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## **Three-step approach for visualizing climate adaptation strategies at municipal level in Sweden**

The ongoing climate change has caused an increase in the global mean sea level, and this sea level rise is predicted to continue during the 21st century. The importance of including climate change in decision making is becoming more and more recognized and increasingly important for decisions yielding consequences on longer time scales. The field of climate change communication is currently expanding, and visualization has here been suggested as an approach to make abstract information appear more concrete. In Sweden local strategies and policies are important in climate adaptation however, barriers exist, for example different views on strategies within municipalities. The aim of this study was to assess the current and potential future use of visualization in adaptive planning in Swedish municipalities in response to a rising sea level. A three-step approach for visualizing climate adaptation strategies at municipal level in Sweden was proposed with the purpose of providing a basis for future planning and corporation. The approach consisted of 1) showing areas at risk, 2) showing the by the municipality suggested adaptive strategies and 3) showing the areas that would benefit from the strategies. This study sought to answer the questions: what is the current use of visualizations in Swedish municipalities regarding communication of adaptive strategies to a rising sea level, and how can Swedish municipalities improve their use of visualization as a tool for climate change communicating regarding a rising sea level in adaptive planning?

In order to fulfill the aim, I conducted three-case studies. Three costal Swedish municipalities, Gothenburg, Malmö and Trelleborg were selected and evaluated regarding their use of visualizations in climate adaptation. I analyzed the municipalities' plans focusing on the use of visualization in adaptive strategies related to sea level rise and evaluated using an analytical framework. The three-step visualization approach was derived from existing literature, and I produced visualizations using Geographic Information System (GIS) tools and Scalable Algorithms (SCALGO) a platform providing large scale data processing of terrain. From the results it can be seen that the use of visualization in adaptive planning differs considerably between the municipalities and is mainly limited to communication of future potential sea levels. The results indicates that an inclusion of the proposed three-step approach in the municipalities' comprehensive plans would increase the use of visualization and aid the communication of climate adaptation. The potential of using the proposed three step approach was recognized by the participating municipalities, as a tool for aiding the planning and communication of climate change adaptation. Further research is needed evaluating the three-step approach from the perspective of stakeholders and inhabitants as well as regarding the inclusion of uncertainties.

**Keywords:** Physical Geography and Ecosystem analysis, climate change, climate adaptation, sea level rise, climate communication, visualization, GIS, SCALGO

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