Adaptive Delta Planning and Management

creating capacity, new delta research, and food systems' approach for deltas under pressure at Wageningen University and Research

Catharien Terwisscha van Scheltinga, Wageningen University & Research
and many colleagues

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Prepared for special lecture at Jadavpur University, Kolkata,
20 February 2020

Overview

1. Introduction of Wageningen University and Research
2. Change and water management
3. Bangladesh Delta Plan 2100
4. Adaptive Delta Planning and Management
5. Food Systems in Deltas
6. Back to the future

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Introduction

Catharien Terwisscha van Scheltinga

Delta Expert, Wageningen Environmental Research, team Water & Food

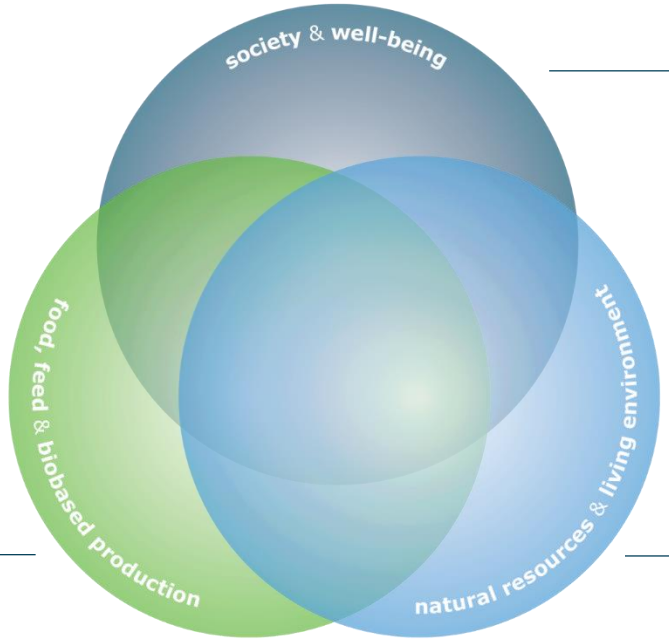
Twitter @CatharienTvS

- WUR Strategic research: Food Systems in Deltas under Pressure
- Joint Cooperation Programme Bangladesh – the Netherlands (www.jcpbd.nl); Communication and Outreach; Knowledge App development; Water-Food-Nexus; Polders of the Future
- DeltaCap; building capacity for implementing BDP2100. www.deltacapproject.net
- Delta Alliance, International Secretariat (www.delta-alliance.org)

- Chair of the Network Land and Water, professionals in water management

Wageningen domain: Food and Living Environment

Mission:
to explore the potential of nature to improve the quality of life



- Food and Living environment
- Lifestyle
- Perceptions
- Governance
- Market and chains
- Social innovations

- Sustainable production and food processing
- Animal feed and biobased products
- International food chains and networks
- Food security and food health aspects

- Nature and landscape
- Land use
- Water, sea and natural resource management
- Biodiversity

100years

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Wageningen University and Research (WUR)

Wageningen University

- 12,000 BSc/MSc students from > 120 countries
- 2,000 PhD candidates
- 2,640 FTE of faculty and staff
- Revenue in 2018: € 363 million
- Top 3 of the world in its domain in international rankings

Wageningen Research

- 2,491 FTE of faculty and staff
- 9 research institutes
- Revenue in 2018: € 323 million

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Organigram



Supervisory Board
Executive Board
Concern Staff
Facilities & Services
Agrotechnology & Food Sciences Group
Animal Sciences Group
Environmental Sciences Group
Plant Sciences Group
Social Sciences Group
Wageningen University
Agrotechnology & Food Sciences
Animal Sciences
Environmental Sciences
Plant Sciences
Social Sciences
Wageningen Research
Wageningen Food Safety Research
Wageningen Food & Biobased Research
Wageningen Livestock Research
Wageningen Bioveterinary Research
Wageningen Marine Research
Wageningen Environmental Research
Wageningen Plant Research
Wageningen Economic Research
Wageningen Centre for Development Innovation

The Wageningen approach

- No one-dimensional solutions for urgent challenges, therefore: multidisciplinary approach and open connections between scientific and social science disciplines
- Cooperation between university and market-oriented research institutes
- Close collaboration with government authorities, the business community, research institutes and other universities

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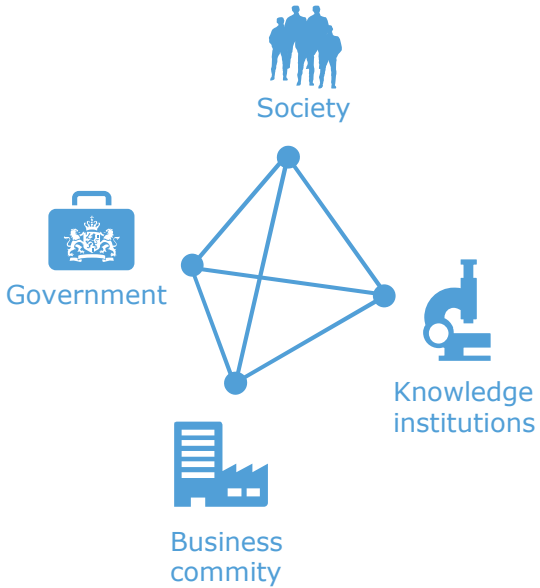
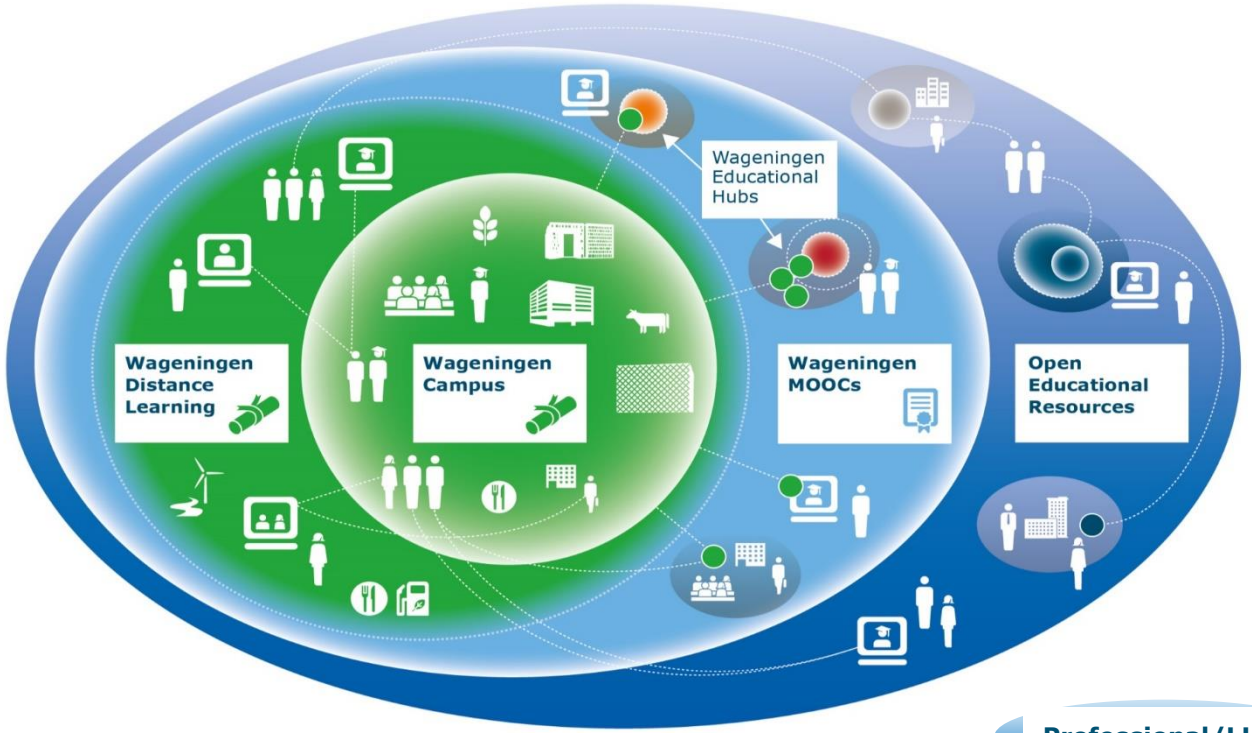
Our stakeholders

Our stakeholders include:

- Dutch government ministries, provinces, and municipalities
- International governments, such as China and Ethiopia
- The business community
- Non-profit organisations



