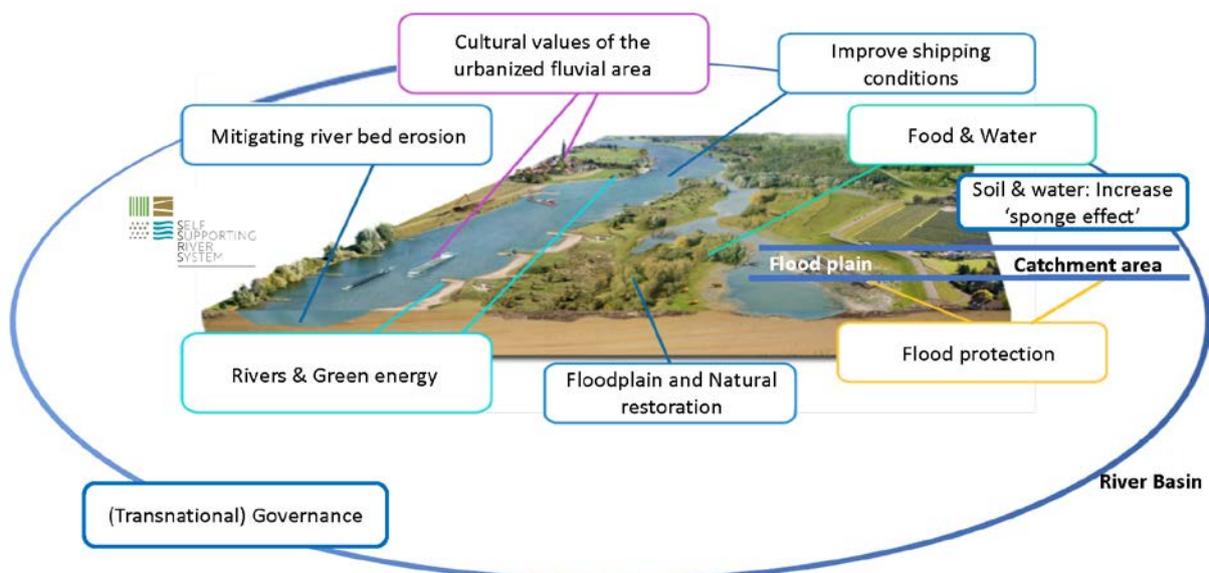


Meet Living Lab Delta East

During your 2nd semester on River systems you will conduct a research project within **Living Lab Delta East**, the urbanized river area of Arnhem and Nijmegen where the river Rhine splits into the Waal, Lower Rhine and IJssel. In this area many interests come together, like shipping, mineral extraction, nature and recreation. And making the river area climate proof so that it can cope with the extremes in water regimes.

The challenges in this river area are so complex that no organization can solve them alone. Within the Living Lab approach knowledge institutes, companies, governments and citizens work hand in hand on innovations. Therefore Living Lab Delta East provides you with a variety of research topics that focus on the complex water related issues of the urbanized fluvial area. Each topic is addressed by a so-called 'knowledge table' involving peers from administrative organisations, entrepreneurs and citizens/NGO's. Knowledge tables are chaired by a lector or teacher-researcher. As a student of the master River Delta Development you will work closely with these peers and define your own piece of research in consultation with the members involved. Your (research) achievements will be evaluated and graded by the involved lector or teacher-researcher according to a grading guideline that will be handed over to you as soon as you start.

This overview below shows the concurrent topics and the related research activities within Living Lab Delta East.



Source picture: Rijkswaterstaat

Mitigating river bed erosion

Due to former river harnessing measures the river bed is severely eroded. River bed erosion has a great impact on shipping, safety and groundwater levels. There is a high sense of urgency to stop this process. But how? And which kind of measures are sustainable?

Research activities

- *Interviewing experts on morphology, ecology and shipping*
- *Literature research focused on innovations in low draft ship construction*
- *Morphological modelling*
- *Land use design plans of floodplains*
- *Implementing 'Building with nature' processes in a river bed masterplan*

Floodplain and Natural restoration

Because the available space in the floodplains is limited there is a potential conflict between safety (water discharge capacity) and nature goals (riparian vegetation). How can we manage floodplain vegetation in a way that this serves both flood protection as well as nature restoration goals.

Research activities

- *Interviewing experts on floodplain vegetation and water/rivermanagement*
- *Drafting floodplain land use design plans (landscape design)*
- *GIS mapping*
- *Drafting management and business plans including volunteers for vegetation management*
- *Serious gaming as a tool for negotiation between shareholders*
- *Data collection and analysis using 'citizen science'*

Rivers and Green energy

The world is in need for green energy. Hydropower dams are not sustainable but there is a variety of innovative ideas that might offer a solution. They involve solar systems, fish friendly hydroturbines, biomass etc.

Research activities

- *Literature review on technical innovations such as fish friendly turbines and solar systems*
- *Interviews with peers how to introduce these innovations in the fluvial landscape*
- *Innovative business plans*

Flood protection (Room for the River)

Flood protection is a major issue in the urbanized fluvial landscape. For sustainability reasons we strive to create more space for the water instead of heightening our dikes/levees. How can we make more room for the river with public support and at low costs?

Research activities

- *Science communication techniques (visual problem appraisal)*
- *Serious gaming with stakeholders*
- *Case analysis such as the dike relocation at Varik (Waal river)*

Cultural values of the urbanized fluvial area

Apart from the ecological and economic values there are also many historic and cultural aspects that need to take care of. Historic cultural elements in the floodplains are brickfactories and military defense units. How can we smartly reuse these landscape elements in synergy with nature restoration and ecotourism goals.

Research activities

- *Business model development for floodplain development*
- *Decision tool development*
- *Historical landscape development*

Soil and Water

Drained peatsoils in the delta contribute considerably to climate change. In order to stop this we are exploring new business models for farmers in wet agriculture (paludiculture).

Soil fertility and its link to soil hydrology is of utmost importance for food production, and receives increasing attention from farmers, cooperatives and governments

Research activities

- *Developing carbon credit and blue credit systems*
- *Soil fertility and soil structure*

Food and Water

River delta development is also about making sustainable use of the existing ecosystem services. At present, options for different ways of integrating food production and water management in a sustainable but economically viable way are investigated.

Research activities

- *Restoration of the sponge effect of stream valleys*
- *Nature inclusive agriculture*
- *Closing nutrient loops in agriculture*

If you are interested to learn more about these topics and have questions related to the research activities, do not hesitate to contact [Sara Eeman](#) – teacher at Van Hall Larenstein University of Applied Sciences and member of the River Delta Development management team.