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SEA and ESIA for a spatial plan in The Netherlands

Dike reallocation Lent

Type of impact assessment	Strategic Environmental Assessment (SEA) and Environmental and Social Impact Assessment (ESIA)
Type of project/plan	Spatial Plan (ESIA), preceded by 'physical planning key decision' (SEA)
Climate change related issues	Increased flooding risks, periods of drought
Influence of the SEA and ESIA	Climate smart design solutions adopted

The SEA for the 'Room for Rivers' plan was followed by ESIsAs for individual projects, including the dike allocation project in Lent. Both SEA and ESIA assessed climate change effects and proposed measures. In the dike allocation project, various climate smart solutions were applied to 'make room for water'.

Climate change in the area

The plan 'Room for Rivers' aims to define the necessary measures to

protect The Netherlands against flooding of the river Rhine, now and in the future. During the 1990s,

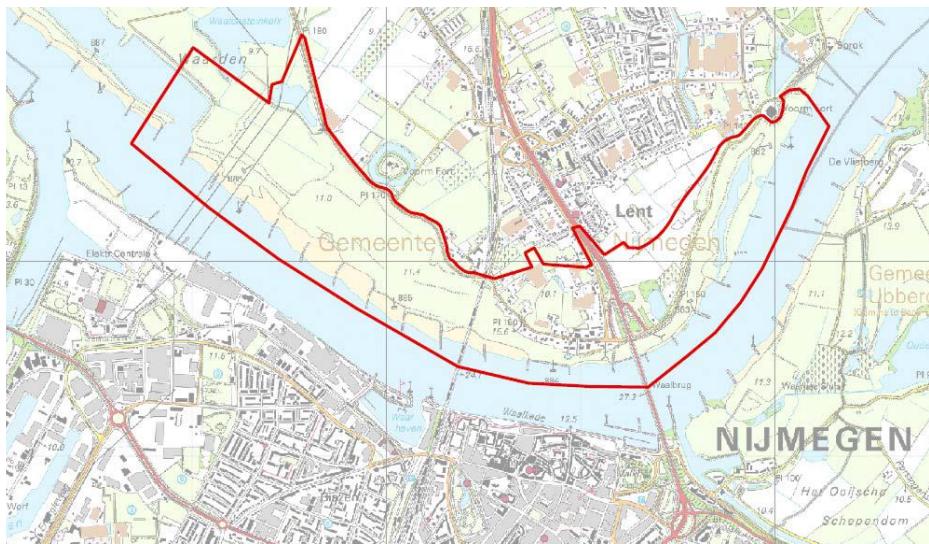
floods nearly took place on two occasions. It is expected that the risk of flooding will be even higher in the future, when more intense upstream rainfall is projected.

More specifically, the plan defines packages of measures for the three main branches of the Rhine: the rivers IJssel, Nederrijn/Lek, and Waal. Packages are combinations of two types of measures:

- Dike improvement or heightening (the traditional approach);
- A new – climate smarter – approach, aiming to create more space for water discharge or re-

tention in the river foreland or riverbed (hence the title ‘Room for Rivers’). This is done, for instance, through removal of obstacles, deepening of the riverbed, creation of retention ponds, or relocation of dikes.

An SEA for the Room for Rivers programme was undertaken to enable planners and decision makers to find the best compromise of safety, environmental benefits and low costs. Also, the SEA took an integral view of the entire river system, since the three branches are interconnected and because upstream and down-



The city of Nijmegen and the dike reallocation area

stream measures may affect each other.

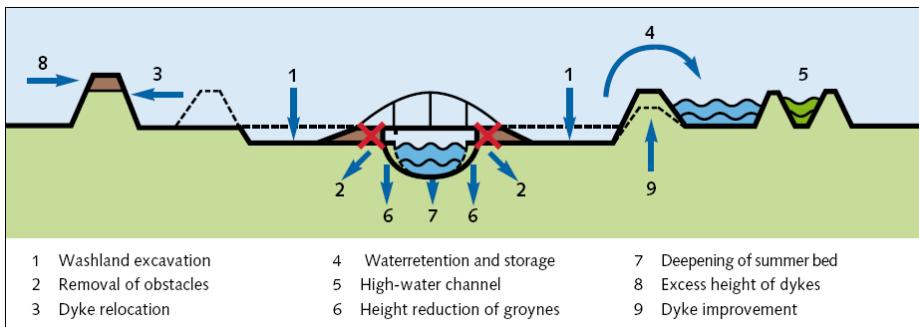
In the final programme, forty individual projects were proposed. One of these projects was 'dike reallocation Lent', near the city of Nijmegen. For more detailed design and implementation of this project, an ESIA was undertaken. The river Waal bends sharply near Nijmegen and narrows itself in the form of a bottleneck (see map). Adequate measures were necessary in order to protect the inhabitants of the city against the dangers of the water. In the case of Nijmegen, this involved moving the Waal dike in Lent and constructing an ancillary channel in the flood plains. This has created an island in the Waal and a unique urban river park in the heart of Nijmegen with room for living, recreational activities, culture, water and nature.

Assessing climate change risks for the plan

In the SEA and ESIA, for the development of alternatives and assessment of their impacts, a set of criteria was used, including on lowering of expected high water levels and robustness to change/flexibility. Measures should not only solve short term problems of floods, but should also be future proof. In the next decades, climate change will cause both longer periods of intense rainfall and periods of drought.

Climate smart alternatives in the SEA

In the SEA Room for Rivers, packages of climate smart measures were assessed. Most measures are aiming to create more space for water. This space will function for both water storage (during high waters) and retention (low waters).



Climate smart measures identified in the Room for Rivers SEA

Conclusion: Climate smart design of the dike allocation

For the dike reallocation Lent, all alternative options focus on climate smart solutions: creating space for the river and providing space for other activities. For instance:

- An ancillary channel (150–200 metres wide and 3 kilometres long) collects part of the discharge at high waters, which will prevent flooding. The channel facilitates nature development and can also be used for recreation.
- A new quay was constructed as a paved sloping surface that gradually disappears in the water. The quay can be used for cycling, strolling etc. A cut-off wall was constructed to prevent seepage.
- A new island in the middle of the river offers room for urban development. Bridges link the island to both the new quay of Lent and the other side of the river.

References

Environmental Assessment Room for Rivers – Ministry of Public Transport & Water Affairs, Ministry of Housing, Spatial Planning & Environment, Ministry of Agriculture, Nature & Food Quality, The Netherlands (2005).

Characteristics of climate smart(er) plan:

- Three-step approach applied ✓
- Climate smart(er) plan design ✓
- ESIA and SEA increased commitment for plan ✓

Climate smart(er) because:

- The dike allocation offers solutions for both periods of high waters and periods of drought.
- The project creates space for water storage and retention and for other activities, such as housing, recreation and nature.

Ruimte voor de Waal, Environmental Impact Assessment – Municipality of Nijmegen (2011)
<http://www.ruimtevoordewaal.nl/en/room-for-the-river-waal>.