Wageningen Education Ecosystem



MOOCs

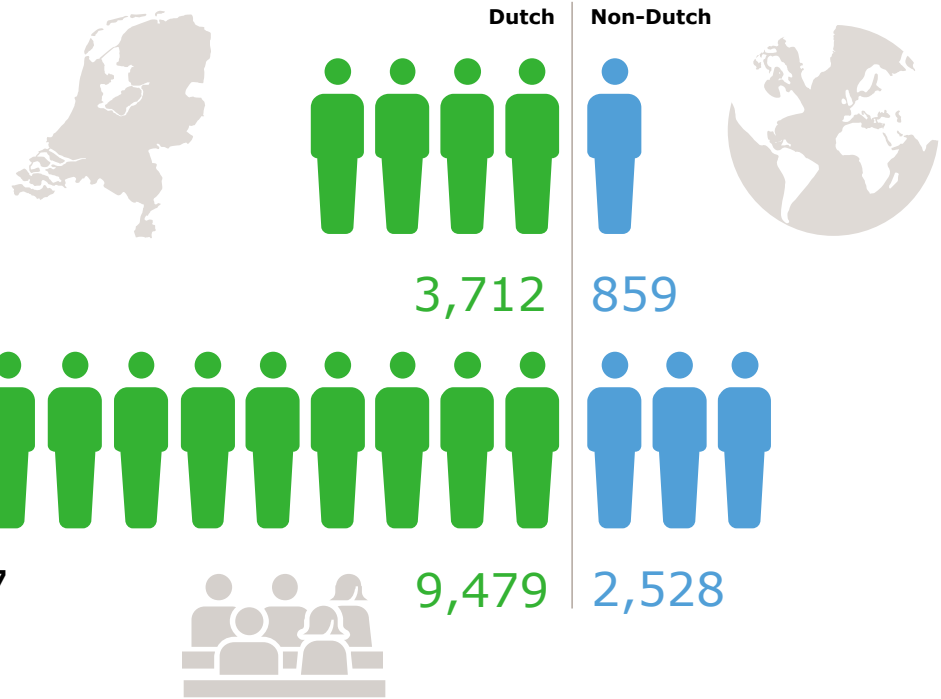
Massive Online Open Courses:

- About 690,000 registrants, 3,000 new registrants added every week
- 24 topics, including amongst others: Nutrition & Health, Future of Food, Sustainable Urban Development, Soil4Life, Sustainable Soil Management, Food Access, Practical Animal Behaviour, Biobased Economy, Sustainable Tourism, Human Microbiome, Circular Economy, Business and Economics

Number of students

excluding PhD students

Period	Total	Dutch	Non-Dutch
2002-2003	4,571	3,712	859
2018-2019	12,007	9,479	2,528



Strong position in the rankings

1

WUR ranking in QS World University Rankings 2019
"Agriculture and Forestry"

1 (14 years running)

WUR ranking in Keuzegids in full time university education 2019

7

WUR ranking in QS World University Rankings 2019
"Environmental Sciences"

59

WUR ranking in Times Higher Education World University Rankings 2018-2019

1 (6 years running)

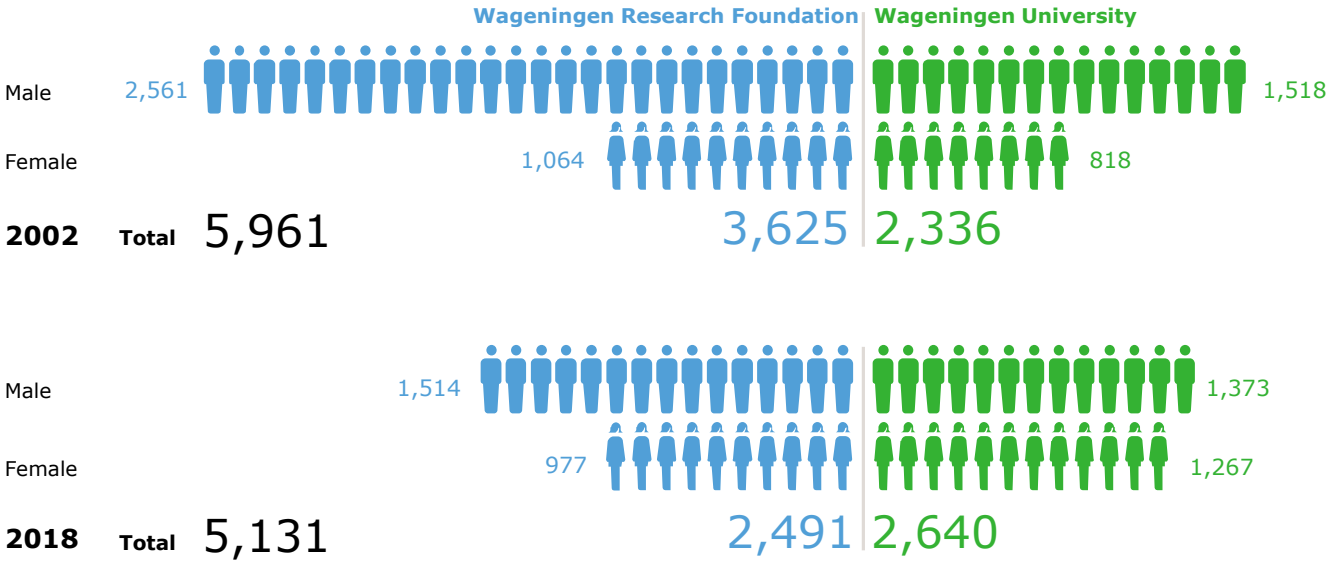
WUR ranking in National Taiwan University Ranking, World Universities 2018-2019
"Agriculture"

2

WUR ranking in Shanghai Ranking of World Universities 2019
"Food Science & Technology"

Number of Employees

in fte



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Our institutes

- Wageningen Bioveterinary Research
- Wageningen Centre for Development Innovation
- Wageningen Economic Research
- Wageningen Environmental Research
- Wageningen Food & Biobased Research
- Wageningen Food Safety Research
- Wageningen Livestock Research
- Wageningen Marine Research
- Wageningen Plant Research

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A changing world

The world is rapidly changing and this poses great challenges to science within our domain:

- The global population is growing rapidly (to 9 billion in 2050), prosperity is increasing and with this, the demand for food, especially high-protein food
- Environment, nature, and climate is under major pressure
- Fossil fuels and other raw materials are being depleted
- Much of the global population lacks access to adequate or sufficiently nutritious food
- People are growing older and lifestyle diseases are on the rise
- The pressure on food production has increased food-safety incidences and confidence in food production is decreasing
- People are moving to urban centres worldwide, which creates new challenges for food safety, energy transport, and liveable environments

Research themes
(Wageningen Research)

- Circular and climate-neutral
- Food security and valuing water
- Nature inclusive and landscape
- Safe and healthy
- Data driven and high tech

- www.wur.nl

Wageningen Environmental Research

- Sustainable Soils
- Sustainable Water Management
- Green Cities
- Biodiverse Environment
- Green Climate Solutions

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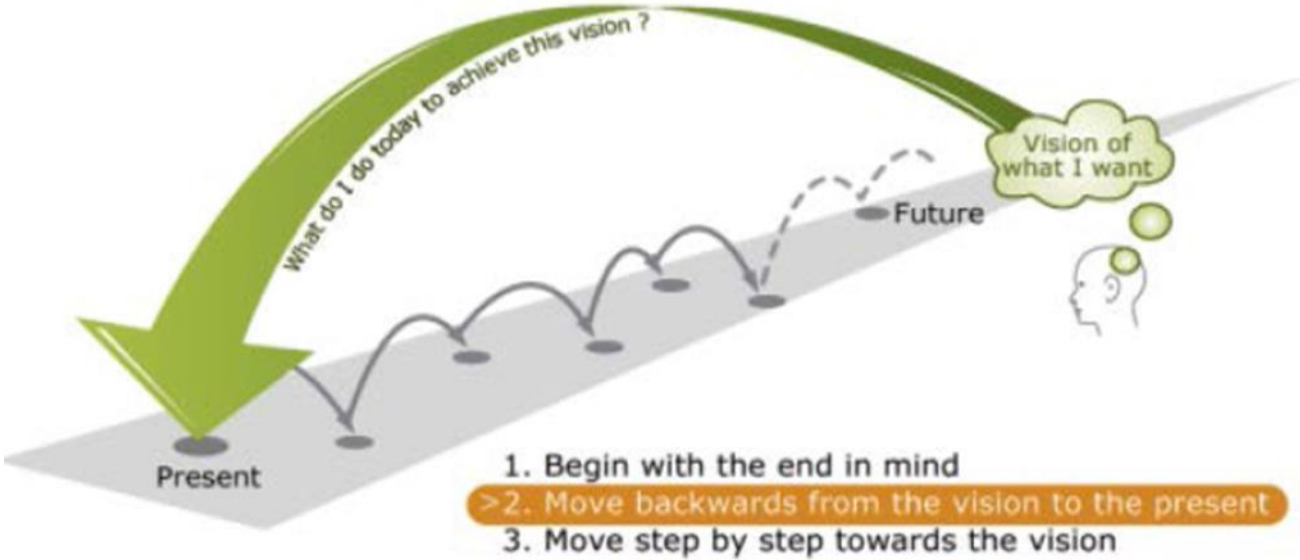
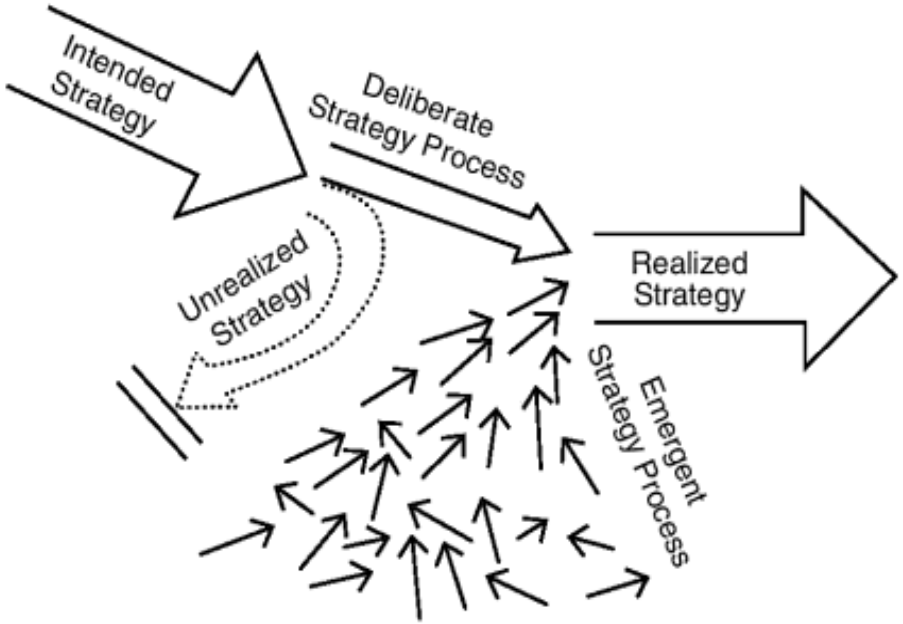
Wageningen Campus

