A participatory method for agrobiodiversity conservation

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Abstract: Which sites would be best to revive cultivating crops and vegetables? In Swiss mountains, the area used for arable farming decreased by over 50% from 1990 to 2010. We are interested in methods able to integrate different knowledge forms and viewpoints with spatial reference. Arable farming contributes to culture, local knowledge, and landscape aesthetics. At the same time it is dependent on those elements. Therefore, biosphere reserves are candidates for reviving arable farming. Here, an approach called participatory mapping is used to find the suitable sites. Airborne photos serve as a basis with a direct reference to the physical world. Various stakeholders then create a thematic map by drawing suitable areas on top of the photos. While participatory mapping was applied on a broad range of topics, this method lacks scientifically sound guidelines for best application. Hence, we research required sample size and the influence of mapping scales and technologies. In addition, we examine precision, accuracy, and validity of the data gathered through participatory mapping. We further look into additional effects such as social learning or emerging conflicts as a consequence of the mapping process. In this project, arable farming in the protected areas serves as a case study. However, the method has much broader application possibilities.

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A participatory method for agrobiodiversity conservation

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1 Abstract

Which sites would be best to revive cultivating crops and vegetables? In Swiss mountains, the area used for arable farming decreased by over 50% from 1990 to 2010. We are interested in methods able to integrate different knowledge forms and viewpoints with spatial reference. Arable farming contributes to culture, local knowledge, and landscape aesthetics. At the same time it is dependent on those elements. Therefore, biosphere reserves are candidates for reviving arable farming. Here, an approach called participatory mapping is used to find the suitable sites. Airborne photos serve as a basis with a direct reference to the physical world. Various stakeholders then create a thematic map by drawing suitable areas on top of the photos. While participatory mapping was applied on a broad range of topics, this method lacks scientifically sound guidelines for best application. Hence, we research required sample size and the influence of mapping scales and technologies. In addition, we examine precision, accuracy, and validity of the data gathered through participatory mapping. We further look into additional effects such as social learning or emerging conflicts as a consequence of the mapping process. In this project, arable farming in the protected areas serves as a case study. However, the method has much broader application possibilities.

Keywords: Participatory Mapping, PPGIS, Agrobiodiversity, Transdisciplinarity, Ecosystem Services

2 Project description

2.1 Introduction

In Swiss mountains, the area used for cultivating crops and vegetables decreased by over 50% from 1990 to 2010 *(Swiss Federal Statistical Office 2012)*. Biosphere reserves are especially suitable for conserving agricultural practices in marginal areas. A big portion of the worlds protected areas are in mountains (Rodríguez-Rodríguez & Bomhard 2011), which are a refugium for crop diversity (Bardsley & Thomas

2004). Arable farming contributes to cultural and biological diversity. Conserving crop diversity, a natural resource, through use, fits perfectly to the aims of UNESCO biosphere reserves (Lange 2011). Recently, the new agrarian policy of Switzerland aims at securing and enhancing landscape qualities. Farmers can list arable farming as a landscape quality and thus apply for government subsidies. However, it is complicated to locate where policy measures would most likely take effect. We research methods to find the most promising areas for reviving arable farming in the mountains.

Bringing back arable farming depends on several factors and stakeholders. For example appropriate machines, suitable soils, and a good climate are required. At the same time, the individual motivation, experiences, and knowledge plays an important role *(Bardsley & Thomas 2004; FAO 2010)*. Thus, there is a need for methods able to integrate different knowledge sources and types of knowledge.

2.2 Method

Participatory Mapping (PM) is a promising approach for integrating different knowledge. In PM, participants are asked to draw a map on an airborne image. The maps then are merged, resulting in an aggregated map. Thus the setup and the result have a clear spatial reference. PM was already applied on similar issues. For example PM was applied on conservation management *(Brown & Weber 2012)*, landscape values *(Sherrouse et al. 2011)* and ecosystem service assessment *(Brown et al. 2012)*. Research has shown various influences on the results, such as the familiarity of the participants with the area *(Brown 2012; Brown et al. 2012)*, the use of points or polygons as input geometry *(Brown & Pullar 2012)*, and effects of paper- and web-based solutions *(Brown et al. 2012; Pocewicz et al. 2012)*. Despite the promising aptness of PM for complex socio-ecological tasks, there is lack of scientific sound guidelines for best practice.

2.3 Conclusion

Using the case of arable farming in the Swiss mountains, we research PM. It might well be, that for some cases, a rule based spatial multi criteria evaluation *(Malczewski 2006)*, is the most effective and efficient way to go. However, if the aim is a participatory process PM is a valuable tool for assessing complex socio-ecological phenomena. PM can be carried out without much computer technology, by using paper and pencil. On the other hand, bigger samples can be reached and processed if using web-based tools. For different aims different setups and scales yield best results. In any case, PM is able to show

perceptions of the participants regarding a complex subject in a defined area.

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