

- Questionnaire on Meta Model needs --> You will be approached in the coming month
- May 2020 - release of first results for Northwest including impact of scenarios and projects
- June 2020 - thematic expert reflection sessions
- September 2020 - results for the Coastal Zne
- October 2020 - end-user training
- December 2020 - results for the whole country
- 2021 and further – application to support SIBDP, maintenance and possibly further development