



The Dutch Delta model to support national policy analysis

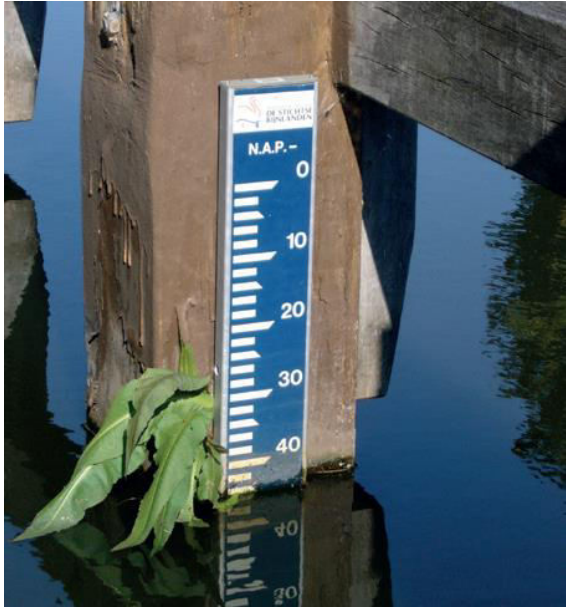
Erik Ruijgh

Deltares, the Netherlands

16 maart 2016



Water management in the Netherlands



World Water Congress XV
International Water Resources Association (IWRA)
Edinburgh, Scotland. 25th to 29th May 2015



Deltares

Water management in the Netherlands



World Water Congress XV
International Water Resources Association (IWRA)
Edinburgh, Scotland. 25th to 29th May 2015

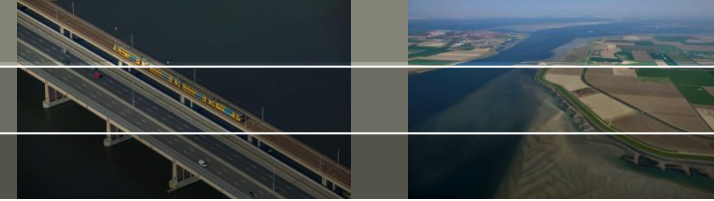


Deltares

Water management in the Netherlands



Delta programme



Historically, measures were implemented **AFTER** a disaster.

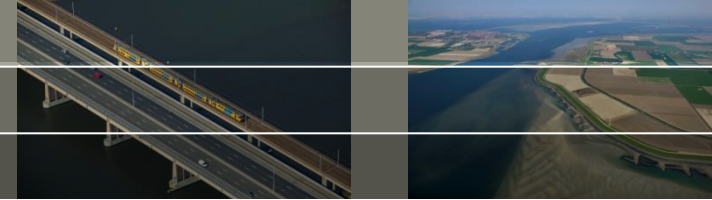
The Dutch government started the Delta programme to implement a series of measures to **PREVENT** new disasters.

Focus on consequences of climate change and socio-economic development.

Both flood risk, drought management and spatial planning are included.



Delta....



- Delta commission
- Delta commissioner
- Delta act
- Delta fund
- Delta programme
- Delta decisions
- Delta model / Delta scenarios



Delta programme

Generic sub-programs:

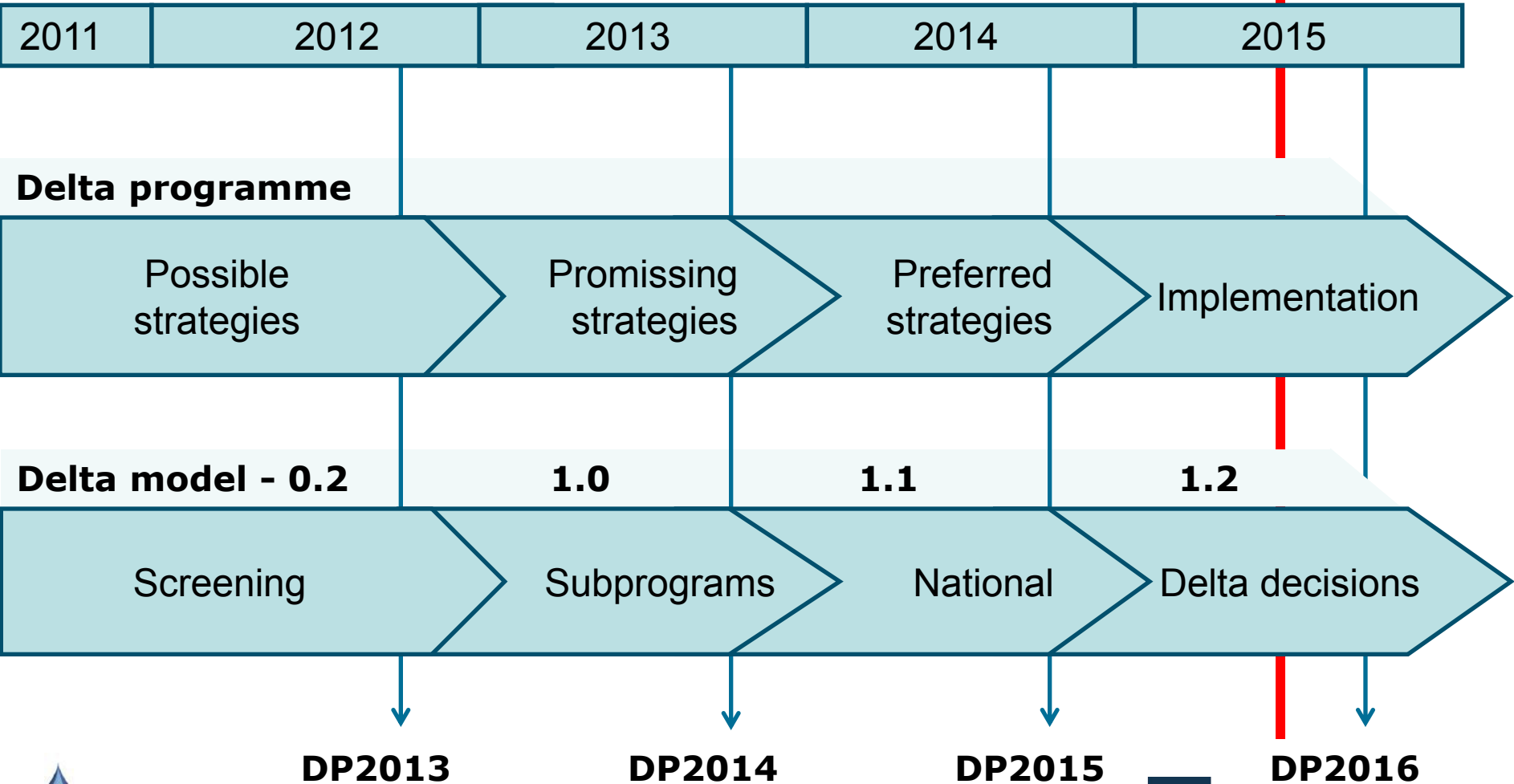
- Flood protection
- Fresh water supply
- Reallocation and renovation

Regional sub-programs:

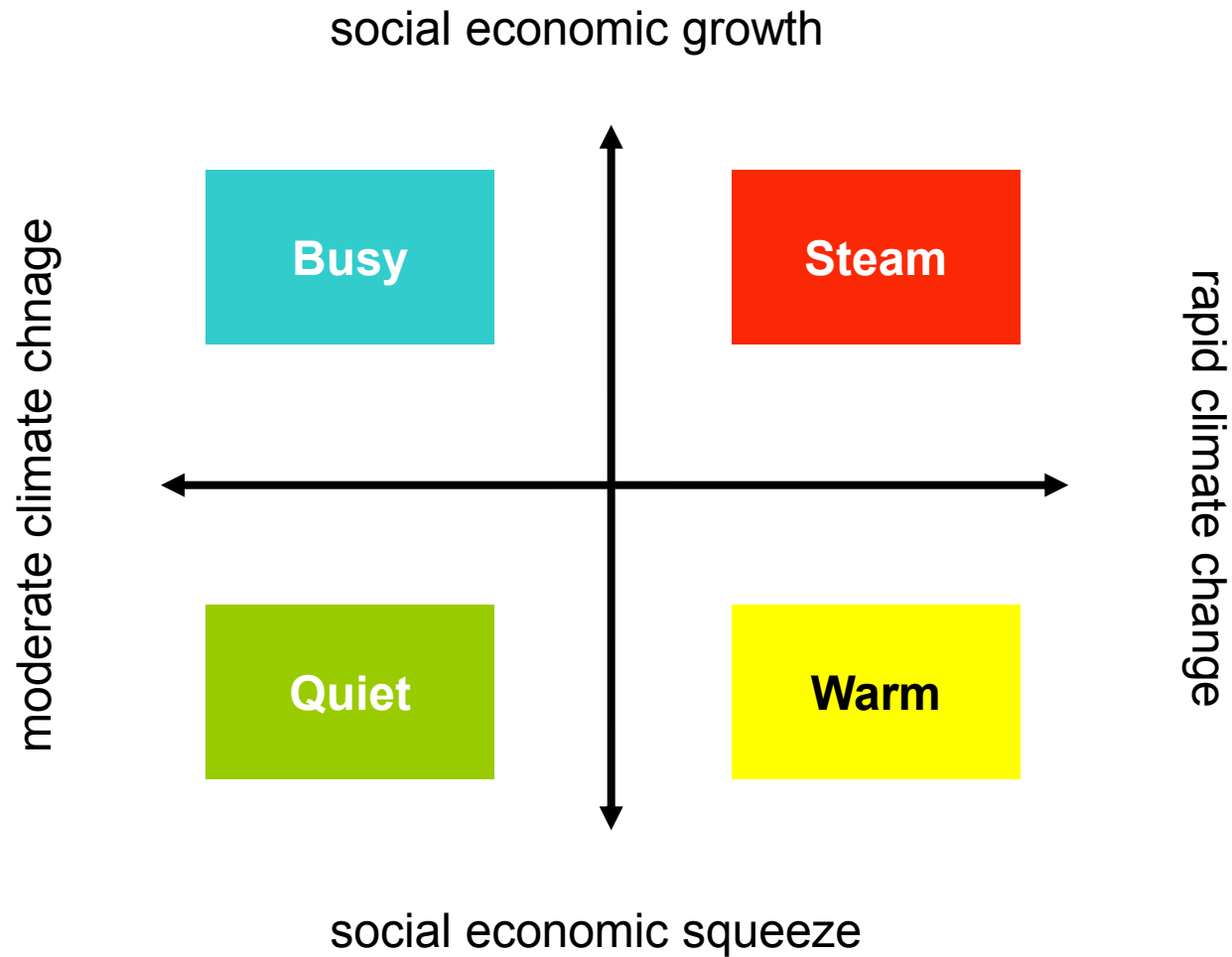
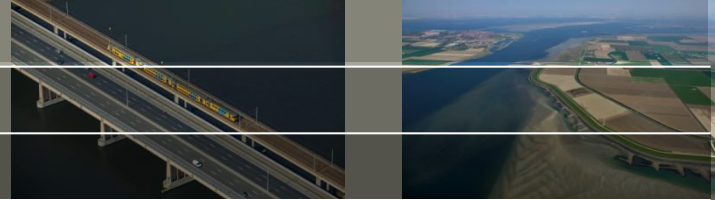
- Coast
- Wadden region
- **Southwest Delta**
- **Rivers**
- **Rhine Meuse estuary**
- **Lake IJsselmeer region**



