

# Climate and Land Use Changes - Implications for Water and Food Security in Bangladesh

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# Overview

1. Introduction
2. Climate and land use change in Bangladesh
3. Implications for water and food security
4. Reflection on possible next steps



Short CV

Catharien Terwisscha van Scheltinga

- Senior Researcher, Water & Food Systems, Wageningen Environmental Research
- Originally trained in irrigation and soil and water conservation
- Working on integrated water management
- Leading WUR research on deltas
- 30 years of experience in Bangladesh
- Contributed to BDP2100
- Catharien.Terwisscha@wur.nl
- <https://weblog.wur.eu/fnh-ri/combined-insights-stimulate-sustainable-food-production-in-deltas-under-pressure/>
- [www.wur.eu/food-in-deltas](http://www.wur.eu/food-in-deltas)

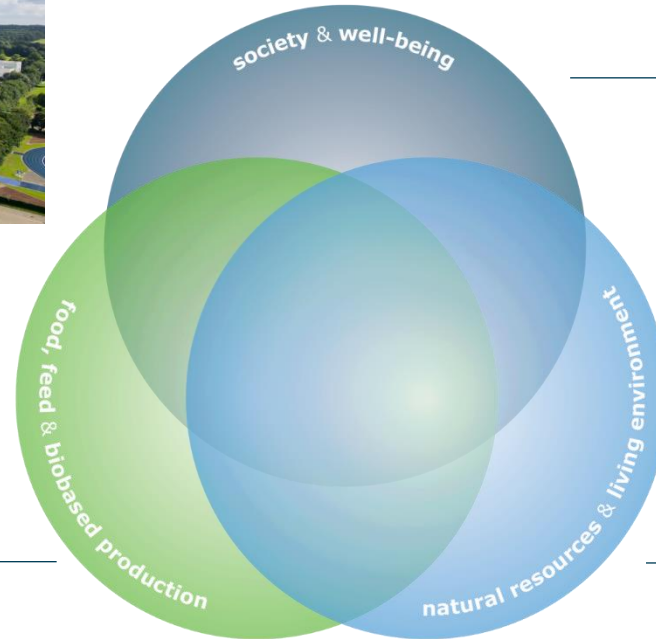
# Wageningen domain: Food and Living Environment

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

[www.wur.nl](http://www.wur.nl)



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



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

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



**100years**

# WUR engagement in Bangladesh

1. Trade off and Synergies
2. Transition pathways
3. Salinity Hotspot Identification
4. Water for food for future (JCP – MIR)
5. Seasonal to sub-seasonal forecasting (S2S)
6. Climate Smart Agriculture

## Collaboration with

- knowledge institutes (IWM, CEGIS, BUET, BAU, KU, PSTU), government organizations (DAE, BMD)
- NGOs (Solidaridad, Uttaran, Max Foundation) and private sector (Lal Teer)
- and international organizations (FAO, WB, ADB, IRRI, CIMMYT)



# Different types of change, simultaneously

## Climate Change

- IPCC expects the total annual amount of rain to go up
  - At ICWFM9: Increase in extreme events of higher intensity
- = More, at uncertain times – uncertain patterns



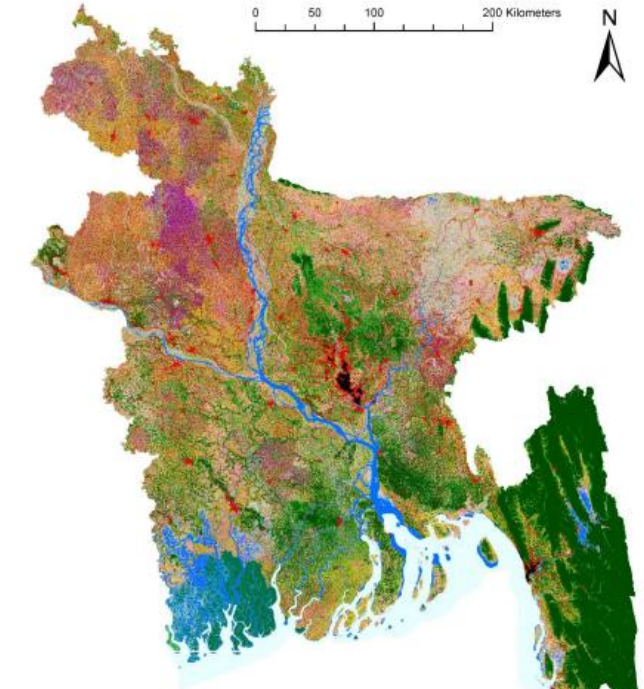
## Land use change

- Cities increasing
- Forest, nature, wetlands decreasing
- Agricultural land decreasing

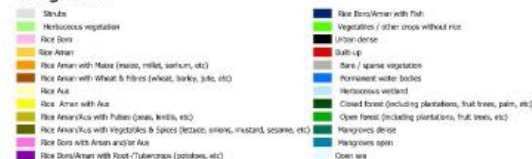
NB: Diet also changing

# Complex: data / facts

- Land use classification Bangladesh, combining and downscaling existing databases (figure 10)(Van Haren et al, 2022)
- [DOI: 10.18174/576671](https://doi.org/10.18174/576671)



