

# Nature based solutions for climate adaptation - paying farmers for flood control

*Marianne Zandersen<sup>1</sup>, Anders Branth Pedersen<sup>1</sup>, Helle Ørsted Nielsen<sup>1</sup>, Jakob Oddershede<sup>2</sup>, Mette Termansen<sup>3</sup>*

*1) Institut for Miljøvidenskab (AU)*

*2) Deloitte*

*3) Institut for Fødevareøkonomi (KU)*

Climate change is expected to lead to more frequent and severe fluvial flood events in Northern Europe. Since the mid-20th century, Northern Europe has received more precipitation, most notably during winter months, with subsequent increasing river flows and river flooding. The level of climate-driven physical causes is exacerbated with socio-economic factors such as urban development in flood prone areas, and agricultural land use activities in floodplains that have changed and restrained the natural course of streams and rivers.

Nature Based Solutions (NBS), which comprise actions inspired by and supported by nature, are increasingly recognised as a valuable yet still under-utilised means to alleviate negative effects of a changing climate and to improve risk management and resilience by increasing the natural insurance against adverse events such as flooding, for instance by overflowing farmland, which deliberately increases the flood intensity on farmland compared to the current situation.

This requires collaboration at landscape scale between providers and beneficiaries of flood control. In particular, mechanisms to incentivise owners of land could potentially offer cost-effective ways to reduce damages to urban infrastructure.

We conduct a choice experiment among farmers located in vicinity to a river to assess their willingness to accept a contract that would allow a local Danish municipality to periodically flood farmland to reduce urban flood risks. Results indicate that farmers on average are hesitant about entering into abatement contracts. If they were to agree on a contract they would prefer a separate compensation for lost crops; a collective negotiation and higher rather than lower yearly payments. Surprisingly, data did not show a significant preference for or against a requirement to grow flood resistant crops. The results suggest that a contract with a separate damage compensation and based on individual negotiation would on average require an annual payment of 309Euro/ha. The paper discusses the potentials and limitations of landscape scale nature-based solutions for climate adaptation.