An ontological approach to data management in agroforestry

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Abstract :

   Data from field observations acquired in partnership with several categories of actors (foresters, farmers, breeders, etc.) as part of agroforestry experiments have been accumulating for many years now. The management and reuse of this data is made difficult by the multiplicity of media and formats used and by the diversity of the actors and their language. In addition, agroforestry studies require systemic approaches to better understand, for example, agroforestry operations' response mechanisms to climate change, pests and soil pollution. This implies linking up with other fields of knowledge such as climatology, zoology or pedology.

   To help the agroforestry community in the exploitation and sharing of their data, in order to report on the evolution and effectiveness of the developments they have carried out, we propose as a first objective, to set up a knowledge model (an ontology) dedicated to agroforestry. This ontology will serve as the basis for capitalizing and sharing data in agroforestry.

   A second objective is to link agroforestry data with other data sets in other knowledge areas such as the environment and territories. For example, an agroforester manager should be able to easily compare the selling price of standing timber in his region for different tree species that he would be likely to plant on his agroforestry plot.

The dual challenge of sharing and interconnecting data in agroforestry brings us closer to what is currently practiced within the "semantic web" with different tools and methods to promote the sharing of open and linked data sources. Semantic web technologies provide standard procedures for describing and accessing resources on the web. The linked data is exploited and enriched by technologies such as RDF, SPARQL, OWL and SKOS. We reuse semantic web standards and exploit a range of terminological ontologies to provide an open and flexible knowledge model that can reflect the complexity of data already collected in agroforestry. This new model will be able to connect to other knowledge models already present on the Web. Agroforestry expertise linked to other expert areas on the web will facilitate the creation of decision support tools and thus provide new solutions to agroforestry practice.