

# Economic Modelling and Assessment of the Economic Benefits of Beneficial Use of Dredged Sediment

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**Introduction:** The EU Interreg-funded SURICATES projects aims to increase sediment use for erosion and flood protection by providing the industry with new solutions for sediment use in ports and waterways. Dredged sediment management and it being a resource in a circular economy context is both a challenge and an opportunity. As part of the SURICATES project, an economic modelling and analysis tool has been developed to determine the economic benefits associated with beneficially using dredged sediment. This paper focuses on the economic model developed which allows assessment of the economic costs and benefits associated with the use of dredged sediment.

**Methods:** A decision support tool has been developed and applied to analyse the economic impacts of beneficial use of dredged sediment in terms of Gross Domestic Product (GDP) contribution and jobs created for projects in the SURICATES Project partner countries (Ireland, Scotland, France, the Netherlands and the United Kingdom).

The methods for estimating the direct/indirect/induced impacts on GDP and jobs created are based on industry specific Type I & Type II economic multipliers and coefficients, derived for each of SURICATES partner countries using Symmetric Input-Output Tables and application of the open Leontief model and based on available data from national statistics offices, the OECD, and Eurostat. The economic and employment contributions were downscaled to a regional NUTS3 level.

The decision support tool, developed through EXCEL VBA, allows the user to select the region where the dredging project is located. Required inputs include relevant national/regional economic data and all the relevant project specific processes and characteristics involved in the logistical transport chain through the dredging and placement/disposal operations (excavation, transportation, placement, treatment methods, beneficial use, disposal, and material import and export as relevant). The model uses a range of pre-defined unit costs based on a database gathered from dredging contractors, consultants and public bodies across the SURICATES partner countries.

## **Results:**

The economic tool has been applied to assess the economic impacts and benefits of a number of recently completed dredging projects with dredged sediment resource application including the Castletownbere

Harbour Pier Extension Project in Ireland (2019) and the Scottish Canals Falkirk Site Dredging Project in Scotland (2020). The Castletownbere Harbour Project involved 66,000m<sup>3</sup> of dredged sediment with sediment reuse on site for land reclamation and as fill for a breakwater structure. The Scottish Canals Falkirk Project involved 533m<sup>3</sup> of dredged sediment and application in a bio-engineering pilot site as part of the SURICATES Project. The model has also been applied to a number of future projects including the large scale Alexandra Basin, Port of Dublin dredging project to assess potential economic benefits.

The model results provide information on the direct, indirect and induced impacts on both GDP and jobs created for each dredging project. Comparison of actual project costs and employment created for these small to medium scale projects with model results is satisfactory facilitating application to planned and larger scale dredging projects.

## **Discussion:**

This paper applies a new economic modelling approach allowing assessment of the economic benefits (GDP, employment) of dredged sediment reuse. The detailed economic modelling undertaken provides satisfactory comparison between model results and real economic values from completed dredging projects and thus allows application of the economic model to larger scale dredging projects.

The model provides significant and new insights into the potential economic benefits of sediment reuse projects at a local and a regional scale in the context of the circular economy. It also has the potential to inform the decision making process by providing stakeholders and regulators with a broader economic perspective than heretofore.

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## **Key words:**

- Sediment, Decision tool, Economic model, Resource