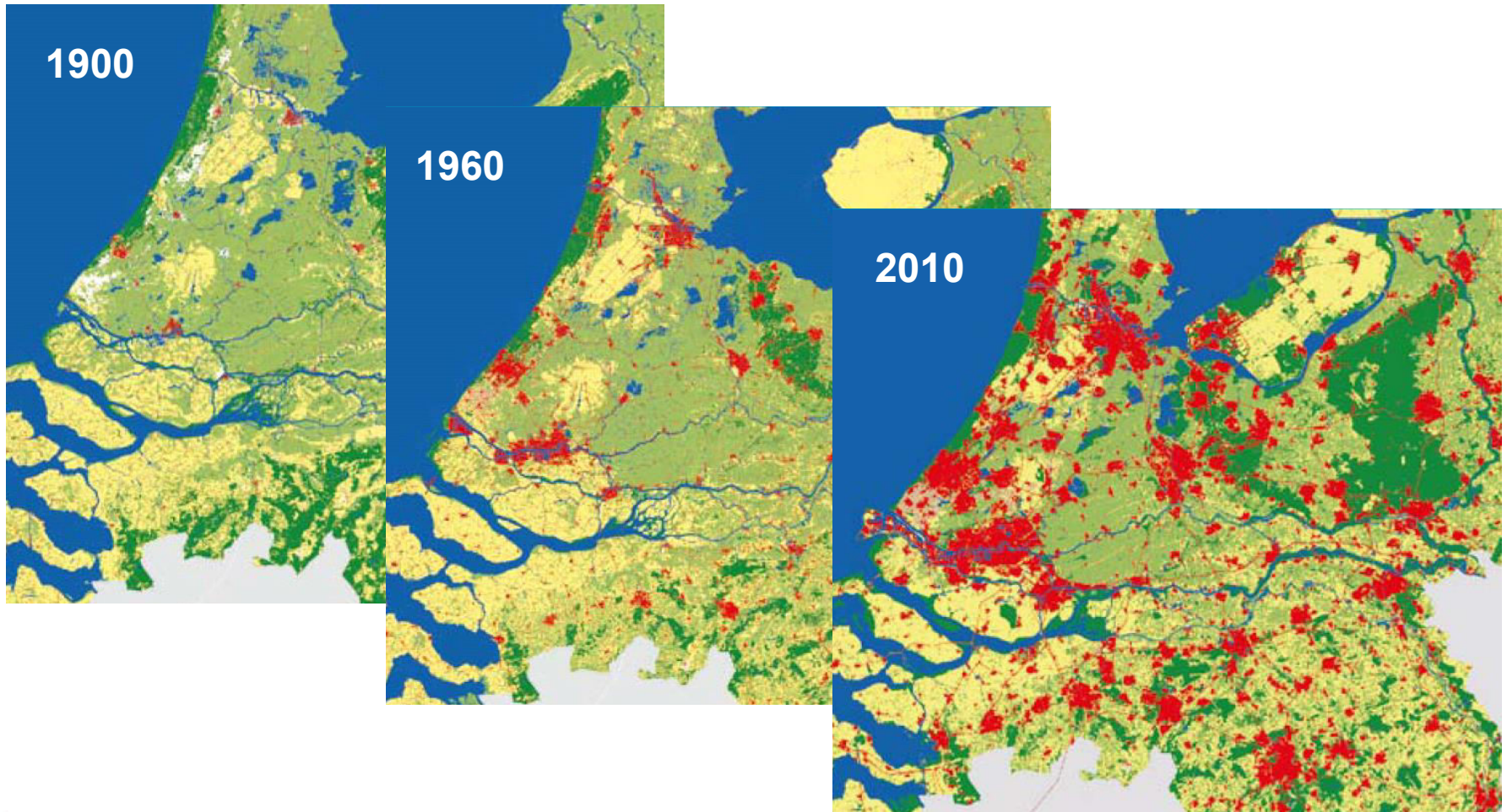
Planning



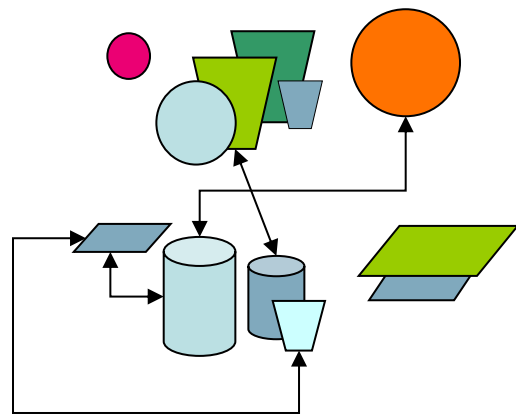
Delta scenarios



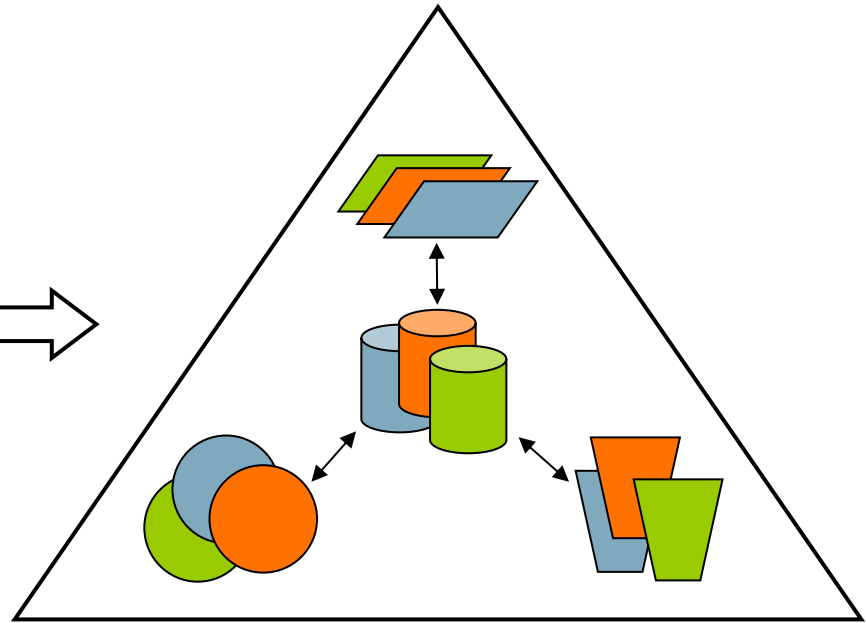
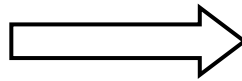
Delta scenarios: urban development