Change and water management


What do I do today to achieve this vision ?
Vision of what I want
Future
Present
1. Begin with the end in mind
>2. Move backwards from the vision to the present
3. Move step by step towards the vision



Address uncertainty

Address complexity

Change in water management

IWRM (GWP, 2000)

Including climate change, climate change adaptation

Need to be flexible

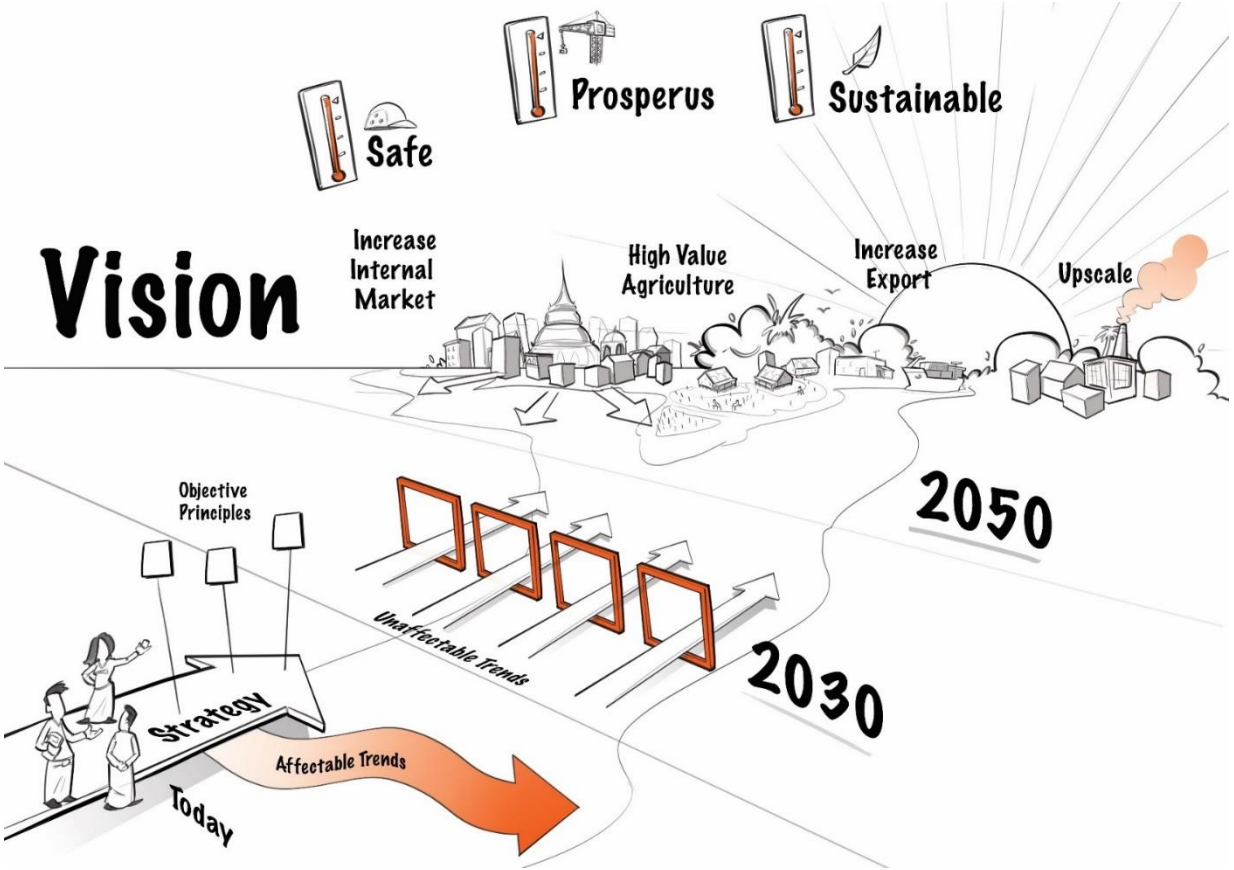
Possibility to change at a later stage

But starting already

Based on a **vision, goals, strategy, scenarios**

Adaptive water management (Pahl Wostl and Kabat, 2008)

Adaptive delta management (a.o. Zevenbergen et al, 2018)


Safe
Prosperus
Sustainable
Vision
Increase
Internal
Market
High Value
Agriculture
Increase
Export
Upscale
2050
Objective
Principles
Unaffectable Trends
2030
Strategy
Affectable Trends
Today

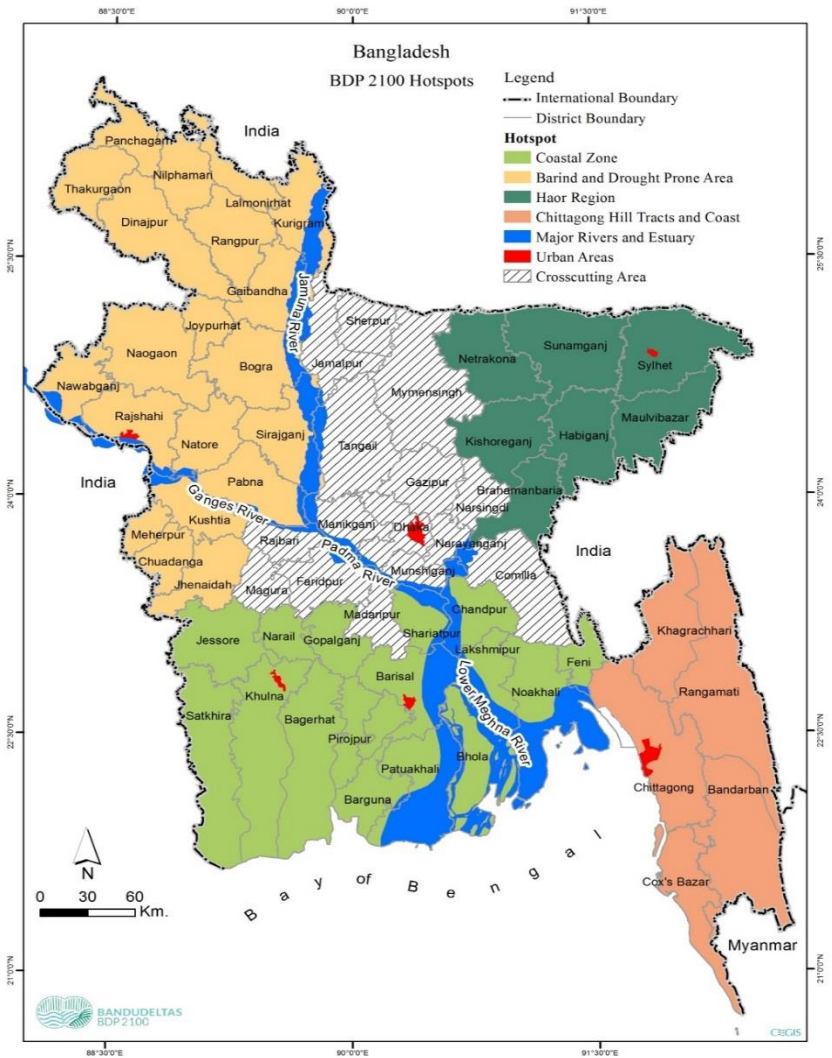
Bangladesh Delta Plan 2100

GoB General Economic Division (GED)
Planning Commission
and
GoN Embassy of Kingdom of The Netherlands (EKN)

Bangladesh Dutch Delta Advisory Services (BanDuDeltAS)

Process of development:

- Base line studies (8)
- Consultations
- Vision development
- Strategy development in selected Hotspots



Delta Vision

"Ensure long term water and food security, economic growth and environmental sustainability

while

effectively coping with natural disasters, climate change and other delta issues

through

robust, adaptive and integrated strategies, and equitable water governance."

