METHOD FACTSHEET

Participatory GIS

Introduction

Participatory mapping of ecosystem services consists in assessing the spatial distribution of ecosystem services according to the perceptions and knowledge of stakeholders. It encompasses different approaches including Participatory GIS (PGIS) and Public Participation GIS (PPGIS) (see Brown and Fagerholm, 2014) to which we broadly refer here as PGIS. In PGIS a plurality of stakeholders can participate in the creation of a map of ecosystem services, including local stakeholders and community members, environmental professionals and technicians, members of environmental NGOs, decision-makers, scientists, etc. PGIS can therefore integrate the perceptions, knowledge (local-based or technical) and values of different stakeholders and presents the outputs in the form of a map of ecosystem services (Fagerholm et al., 2012; Raymond et al., 2009). Most common used methods in PGIS for data collection include web-based surveys, face to face interviews and workshops. The results obtained allow similar data treatment as for non-participatory mapping methods (analysis of trade-offs, correlation analysis among services or with other aspects such as land use change, etc.) (Palomo et al., 2014; Sherrouse et al., 2011). PGIS is being increasingly used in recent years due to its potential for: including stakeholder´s perceptions in ecosystem services spatial assessments, incorporating different types of knowledge, mapping ecosystem services in data scarce regions, enhancing capacity building and social learning, and integrating stakeholders in a democratic process-oriented approach to decision-making (Fagerholm and Palomo, forthcoming).

Keywords

Stakeholders, Geographical Information Systems (GIS), map, values, social learning.

Why would I chose this approach?

PGIS both enables the integration of different knowledge types, perceptions and values into ecosystem services spatial assessments, as well as providing a more democratic approach to decision-oriented science than using GIS approaches alone. Some types of ecosystem services, such as cultural services, might naturally be better mapped using PGIS than non-participatory methods, due to their direct link to people's perceptions and values (Plieninger et al., 2013). PGIS has been used to map all service categories as well as the spatial distribution of ecosystem services supply and demand (Palomo et al., 2013; Burkhard et al., 2012). It has also been applied to compare the perceptions of stakeholder groups towards the spatial distribution of ecosystem services (García-Nieto et al., 2014). PGIS usually achieves better outcomes when mapping ecosystem services at the local scale (than GIS approaches alone), and can be applied in different decision-making contexts, from awareness raising to priority setting and instrument design. The main methods for PGIS (web-based surveys, face to face interviews and workshops), and associated approaches such as the matrix approach, allow flexibility in the stakeholder

selection and prioritisation processes, as well as in the general requirements for applying the method (Burkhard et al., 2012; Fagerholm and Palomo, forthcoming).

What are the main advantages of the approach?

- Integrates stakeholder perceptions, knowledge and values regarding ecosystem services (methodological and operational advantage).
- Allows the involvement of multiple stakeholder types and thus creates awareness and fosters social learning related to ecosystem services (methodological and operational advantage).
- Some ecosystem services (such as cultural services) fit well with this mapping approach (methodological and operational advantage).
- Permits mapping ecosystem services in areas where spatial data is unavailable (methodological and operational advantage).
- The GIS skills needed to develop this method are relatively simple (methodological advantage).

What are the constraints/limitations of the approach?

- The development of best practices or guidelines for the method is still on going.
- PGIS methods have been mostly applied at local scales and integration of results into decision-making at larger scales has been elusive.
- The comparability among studies is usually low.
- The spatial resolution of the results and accuracy might be lower for certain services than for other approaches.

What types of value can the approach help me understand?

Participatory GIS is especially suitable for capturing ecological and socio-cultural values as well as instrumental and relational values related to quality of life. The method is not suitable for capturing monetary values.

How does the approach address uncertainty?

The approach does not explicitly address uncertainty

How do I apply the approach?

A PGIS study usually begins by identifying the most suitable method for data collection (surveys, interviews, workshop) and the relevant stakeholders to participate (e.g. a broad sample, certain key stakeholders, etc.) to achieve the overall aims of the study. Afterwards the methodology is developed in detail, sometimes deciding which ecosystem services will be mapped and sometimes letting stakeholders map the ecosystem services they choose from a list. A map, usually a topographic map, is designed or acquired for the mapping process. After the process of mapping, data is digitalised or analysed according to the research objectives. Results are usually presented to participants as part of the dissemination process.

Requirements

Data gathering	☑ **Low-effort** ☑ **Medium-effort** ☑ **Intensive-effort**	Depending on the number of participants and the method used the requirements will vary considerably.
Type of data		
Expertise and production of knowledge	☐ Unidisciplinary ☑ **Interdisciplinary** ☑ **Transdicisplinary (includes local knowledge)**	While some methods such as surveys and interviews allow interdisciplinary production of knowledge, other such as workshops (deliberative mapping) allow transdisciplinarity.
Software	☐ Only researchers ☑ **Researchers and non-academic stakeholders**	Allows inclusion of multiple stakeholder types.
Time resources	☑ **Short-term (months for getting accurate output)** ☑ **Medium-term (1-3 years)** ☐ Long-term (more than 3 years)	Time resources vary accordingly to the data collection method, and also to the planned spatial analysis of the data that are undertaken.
Economic resources	☑ **Low-demanding** ☑ **Medium-demanding** ☐ High-demanding	This will vary depending on the number of participants and the spatial analysis to perform after data collection.
Other requirements		

Where do I go for more information?

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