Sand(de)fence: Testing short-term sand trapping capacity of natural solution materials

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In the light of global change, coastlines all around the world are under a lot of stress due to sea level rise, beach erosion and other factors. Building with nature and nature based coastal defense solutions try to counter this problem by leaving a minimum impact and a maximum durability and resilience. Since nature based solutions have gained a lot of interest over the last two decades, worldwide research on different strategies provide already a lot of information on this topic. However, information on the feasibility of nature based solutions on the Belgian coast remains limited.

The solution materials chosen to be tested are drawn from a complete literature review. These materials are used to create sand fences to initiate dune growth through sand trapping. In choosing these materials, two important characteristics were taken into account. All materials should be bio-degradable and relatively local in order to leave no impact on site. Brushwood fences show promising results in locations like northern France during fair weather conditions. This makes brushwood a fine candidate for the material of one of the fences. An experiment conducted in Taiwan showed interesting results for fences made from a local reed species. Since reed is also available on the Belgian coast, this can also be a suiting material. The fences will be deployed perpendicular to the main wind direction, in a zigzag formation. For the formation of embryo dunes, a zigzag setting proves to be very efficient. This fence setting will be able to not only trap sediment blown from the main wind direction, but also from other directions.

The testing will be done at Groenendijk beach in Koksijde (Belgian coast). After deployment of the solution materials, a Terrestrial Laser Scanning survey will capture the initial beach topography. After a period of a few days, a second survey will be carried out to determine the amount of trapped sand. It is expected that the brushwood fence in zigzag setting will be one of the most efficient solutions to trap sand. Lastly, some recommendations will be provided for future research and practical implication at the coast.

Keywords: Building with nature; Sand fences; Sand trapping; Beach topography; Belgian coast