BDP2100: a new way of thinking and planning

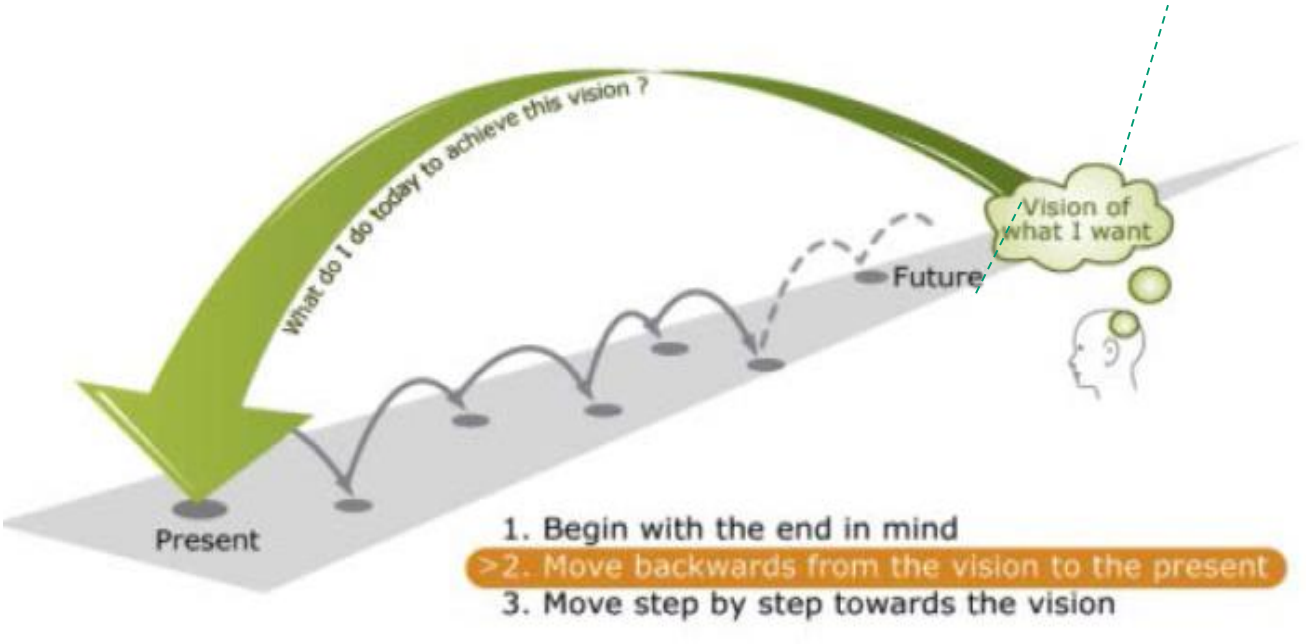
What does this way of planning mean?

- Water infrastructure is to last for 10 – 30 years or often longer. You have to design for the conditions and lifestyles of tomorrow
- As the future is uncertain, this means you consider different scenarios. Designs that offer flexibility are prefered
- Monitoring is key to know how your system is performing and whether adaptation is required
- Replacement is an opportunity to change and improve, not to build back the same as before

Shift in planning approach *and* research

Back Casting the Vision

'Climate Change proof Bangladesh'



Plan for future conditions!

Act now

Strategy Formulation and Selection

BANDUDELTAS
BDP 2100

Possible Strategies & Measures

- Longlist based on inventory
- Inspired by Vision, Goals, 'guiding principles'
- Additions by Stakeholders and Experts from Knowledge, Planning and Implementing Agencies

Potential Strategies & Measures

- Application of screening criteria - guiding principles - inspired by Vision-Goals/Objectives/Indicators
- Grouped into draft Strategies
- Delta Ateliers for each Hotspot region (2-3 distinctive strategies per region)

Preferred Strategies & Measures

- Elaboration of Strategies National and Hotspot wise, (Water Follows; Water Leads)
- Test on Scenarios
- Ranking according to contribution overall BDP Strategy development

(broad) Strategies per Hotspot

Major Rivers and Estuaries

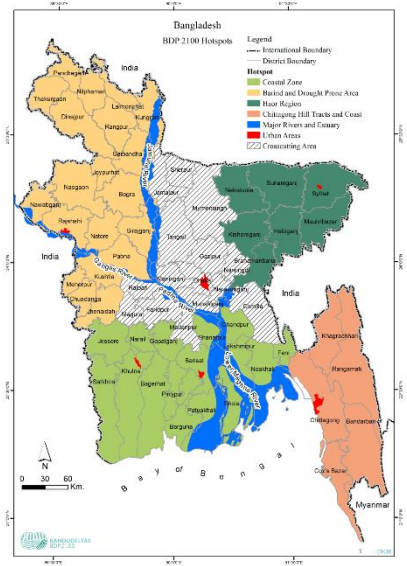
- River Basin Management through stabilization / channelization, dredging,
- Land reclamation in the rivers and Meghna Estuary
- Abstraction of surface water from major rivers through barrages & reservoirs
- Navigation and inland port development

Coastal Zone

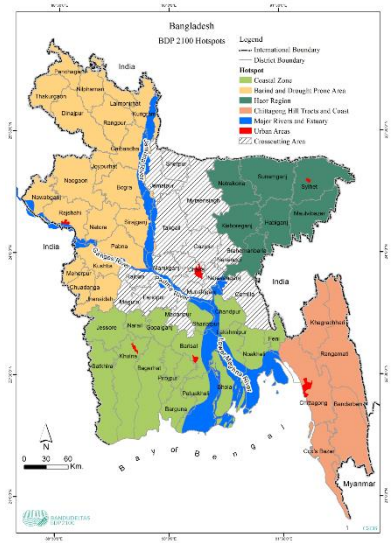
- Improvement of coastal defenses considering climate change & sea-level rise
- Land reclamation and land development
- Protection works, port development

Barind & Drought Prone Areas

- Improved surface water management programs
- Ground water management; retention
- Revitalization and restoration of beels and water bodies



(broad) Strategies per Hotspot



Haor and Wetlands

- Integrated Water Management for livelihood improvement
- Village protection against wave action
- Haor Ecosystem Management

Urban Areas

- Improved flood protection and drainage improvement program
- Integrated Water Supply and Sewage Management Program (incl. water treatment)

CHT and Coasts

- Integrated Eastern Hills Resources Management Program
- Integrated River Basin Management and coastal protection

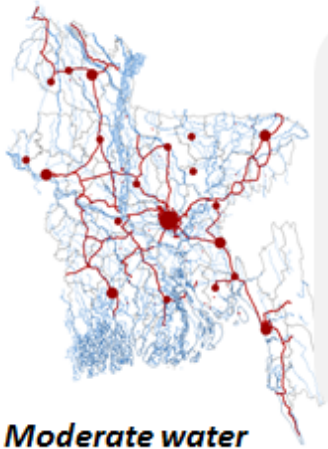
Cross-cutting

- Fresh Water Management Program (irrigation, rural water supply and sanitation)
- Flood Risk Management and Rationalization of existing FCD/FCDI Projects

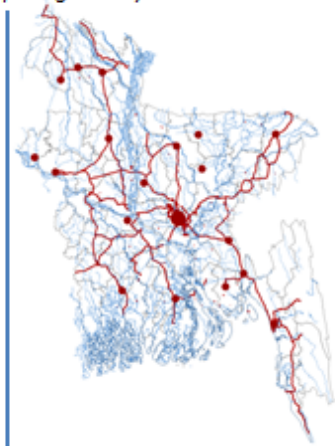
Productive

Diversified economy
(high per capita growth)

Resilient



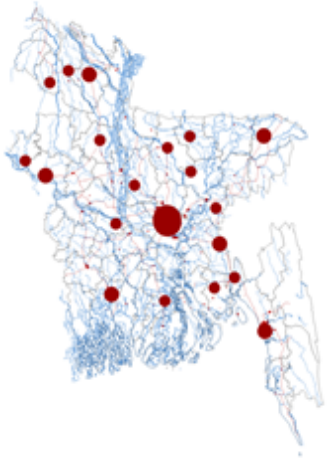
High global growth, Moderate climate change, Strong regional collaboration, growing population (197m -2050) High GDP growth, Diversification economy, Modernization agriculture, decentralization, Increased connectivity, rapid urbanization (70% - 2050)



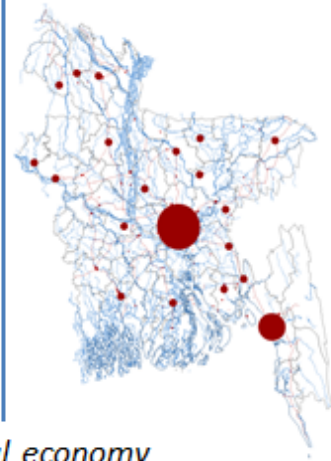
High global growth, High climate change, large upstream developments, Stabilizing population (170m - 2050) - high out-migration, moderate/high GDP growth, agro-technology advancement, decentralization, connectivity & urban growth (67% - 2050)

Moderate water conditions

Extreme water conditions



Low global growth, Moderate climate change, Limited upstream developments, fast growing population (210m -2050), low GDP growth, Traditional economy, increase inequality, centralized urban growth (52% urbanization 2050), Poor connections and urban facilities



Low global growth, high climate change, large upstream developments, fast growing population (230 – 2050), decreasing GDP growth, centralized urban growth, poor housing (45% urbanization – 2050) high rural poverty, urban-rural isolation

