

## 3D Visualization Tools to Support Soil Management In Relation to Sustainable Agriculture and Ecosystem Services

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Visualization tools [1][2][6] have been used increasingly as part of information, consultation, and collaboration in relation to issues of global significance. Visualization techniques can be used in a variety of different settings, depending on their association with specific types of decision. Initially, they can be used to improve awareness of the local community and landscape, either individually or in groups [5]. They can also be used to communicate different aspects of change, such as digital soil mapping, ecosystem services and climate change [7][8].

A prototype 3D model was developed to present Tarland Catchment on the North East Scotland which includes 1:25000 soil map data and 1:50000 land capability for agriculture (LCA) data [4]. The model was used to identify issues arising between the growing interest soil monitoring and management, and the potential effects on existing soil characteristics. The online model was also created which can capture user/stakeholder comments they associate with soil features. In addition, people are located physically within the real-world bounds of the current soil management scenario, they can use Augmented Reality to see the scenario overlaid on their immediate surroundings.

Models representing alternative soil use and management were used in the virtual landscape theatre (VLT) [3] with electronic voting designed to elicit public aspirations and concerns regarding future soil uses, and to develop scenarios driven by local input. Preliminary findings suggest positive audience responses to the relevance of the inclusion of soil data within a scene when considering questions regarding the impact of land-use change, such as woodland, agricultural land and open spaces. A future development is the use of the prototype virtual environment in a preference survey of scenarios of changes in land use, and in stakeholder consultations on such changes. END

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