Article summary

The article discusses the use of local ecological knowledge (LEK) to understand ecosystem change in under-researched areas like South Africa's Wild Coast. The authors examine the accuracy and validity of LEK and its value in comparison to scientific knowledge. They assess changes in woodland and forest cover in the Nqabara Administrative Area between 1974 and 2001 using both LEK and scientific analysis. They find that expert local knowledge provides detailed insights into the ultimate causes of change and contributes a rare historical perspective, adding considerable value to scientific understanding. However, the authors caution against co-opting local knowledge for scientific purposes and stress the importance of acknowledging the differences between local and scientific knowledge.

What is Local Ecological Knowledge:

The use of local ecological knowledge (LEK) has become increasingly recognized as an important complement to scientific knowledge in understanding environmental change. In the case of land-cover change on South Africa's Wild Coast, both expert and generalist LEK have the potential to add value to scientific understanding.

Expert LEK refers to the knowledge held by individuals who have specialized knowledge in a particular field, such as traditional healers or hunters. Generalist LEK, on the other hand, is held by individuals who have a broad range of knowledge about their environment.

Both forms of LEK can contribute to a better understanding of land-cover change on the Wild Coast. For example, expert LEK may be able to provide information about the impact of specific plants on the environment, while generalist LEK may be able to provide insights into the cultural practices that influence land-use patterns.

Additionally, LEK can provide a historical perspective on land-cover change that may not be captured by scientific data. For example, knowledge about the traditional use of certain areas of land may shed light on how these areas have changed over time.

Incorporating LEK into scientific research can also improve the accuracy of scientific models. LEK can be used to validate or challenge the assumptions that underlie scientific models, leading to more accurate predictions about future land-cover change.

Overall, incorporating LEK into scientific research on land-cover change can add value by providing a more comprehensive understanding of the social and ecological factors that drive change. It can also improve the accuracy of scientific models and ensure that conservation and management efforts are more effective.

Give examples of GIS-based approaches that you found in literature that are helping to foster co-production of knowledge among diverse stakeholders.

In the literature, there are various GIS-based approaches that can promote co-production of knowledge among diverse stakeholders. Some of these approaches are:

- Participatory mapping: This approach entails the utilization of GIS to develop maps that represent local knowledge and expertise. Stakeholders actively participate in mapping exercises, leading to the creation of maps based on their knowledge and expertise.

- Community-based monitoring: This approach involves using GIS to monitor and track changes in natural resources like forests, water, and land use. The data collected can inform decision-making and highlight areas of concern that require attention.

- Collaborative decision-making: This approach uses GIS-based tools and techniques to facilitate collaborative decision-making among stakeholders. It promotes the exchange of information and development of consensus-based solutions for complex problems.

- Citizen science: This approach employs GIS to involve citizens in scientific research and monitoring. With GIS-based tools, citizens can collect and analyze data, contributing to scientific research and decision-making.

Overall, these GIS-based approaches provide a platform for stakeholders to share their knowledge, expertise, and perspectives, encouraging a collaborative approach to decision-making. They ensure local knowledge and expertise are considered, leading to informed and inclusive decisions.

How do you think your case study increased participation and buy-in from stakeholders?

The case study effectively increased participation and buy-in from stakeholders through several strategies. Firstly, the study involved a diverse range of stakeholders, including recognized local experts and randomly selected households, to ensure that different perspectives and types of knowledge were taken into account. This approach-built trust and increased buy-in from stakeholders who might have otherwise felt excluded from the process.

Secondly, the study used a participatory approach that involved stakeholders in the data collection and analysis process, leading to a sense of ownership and empowerment among participants. This, in turn, increased their motivation to engage in the study and take ownership of its results.

Thirdly, the study emphasized the value of local knowledge and its importance in scientific research, validating the expertise of local communities and promoting mutual respect between scientists and local stakeholders.

The study utilized several methods to capture a comprehensive understanding of land-cover change. Semi-structured interviews and transect walks with recognized local experts helped to capture in-depth knowledge of ecosystems from those with a deep understanding of natural resources in the area. Semi-structured interviews with randomly selected households provided a diverse range of perspectives, while the analysis of aerial photos provided an objective measure of land-cover change over time. Finally, the desktop study of scientific literature contextualized the findings from the other stages within broader scientific literature, leading to a more complete picture of the drivers of land-cover change in the area and potential solutions for addressing these challenges.

What impact does spatial uncertainty have in developing a PGIS agenda?

Spatial uncertainty is a crucial aspect of PGIS that warrants careful consideration. This is because the accuracy and reliability of spatial data and information used in PGIS can significantly impact the decisions made by stakeholders, decision-makers, and the public. Ignoring or poorly communicating spatial uncertainty can result in inappropriate decisions, with far-reaching social, economic, and environmental implications.

Take, for example, a PGIS project that relies on inaccurate data; it could lead to misinformed decisions about where to build infrastructure or allocate resources, resulting in negative impacts on the environment and communities living in the affected areas. Additionally, stakeholders and decision-makers may question the legitimacy of PGIS projects that do not properly consider spatial uncertainty.

To ensure that PGIS projects are credible and effective, it is vital to be transparent about spatial uncertainty. This can be achieved through the use of visualizations like error bars or confidence intervals that accurately represent the uncertainty in the data. Involving stakeholders in the data collection and analysis process is also essential, as their local knowledge and experiences can help to reduce spatial uncertainty. Finally, ongoing monitoring and evaluation are critical for assessing and adjusting the PGIS agenda based on feedback from stakeholders and new information.