Congestion

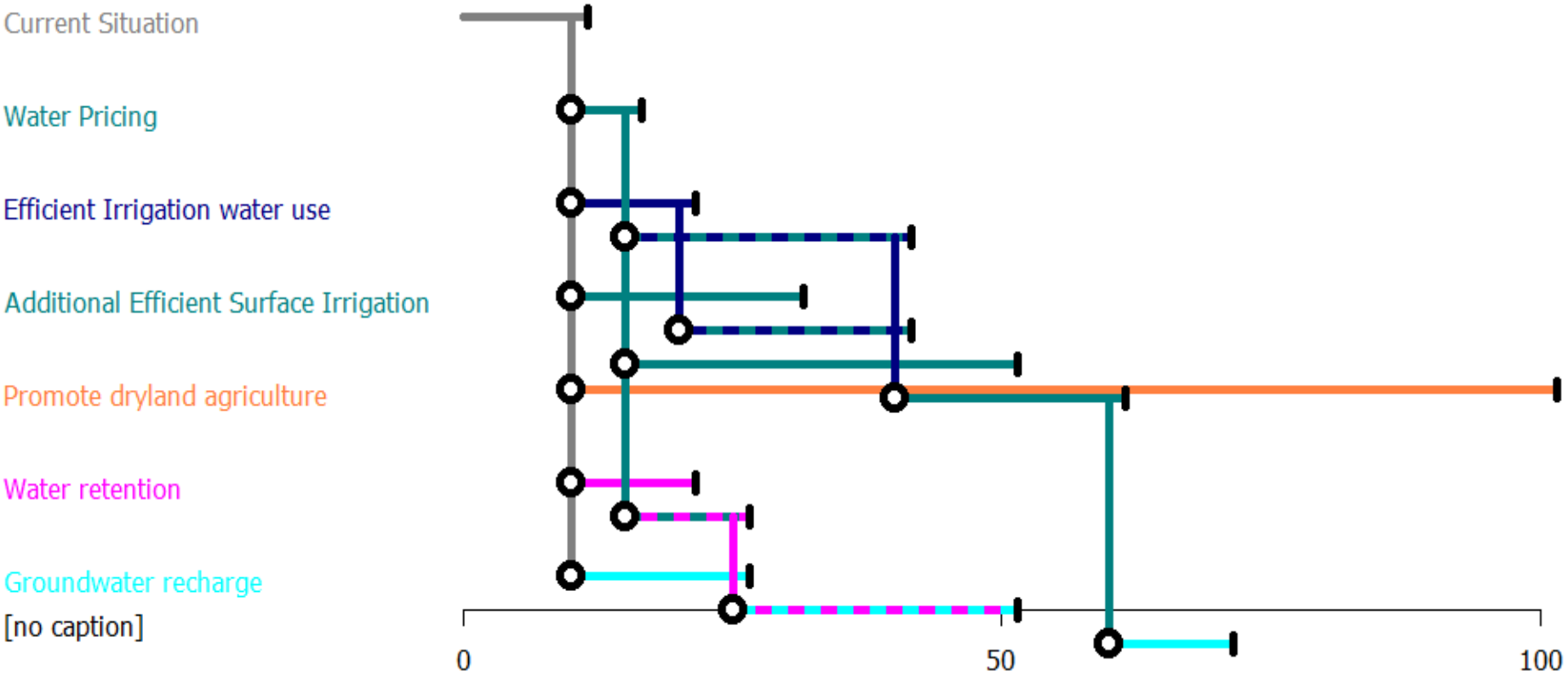
Traditional economy
(low per capita growth)

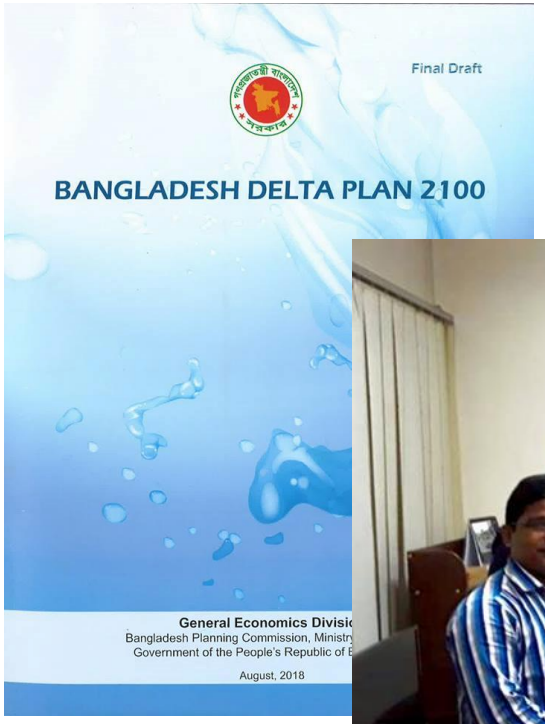
Stagnation

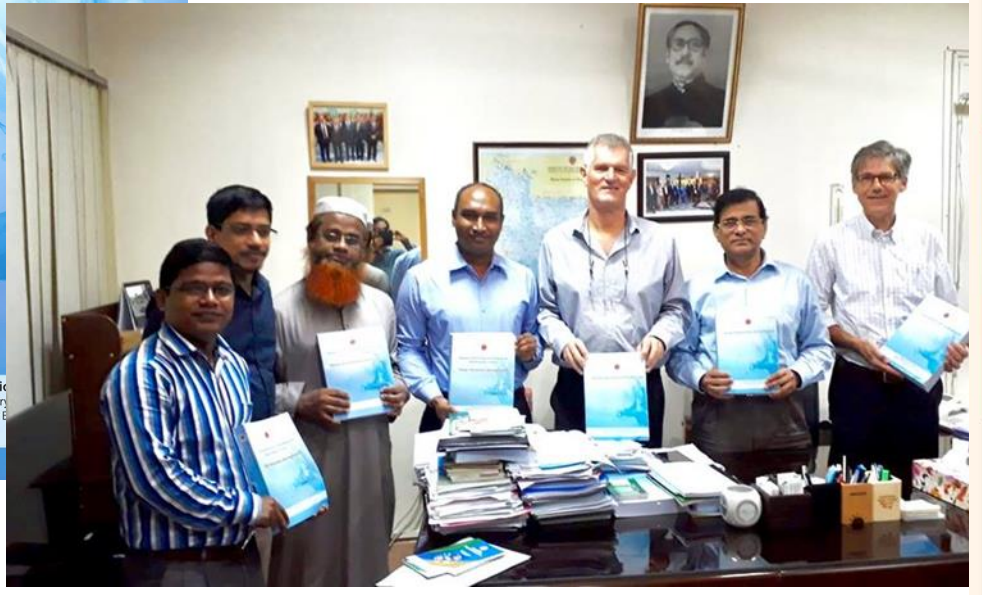
Adaptation pathway – water quantity

Strategic objective:

Priority water needs should be met, whilst maintaining sustainable groundwater abstraction







77% 09:32

NEC approves 100-year delta plan

Published: September 04, 2018 17:26:27 | Updated: September 06, 2018 20:15:17

The National Economic Council (NEC) has approved the long-awaited mega strategy 'Bangladesh Delta Plan (BDP) 2100' in a bid to tap the huge potentials of Bangladesh as a delta country through water resources management, ensuring food and water security and tackling disasters.

On the website of the Planning Commission, Bangladesh
BDP2100: Plan, Investment Programme, Baseline Studies

Summary of the overall process of the BDP 2100 formulation

BANDUDELTAS
BDP 2100

BDP 2100 objective: to realize a sustainable and commonly agreed upon strategy for:

- *Optimum level of water safety & security*
- *Adequate water conditions for food security and sustained economic growth*
- *Institutional Framework for its implementation*

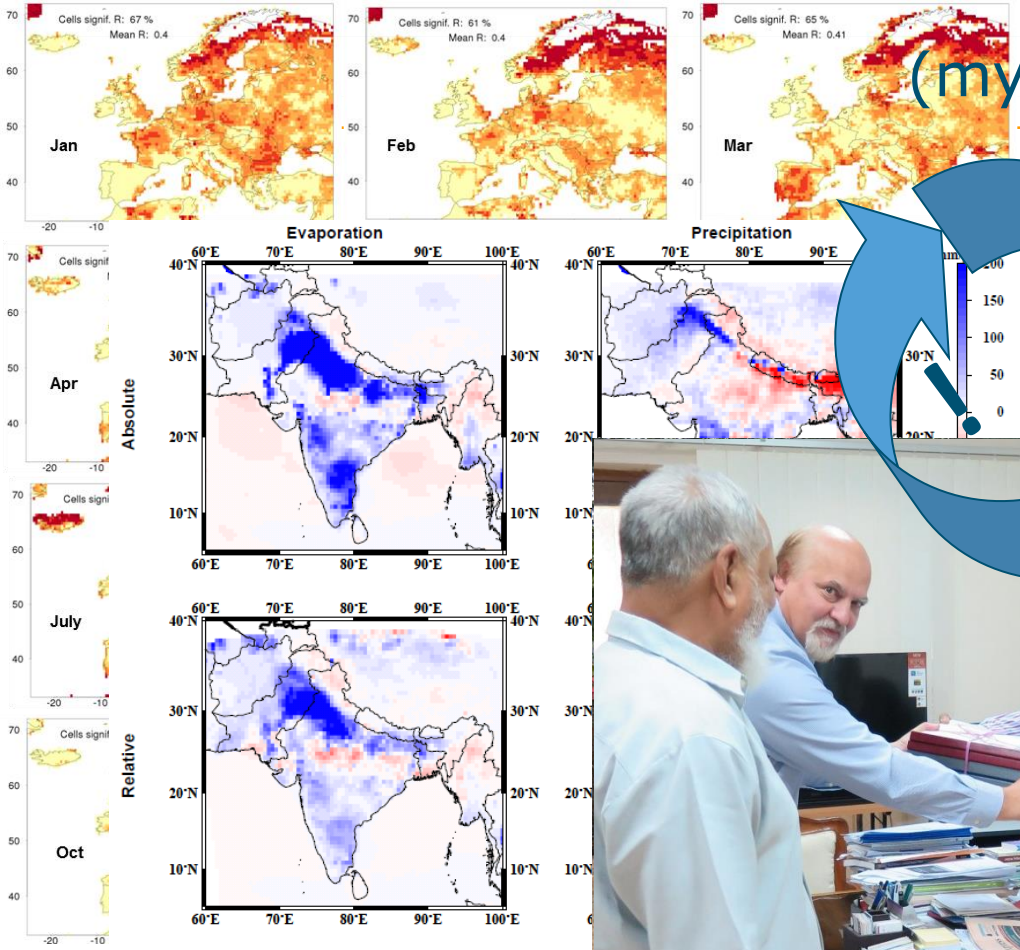
*BDP 2100 offers a new way of planning – **a new way of thinking**:*