The Delta model: a coherent set of models



original situation




Deltamodel

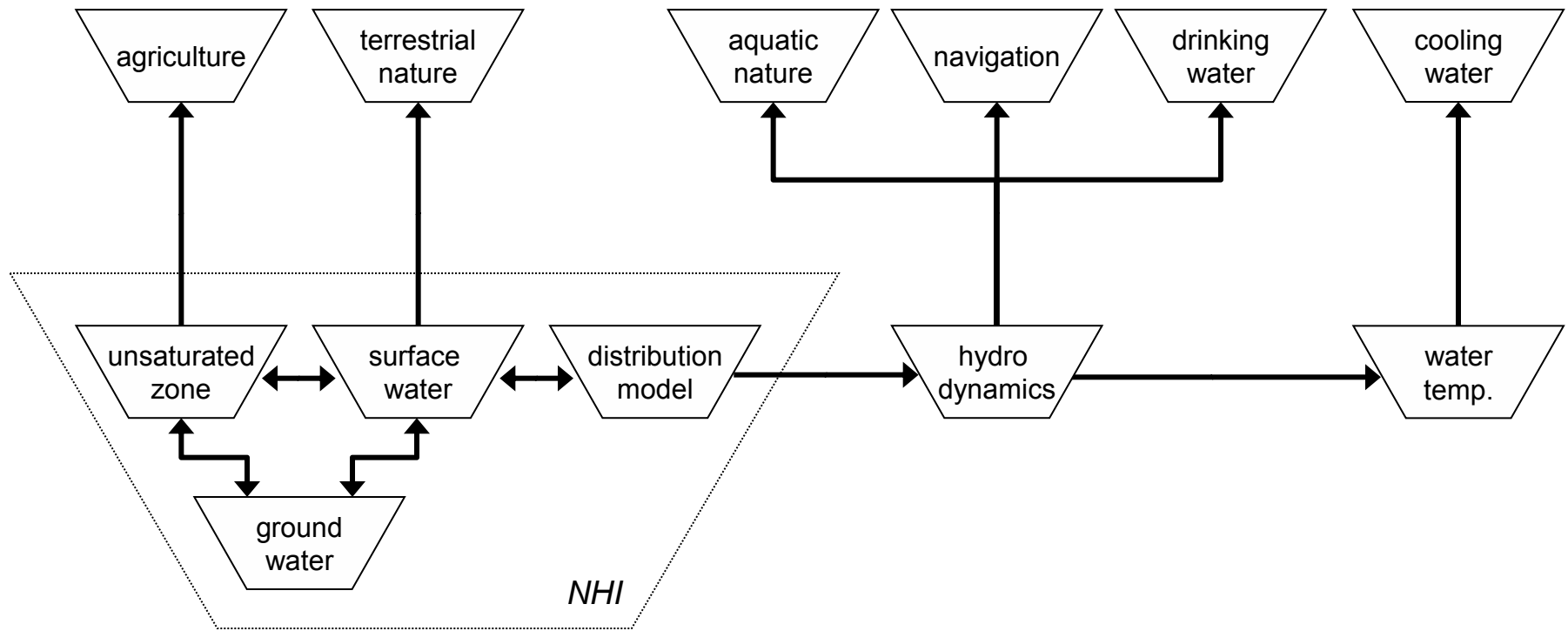
 measure, scenario

 database

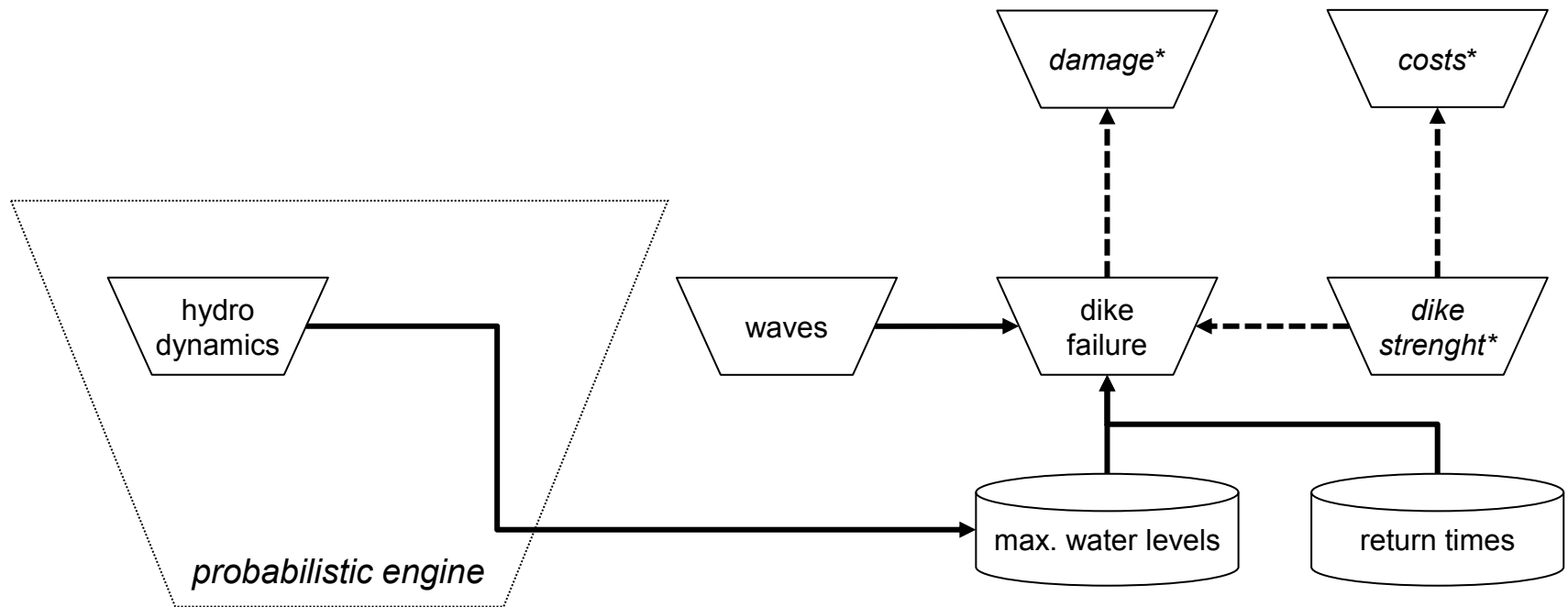
 model

 impact assessment

Delta model components for Fresh Water



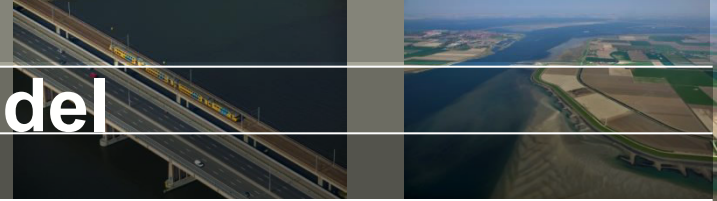
Delta model components for flood protection



Lots of meetings, participants, discussions



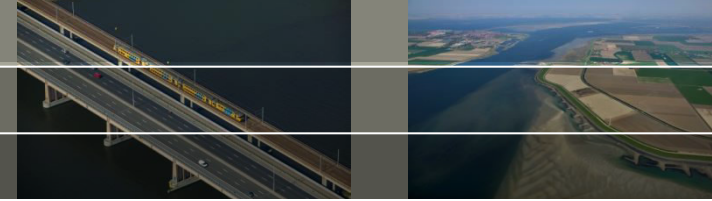
Requirements to the Delta model



- **Functionality**
 - Scenarios: climate change, sea level, socio-economic
 - Measures: new storm surge barriers, operation rules, water use
- **Useability**
 - Large amount of calculations, transparent and reproducible
- **Consistency**
 - Flood protection and Water allocation, models, data
- **Acceptance**
 - Delta commission + Ministry + regional watermanagers + scientists
- **Accuracy**
 - Compared to available monitoring data



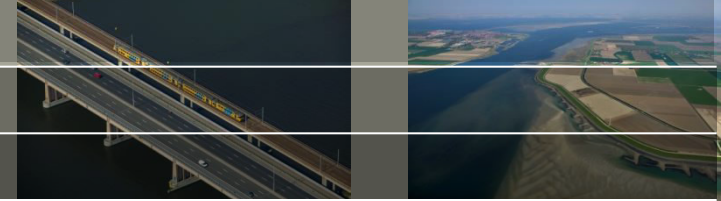
Dilemma



- These requirements are (partly) contradicting
 - Acceptance vs. Consistency
 - Accuracy vs. Functionality
 - Functionality vs. Useability
- It was not possible to implement all requirements