Land use classification  
Land use 2020  
Bangladesh



# Salinity

Complexity – regarding facts on salinity:

- Water (ground water and surface water) and soil related salinity (not same)
- Salinity is seasonal (not same throughout the year)
- and not same over the years (increasing)
- Different depths
- Affected by rainfall – variability and change
- Affected by water management and land use
- Affected by sea level rise

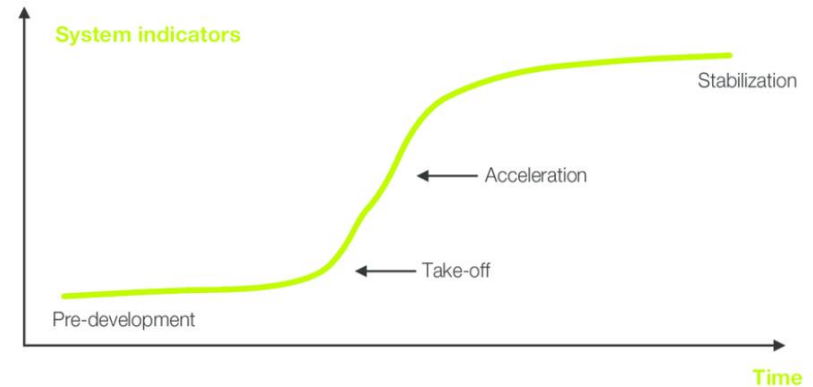
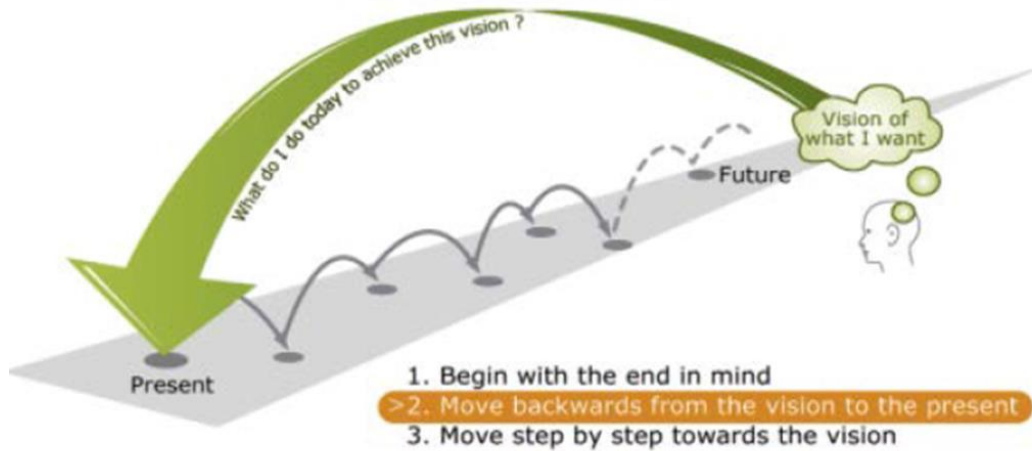
WUR currently working on global hotspot identification  
– also interested to work at national level.

## 2. Longer term: uncertainty and complexity

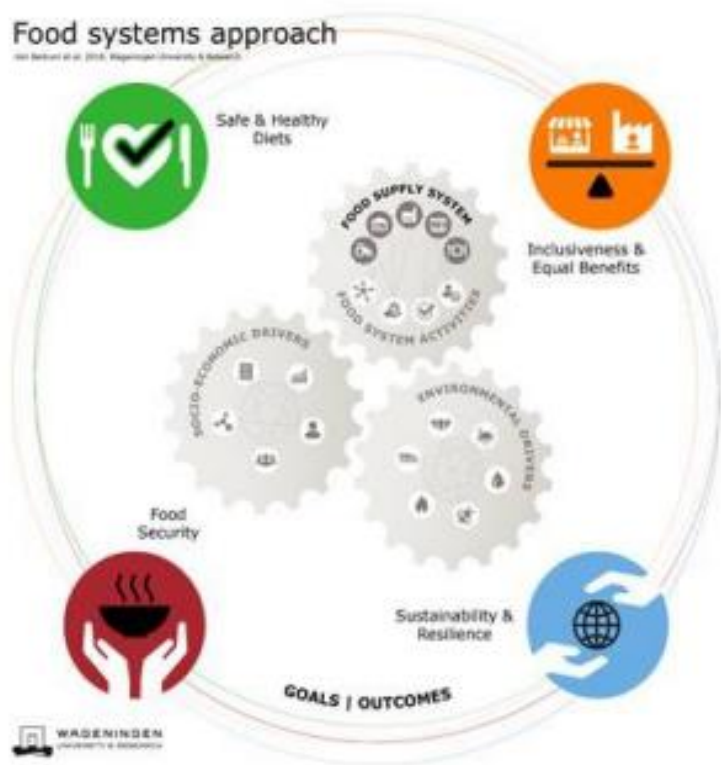




# Transition to future - Pathway



# Food System Approach: Changing agriculture and food situation in deltas



- Value chain
- Environmental factors
- Socio-economic factors

1. Focus on production alone is not enough
2. Need for a systems approach: Bringing balanced approach in the picture
3. Need to deal with uncertainty and complexity