*- water centric, multi sectoral techno-economic long term **adaptive** plan, knowledge and science driven. monitoring and evaluation are key part*

BDP 2100 has two elements:

- *BDP 2100 Strategic planning process (planning document, 800 pages): 'what to do' / 'what to know' on short / medium / long term*
- *BDP 2100 Implementation process (annexes): 'how to achieve expected outcomes' (institutional, funding, investment plan (which includes 80 prioritised projects))*

(my) Motivation
Opportunity

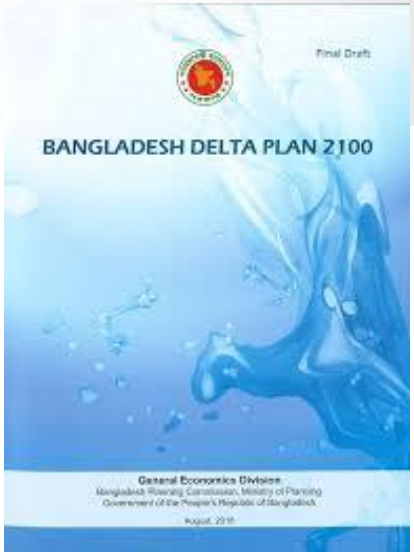


WAGENINGEN UNIVERSITY & RESEARCH

what to do &
when to do what?


Deltares
Enabling Delta Life
CEGIS
Center for Environmental and Geographic Information Services
IWM
Water Environment & Climate
WAGENINGEN
UNIVERSITY & RESEARCH
JOINT COOPERATION PROGRAMME
Bangladesh Netherlands
www.jcpbd.nl

JCP Objectives



- Carry out a long-term knowledge sharing and capacity building program between Bangladesh and Netherlands institutes in the water sector
- With the aim to:
  - Increase the knowledge base of the institutes
  - Strengthen the capacity in Bangladesh to plan, develop and manage (marine and fresh) water resources systems. Capacities include *water system knowledge, data management, decision-support modelling, cooperation and collaboration*
  - Contribute to the BDP2100 Knowledge Agenda

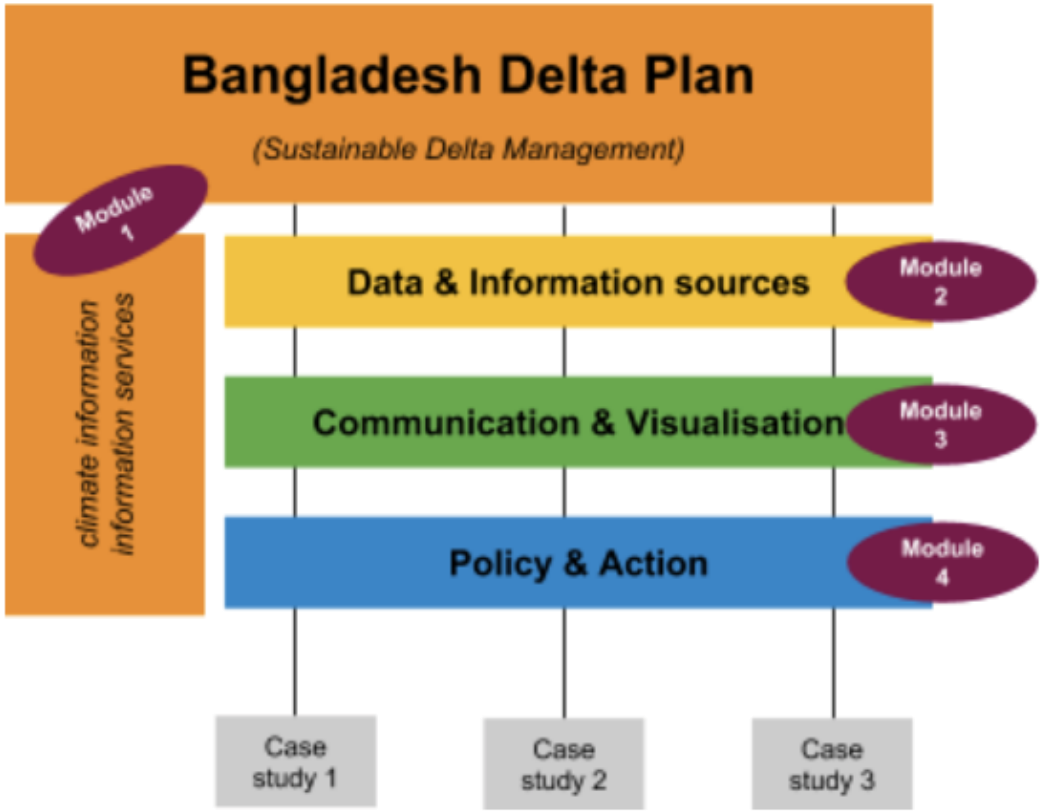
Making a plan needs capacity
Need for capacity also to implement
Building capacity using e.g. online education examples from Delta Cap Project (www.deltacapproject.net)

Presentation builds on presentation by:
Prof Md Shah Alam Khan, Professor, IWFM, BUET **and**
Catharien Terwisscha van Scheltinga, Director Wageningen UR Project Office Dhaka and Saskia Werners, Wageningen University and Research

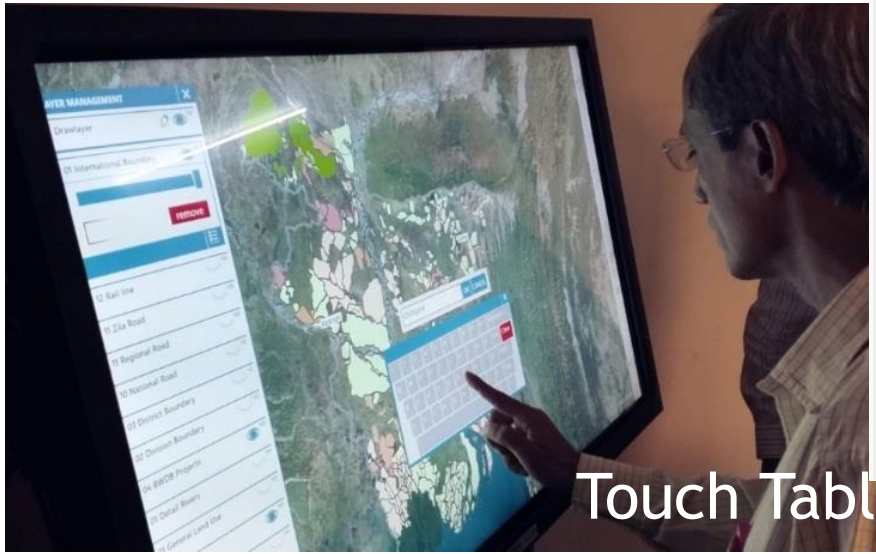
DEVELOPMENT OF A ONLINE COURSE

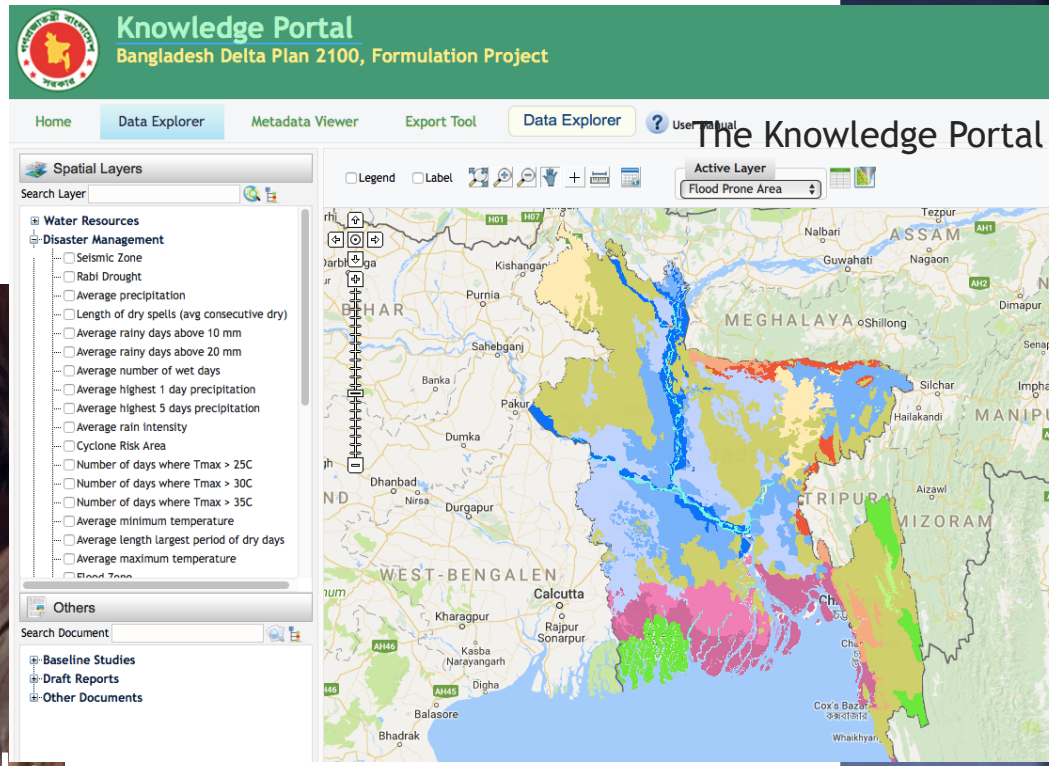
Principles of the course

- Focus on climate information to support *long-term* and *integral* planning
- Free and open data and tools