Views on the Delta model



Policy makers

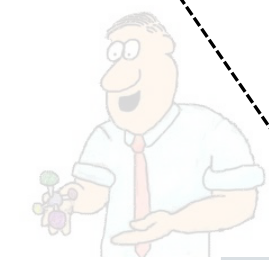
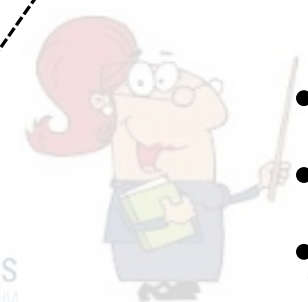
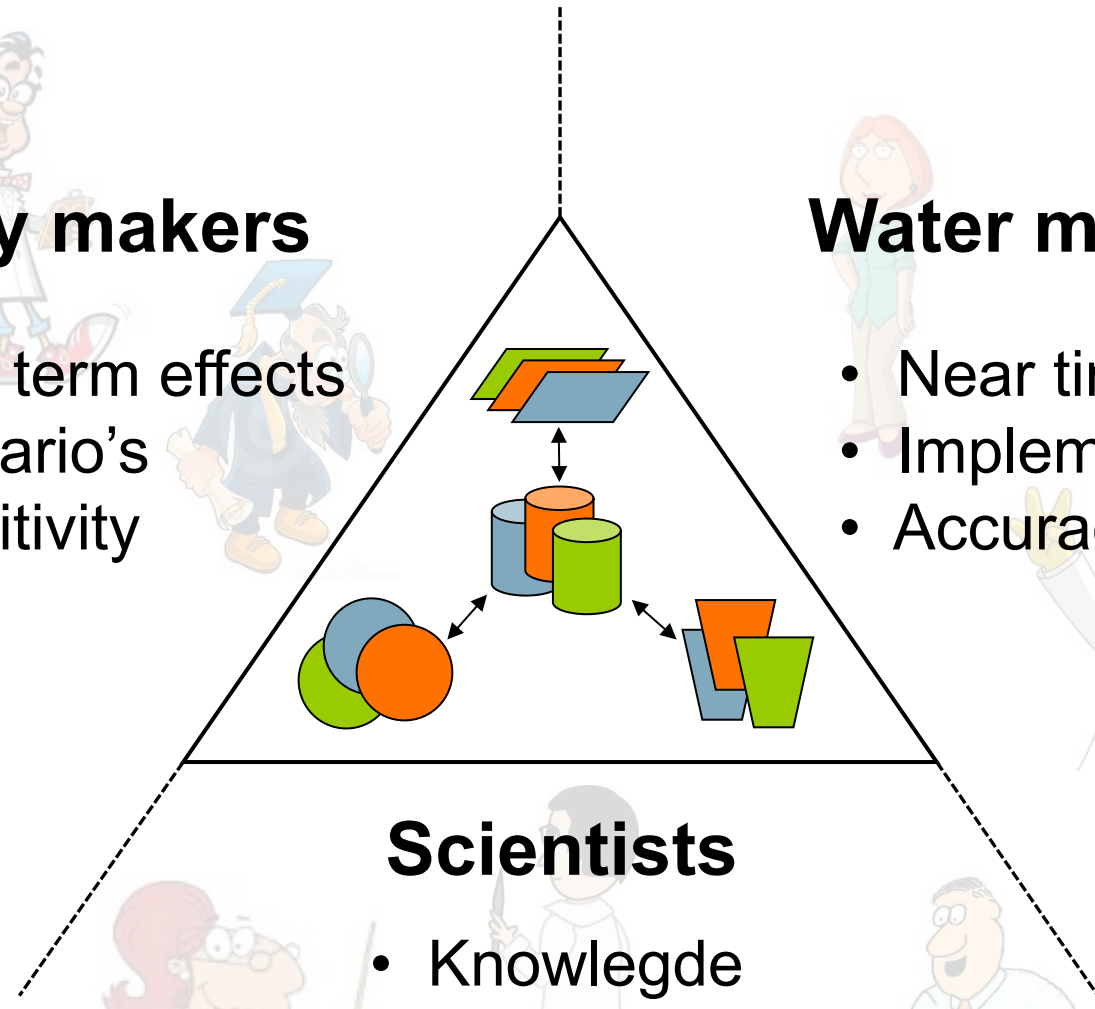
- Long term effects
- Scenario's
- Sensitivity