What are some best practices for communicating uncertainty to stakeholders, decision makers and the public?

In any scientific analysis or study, it's crucial to communicate uncertainty to stakeholders, decision-makers, and the public. When it comes to using participatory GIS (PGIS), there are a few best practices for effectively communicating uncertainty, including:

1. Be transparent: It's important to be upfront about the limitations of the data and methods used, and to be clear about what is known and unknown.

2. Use clear language: Technical jargon can be confusing and alienating, so it's essential to use language that is easily understood by a non-expert audience.

3. Provide context: Uncertainty can have significant implications for decision-making and policy development. Providing context about these implications and potential consequences can help stakeholders better understand the stakes involved.

4. Use visual aids: Diagrams, graphs, and maps are valuable tools for illustrating uncertainty and helping stakeholders comprehend complex information.

5. Provide ranges: Ranges of possible outcomes or estimates can reflect the degree of uncertainty and help stakeholders better grasp the scope of potential risks.

6. Be responsive: Addressing questions and concerns about uncertainty in a timely and respectful manner, and being open to feedback and critique, can foster trust and confidence among stakeholders.

Effective communication of uncertainty is crucial for ensuring that stakeholders have a comprehensive understanding of the limitations and potential risks associated with a particular decision or policy. By employing these best practices, PGIS practitioners can help promote informed decision-making and build trust with stakeholders.

The shortcomings of Hammer:

While the Hammer of PGIS provides a valuable framework for the design and implementation of participatory mapping projects, there are some limitations to its application.

One significant challenge is that the Hammer of PGIS tends to prioritize the technical aspects of the project, such as data collection and mapping, over the social and political context in which the project is taking place. This narrow focus can result in a lack of attention to issues such as power dynamics, local knowledge systems, and community participation, which are critical for ensuring the success and sustainability of the project.

Furthermore, the Hammer of PGIS assumes a high level of technological literacy and access to technology, which may not be available in all communities. This can create barriers to participation for certain groups or individuals who are unable to engage with the technology, leading to unequal representation and potential biases in the resulting data.

Another limitation is that the Hammer of PGIS can be overly prescriptive in its approach, which may not allow for the necessary flexibility and adaptability in complex and dynamic social and environmental contexts. This rigidity can hinder responsiveness to local needs and priorities, potentially undermining the long-term impact and sustainability of the project.

Lastly, the Hammer of PGIS can be resource-intensive, requiring significant time, funding, and technical expertise. This can limit the scalability and replicability of the approach, particularly in resource-constrained contexts.

Overall, while the Hammer of PGIS provides a useful framework, it is essential to consider these limitations and work to address them in order to ensure the success and sustainability of participatory mapping projects.

Explain the argument that GIS is "socially constructed". What does this mean? How can we make the use of GIS more inclusive?

The notion that GIS is socially constructed implies that its creation and use are shaped by social and cultural factors, and that it is not a purely objective and neutral tool. Beyond being a technology for collecting and analyzing spatial data, GIS is molded by social processes such as the interpretation of data, the development of analytical methods, and the communication of results.

The social construction of GIS means that power relations, social norms, and cultural practices influence its use. For example, the data used in GIS can reflect the biases and interests of those who collect it, and the analytical methods employed can reinforce particular worldviews and exclude others. The communication of GIS results can also be influenced by the values and priorities of decision-makers.

To make GIS more inclusive, it is crucial to recognize the social and cultural factors that shape its creation and use. This requires the involvement of diverse stakeholders, including local communities, civil society organizations, and marginalized groups, in the development and implementation of GIS projects. Additionally, recognizing and addressing the biases and limitations of GIS data, methods, and communication, and being transparent about the assumptions and values underlying GIS analysis is key.

To promote inclusive use of GIS, training and capacity-building programs can be provided to marginalized communities and stakeholders to help them gain the skills and knowledge needed to engage with GIS technology. Such programs can include training in data collection, analysis, interpretation, and the use of GIS tools for decision-making and advocacy. Participatory and collaborative approaches to GIS can also be developed to allow a diversity of voices and perspectives to be heard, and to recognize the value of local knowledge and expertise in shaping GIS analysis and decision-making.

How was/ (can be) crowdsourcing implemented in your case study

Crowdsourcing is a method of gathering data or contributions for GIS projects from a large and diverse group of people, often via the internet. While this approach can be useful for tasks such as mapping and data validation, it also poses challenges such as ensuring data quality, privacy concerns, and potential biases in the contributions. However, in the case study of assessing local ecological knowledge in the Nqabara Administrative Area on South Africa's Wild Coast, the researchers did not use crowdsourcing. Instead, they relied on interviews with a small group of "experts" and senior members of randomly selected households to assess local knowledge. The study aimed to determine the accuracy and validity of local ecological knowledge and how it complements scientific knowledge.

Incorporating crowdsourcing in this case study could involve involving a larger sample size of community members who are willing to contribute their local ecological knowledge. This could be done through various means such as community meetings, workshops, or online platforms. By incorporating a crowdsourcing approach, the data collected could be compared and verified against existing scientific knowledge, providing a more inclusive and representative perspective of local knowledge. This approach has the potential to uncover new insights into land-cover change on the Wild Coast.