Training: Information Services for long term planning and design





Training: Information services for Participatory Water Management

- Goal: to make water management (at the small-scale) more resilient to climate variability and change
- By: Learning water managers / users how to use weather and water forecast (water level, salinity) for operational decision making (days – few months)
- And: build capacity with organisations such as LGED, BWDB, and DAE to provide information services to beneficiaries

New ways of using information in water management

Types of **Information services (IS)**

1. IS for disaster risk managment

2. IS for adaptation planning

3. IS for adaptive decision making

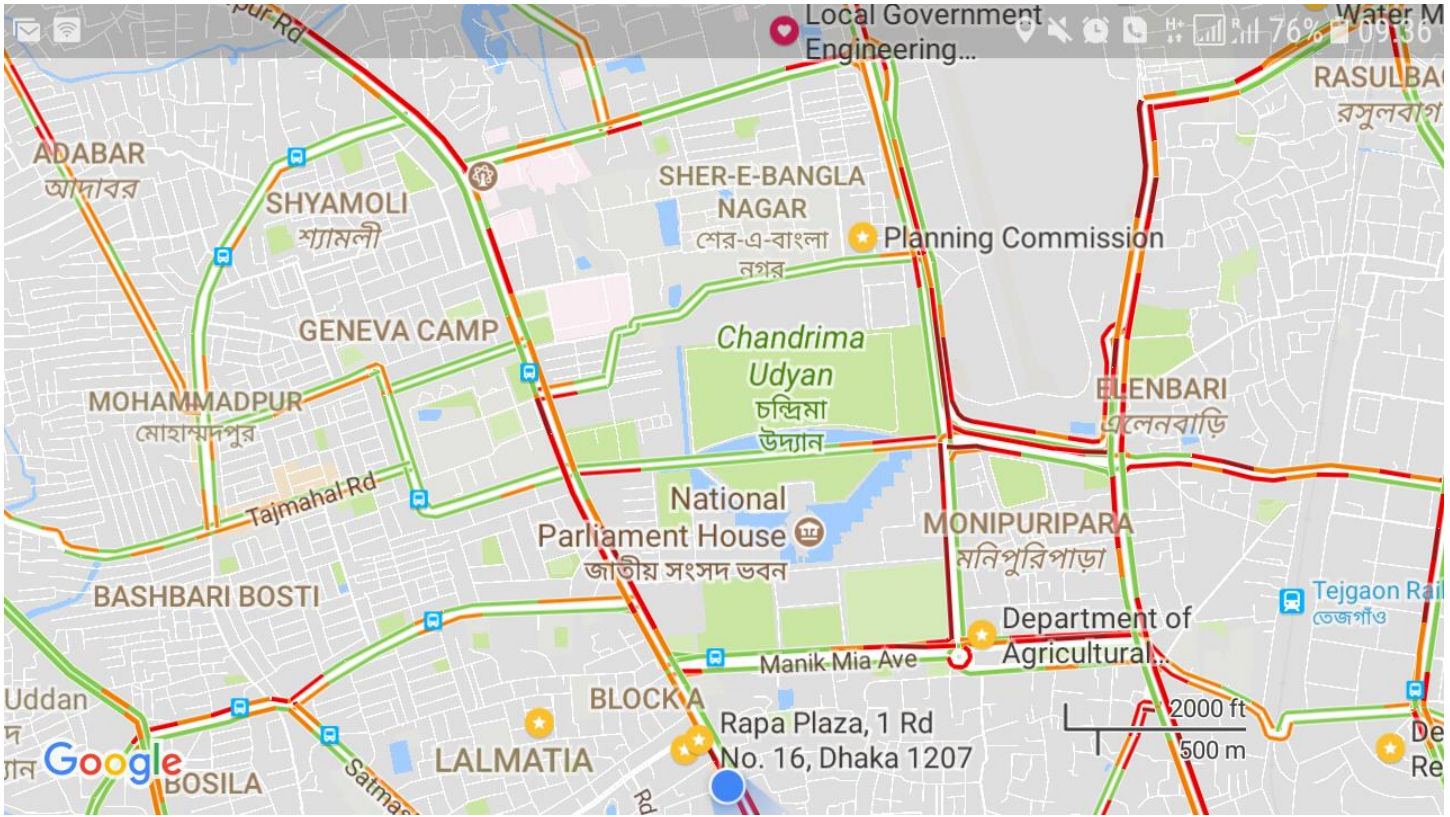
EXAMPLES CLIMATE INFORMATION SERVICES:

1. IS for disaster risk managment

2. IS for adaptive decision making

3. IS for adaptation planning

1) ICTS FOR ENHANCED DISASTER RISK MANAGEMENT (DRM)
GOOGLE MAPS + TRAFFIC + EVACUATION ROUTES /



EXAMPLES CLIMATE INFORMATION SERVICES:

1. IS for disaster risk managment

2. IS for adaptive decision making

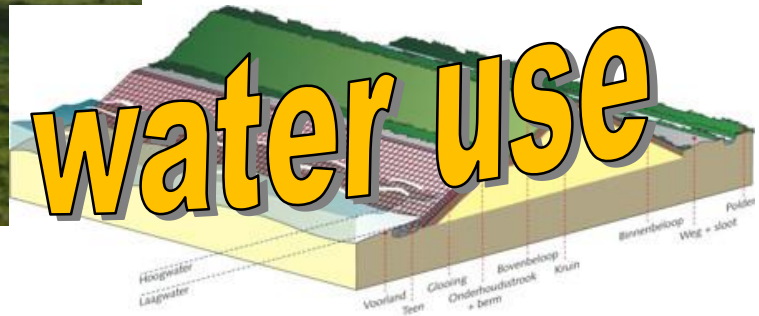
3. IS for adaptation planning

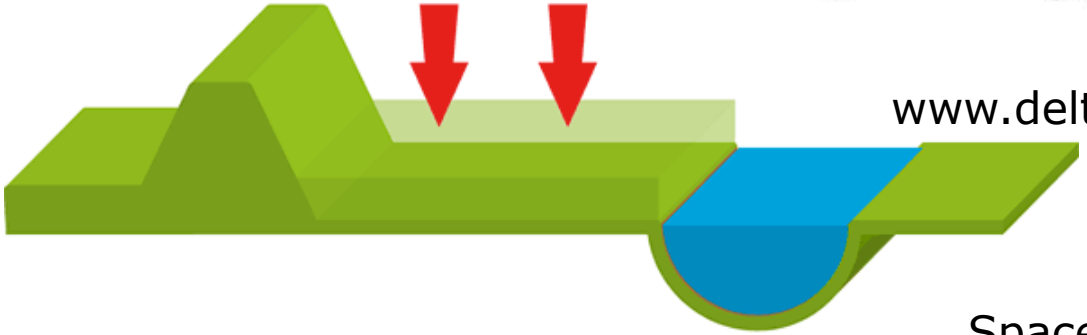
WATER LEVELS + SALINITY

HydroNET Water Control Room dashboard Hollandsche IJssel

- http://www.hydrologic.nl/storm-en-springtij-op-noordzee-hoe-reageert-watersysteem-op-sluiting-stormvloedkeringen/

From static to dynamic land and water use





www.deltawerken.com

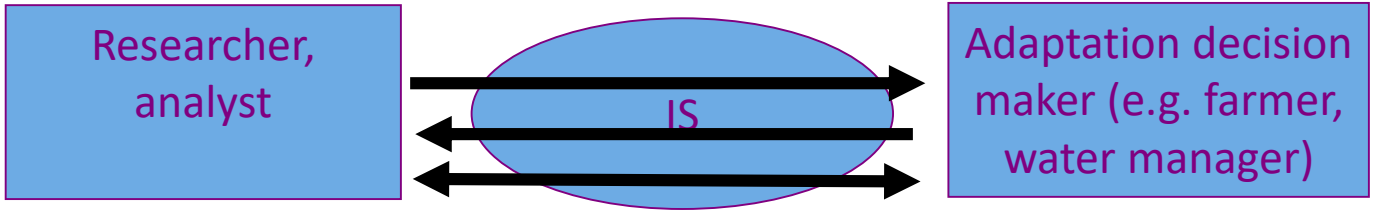
Space for the rivier

SUMMARY: OPPORTUNITIES TO IMPLEMENT BDP2100 BY INTEGRATING INFORMATION SERVICES INTO WATER MANAGEMENT

1. IS for disaster risk managment

2. IS for adaptation planning

3. IS for adaptive decision making



- One way or two-way communication (sending information or co-production)

Bangladesh Delta Plan

Research Method: Survey, interview, focus group

Rice

What to do: Increasing salinity ->

5 **10** **20** **30 ppt salinity**

Shrimp

Crab, other aquaculture

Pathway 1: Large farmers / landowners

Concern: Reduced income from shrimp

Adaptation: Continue salt water agriculture with other varieties if necessary

Salt tole-rant rice

wet season rice farming

Pathway 2: Small (lease) farmers

Concern: Food security & drinking water

Adaptation: Continue rice farming, look at NGOs and government for support

seasonal migration

Permanent migration

Pathway 3: *Landless farmers*

Concern: Food security & drinking water

Adaptation: Migration

DIFFERENT ACTORS -> DIFFERENT PATHWAYS

Food in deltas

Not only ‘water’ is important in deltas.