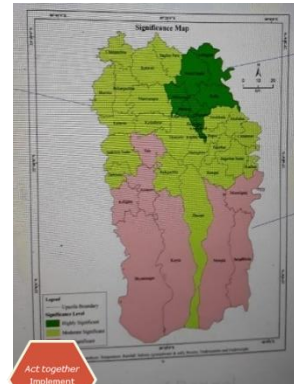
# Bangladesh agriculture system change



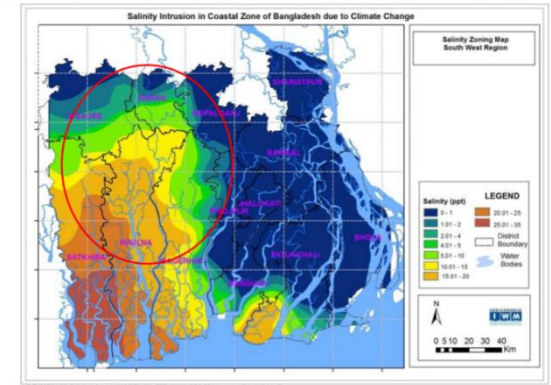
<http://www.plancomm.gov.bd/>

## WUR research collaboration with Solidaridad: exploring pathways

- Dairy/salinity
- Mango export
- Shrimp/mangrove
- Vegetables



May, 2030 climate change (A1B) with minimum Transboundary flow under Ganges Treaty







# Cattle - future

- More demand for milk
- Need safe drinking water
- Water more saline in future
- Start fodder cultivation
- Road development
- Personal circumstances



# Transition Pathway: farmers perceptions at field scale



Experience in south west Bangladesh	Current		Future		Transition Pathway towards perceived sustainable future
<b>General information</b> <ul style="list-style-type: none"> <li>• Salinity level</li> <li>• When highest</li> <li>• where highest</li> </ul>					
<b>Agriculture</b> 					
<b>Livestock</b> 					
<b>Shrimp</b> 					
<b>Drinking Water</b> 					

# Bangladesh agriculture system change



WUR research on water management and food systems in deltas: [www.wur.eu/food-in-deltas](http://www.wur.eu/food-in-deltas)

<https://research.wur.nl/en/publications/food-systems-in-the-bangladesh-delta-overview-of-food-systems-in->

Interesting question: can we use these (water and) food system guidelines to link e.g. BDP and AT programmes to create synergy?



# Next steps

- BDP2100 – regular update
- Further alignment, e.g. water and food: explore synergies between BDP2100 and Agric Transformation Program
- Strengthen the link international-national-local, e.g. on salinity
- Information services for farmers
- Youth – capacity building – e-learning on BDP2100 and water and food alignment



# Thank you ধন্যবাদ

## Summary

1. Water and food decisions interrelated – systems approach
2. Climate and land use change are happening simultaneously
3. Study, data and monitoring parallel with implementation




## Next steps

1. Address salinity
2. Info services for farmers
3. Youth – E-learning

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Spark the future, **join the Challenge!**

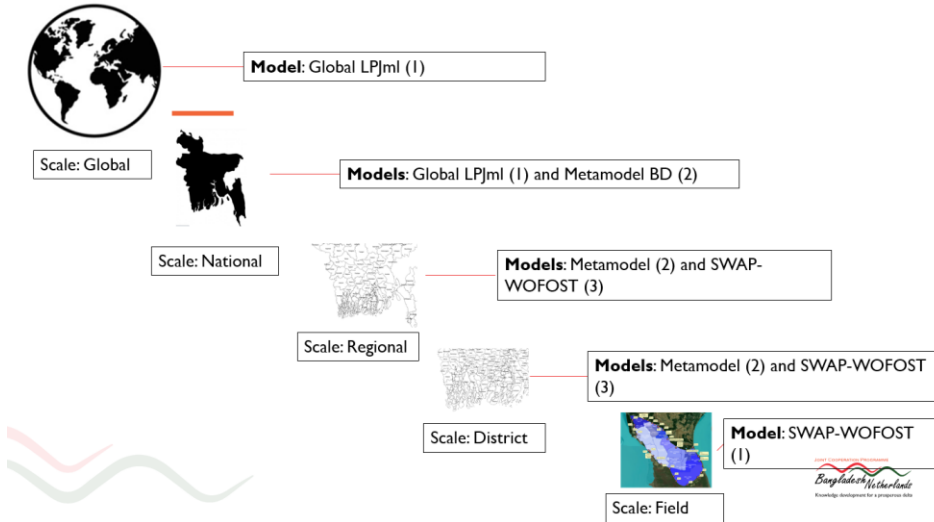
Nature-based  
**Future**  
Challenges

<https://www.nbfchallenge.nl/>



SPARK THE FUTURE,  
JOIN THE CHALLENGE!

# 4. Water – agriculture – food - future



JCP – Make it Real – [www.jcpbd.nl](http://www.jcpbd.nl)  
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