Water managers

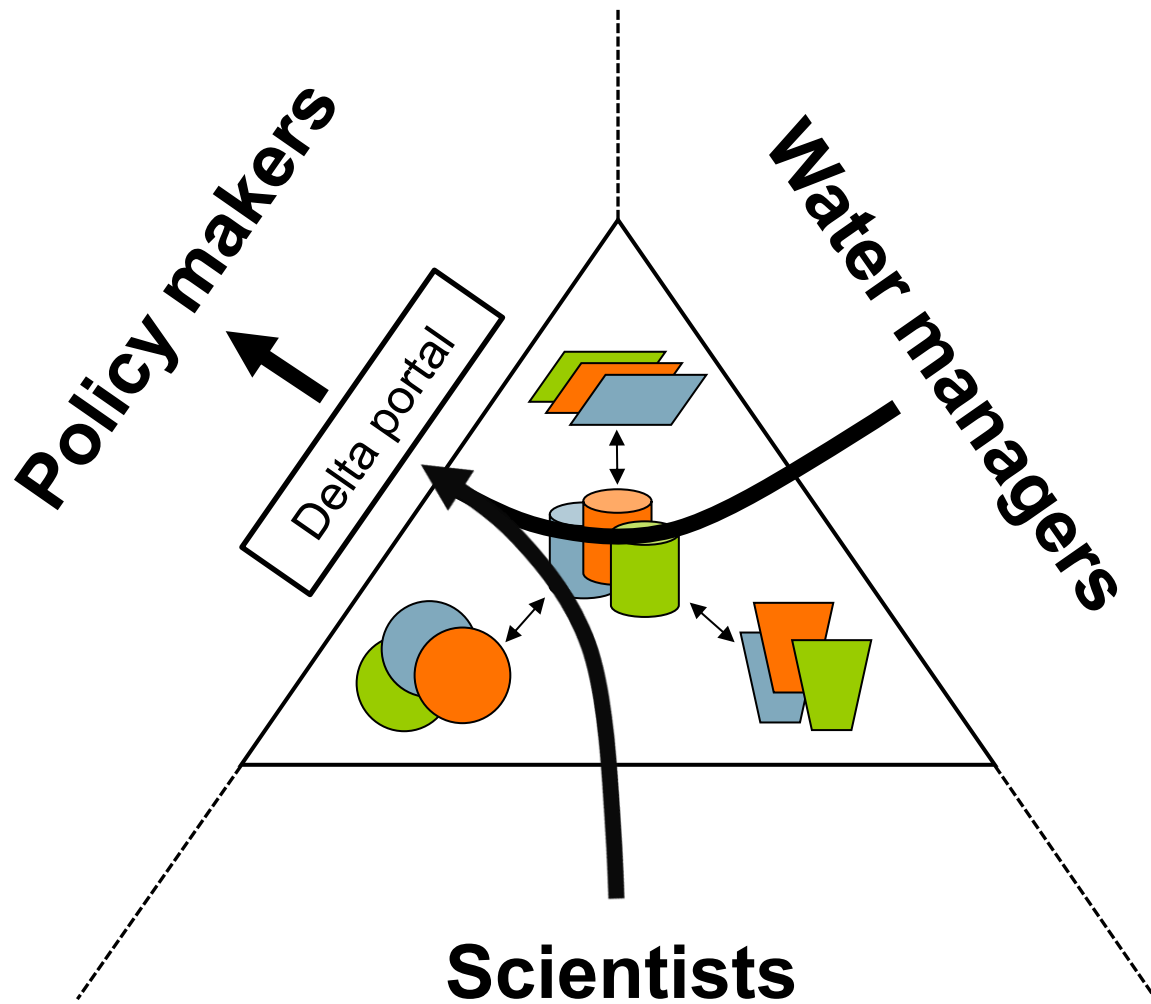
- Near time effects
- Implementation
- Accuracy

Scientists

- Knowledge
- Software
- Consistency



Approach to gain acceptance

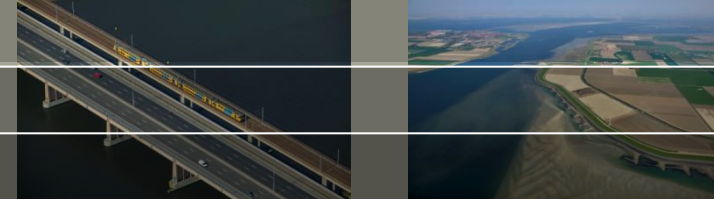


Model resolution “Fit for Purpose”

	Spatial resolution		Temporal resolution	
	Droughts	Floods	Droughts	Floods
Policy analysis	Regions	Rivers	Years	Season
Forecasting	Districts	River stretch	Days	Hours
Management & Maintenance	Field	Dike segment	Hours	Minutes
Design & Construction	hectare	Talud	Minutes	Seconds



Conclusions

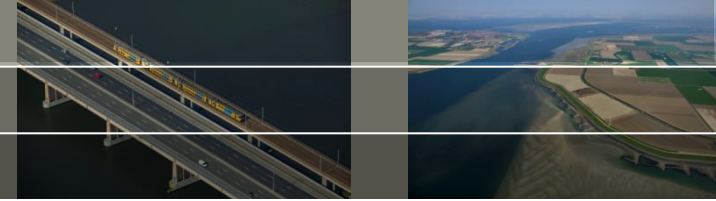


Delta model provides a coherent set of models for flood risk and drought management in the Netherlands.

Acceptance was gained by using fairly detailed models of regional watermanagers for national policy analysis.

Next steps will be to reduce the complexity of the included models, in order to improve the useability for policy analysis.





Thank you for your attention!

erik.ruijgh@deltares.nl



World Water Congress XV
International Water Resources Association (IWRA)
Edinburgh, Scotland. 25th to 29th May 2015



Deltares