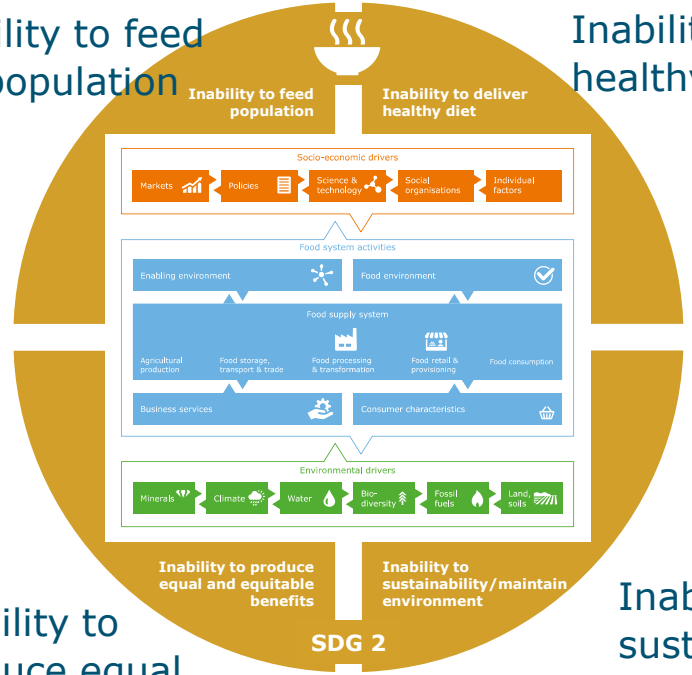
Also wider angle to address wider issues, like food.

The "**food system**" approach provides an analytical framework for conceptualizing **food** related actors, relations and processes and for introducing a policy focus on the socio-ecological sustainability of **food** production and consumption
(van Berkum et al, 2018)

Failure of Food System: different narratives

Inability to feed the population

Inability to deliver healthy diet



(adapted from Bene, 2018)

Inability to produce equal and equitable benefits

Inability to sustainability / maintain the environment

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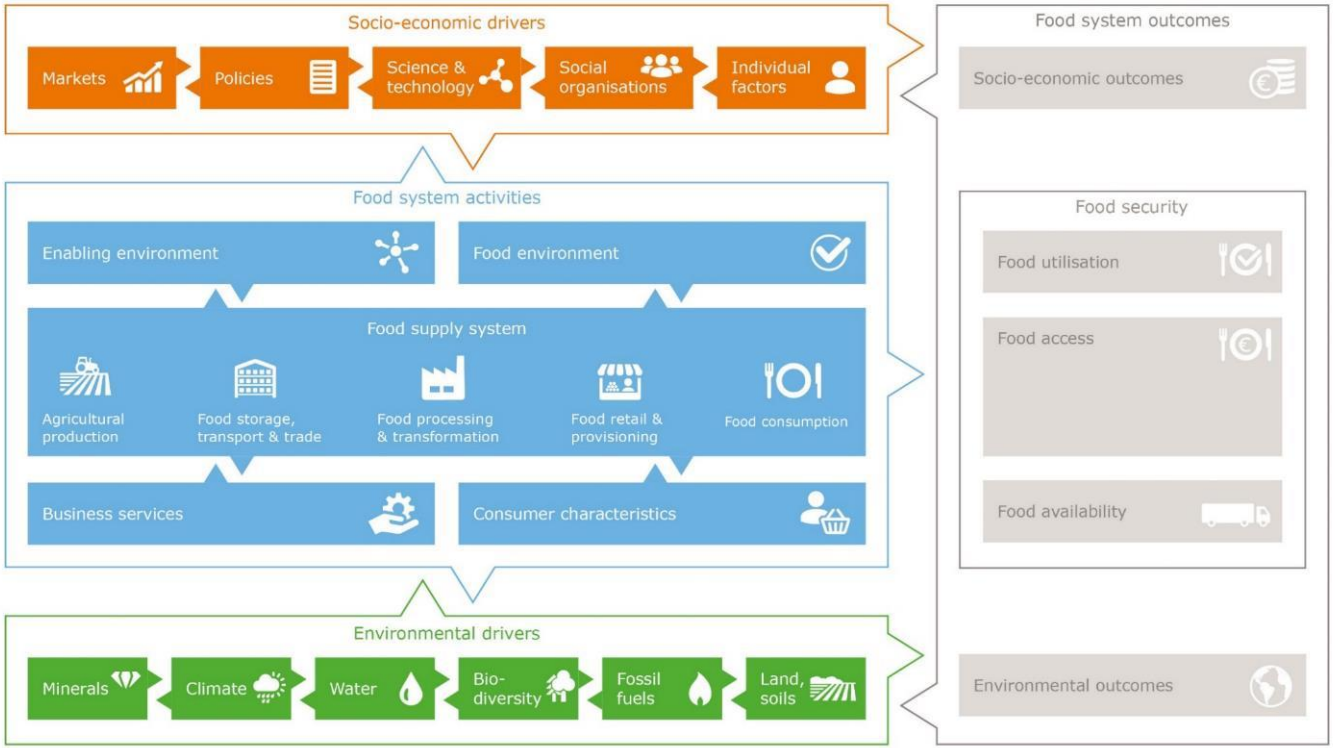
Food System Approach



Van Berkum et al, 2018

Food systems in deltas under pressure

- Challenge: transition in deltas
- Drivers of the change: climate change, dietary change, urban expansion, land use change/market change
- Need to identify **sustainable transition pathways**
- Two case studies – Vietnam and Bangladesh
- Envisaged output:
    - support to sustainable transition pathways in deltas
    - concept to think about FS in deltas developed
    - tools available, also to be used in other deltas

Food systems in deltas under pressure

1. Insight in transition pathways in deltas with challenges: sea-level rise, salinity, water quality problems – besides population pressure, urbanization and changing diets
   - Resilient and diversified food production options
   - Robust integrated systems
   - Informed decision making at farmers' level
2. Look at solutions (future, adaptation)
3. Develop knowledge while collaborating with partners in practical cases, linking local, regional, national level

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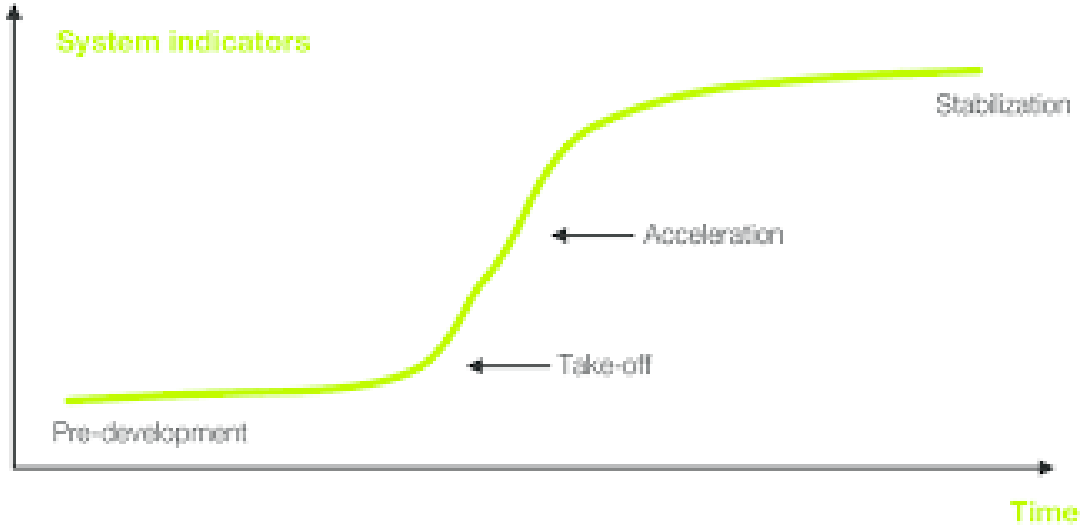
Transition



a.o. Timmermans, 2006, after Rotmans, 2000

Adaptive Delta Management

- From sector-driven development to integrated development; new knowledge
- Co-creation: share knowledge and approaches but learn to adapt, include NGOs, business and government in ACTION RESEARCH
- Focus on adaptation for resilience and development; research solutions and problems
- Growing with sediment and salinity

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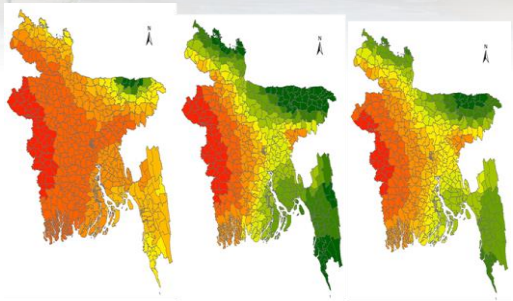
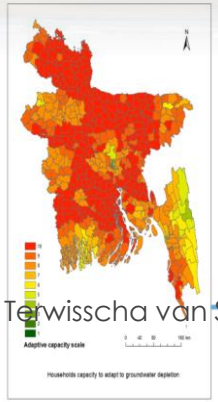
Implemented by:

german cooperation
DEUTSCHE ZUSAMMENARBEIT

giz für Internationale Zusammenarbeit (GIZ) GmbH

Nationwide Climate Vulnerability Assessment in Bangladesh





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www.plancomm.gov.bd

Support to Implementation of
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