The role of stakeholder networks in landscape valorisation

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***Abstract* - This study investigates the network of actors dealing with the topic of "landscape valorisation" in the study region "Mittleres Ennstal". With a Social Network Analysis we approach the stakeholder network from a structural perspective. Different SNA parameters are calculated on actors-, network- and sub network-level. Additionally different strategies of landscape valorisation of single actors are identified to explore strategical gaps in the network. Our results show that the connections between the actors are very dense, with communication intensities between 'occasional' and 'frequent'. However, focusing only on higher communication intensities the density of the network decreases significantly. For efficient landscape valorisation it is necessary to strengthen value chains and develop common strategies.**

INTRODUCTION

In recent years, importance is increasingly attached to the question of how agricultural landscape and the valorisation of landscape services contribute to the development and competitiveness of rural regions. It is assumed that the valorisation of landscape services results in socio-economic benefits such as the enhancement of the stability of the local population, the generation of jobs, the creation of added value, or the increase of local investments (e.g. van Zanten et al., 2013; Cooper et al., 2009). However, the causal relationships between the valorisation of landscape services and the resulting socio-economic benefits are complex and up to now not comprehensively understood (Dissart and Vollet, 2011). An upstream stakeholder workshop in our study region "Mittleres Ennstal" in Austria indicates that functioning networks of regional actors are of utter importance for successful landscape valorisation. Against this background our study targets at identifying the network of actors having a stake in local landscape management and landscape valorisation. To locate strategical gaps in the network and detect potential starting points for the improvement and bundling of landscape valorisation strategies, the study particularly takes into account the various strategies of landscape valorisation which are pursued by the single actors within the network.

METHOD

Our study region "Mittleres Ennstal" represents a typical remote mountain area, characterized by rather low-intensive dairy farming in a richly structured mountainous landscape. In this region we apply Social Network Analysis (SNA), which connects absolute attributes with relational attributes and thus enables the description of internal group structures (Jansen, 2006). Network measures are calculated based on graph theory. The core aspect of this method is based on a valued graph G(v) which considers nodes (N), links/ties (L) and values (V) of a group:

$$G(N, L, V) = G(v)$$
$$\text{where } N = \{n1, n2, \dots, ng\} \quad L = \{l1, l2, \dots, lL\}$$
$$V = \{v1, v2, \dots, vL\}.$$

A complete network analysis focuses on all actors and all ties between these actors. Within a 'directed' network, it can be distinguished between 'tie sender' and 'tie receiver'. Dyads are 'reciprocal' if both actors within the dyad confirm the tie between them (Wasserman and Faust, 2009). Network data can be evaluated either weighted or binary. At this, binary evaluation reflects the quantity of a relation while weighted evaluation reflects the quality of a relation (Jansen, 2006). As regards sub-networks our study applies an "a priori block model", using "strategies" of landscape valorisation as blocking attributes. We calculate 'degree' and 'betweenness centrality' as actor-level-based parameters and 'density' and 'dyad-based reciprocity' on network-level (Wasserman and Faust, 2009). The relevant actors within the network are identified by using the reputational approach of boundary specification (Laumann 1989)[2]. Following the research approach of Hübner (2013) and Benta (2005) network data is collected using a standardized questionnaire. In particular three relations are assessed: (1) First relation describes if an actor is acquainted with other actors. (2) Second relation describes the degree of the communication between actors and assesses its intensity (qualitative likert scale: 'occasional' – 'frequent' - 'intensive' contact). (3) Third relation includes the conformity on strategies of landscape valorisation. The complete network consists of 22 institutions and is visualised based on centrality layout. Within centrality layouts the number of open ties is kept low and link crossing is optimised. Due to this layout-algorithm actors with similar ties are grouped together (Hübner, 2013). In the analysis two network models are investigated. The first model (1) considers all existing contact ties within the network without making differences as regards intensity of contact. The second model (2) is deviated

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[2] Wassermann and Faust (2009) provide a review of boundary specifications and social network analysis.

by using only ties with high intensity scores ("frequent contact" and "intensive contact").

RESULTS

Table 1 shows the key results on level of the overall network for both models, while Figure 1 shows the basic network (model 1) visualised on actors-level.

Table 1: Key figures on overall network level

Parameters	Model 1	Model 2
possible ties	461	461
existing ties	351	142
density	0.761	0.308
dyad-based reciprocity	0.712	0.327
average degree	15.950	6.455
average distance	1.240	1.839
average tie value considering contact intensity	1.533	2.317
average tie value considering conformity of strategy	3.809	4.268

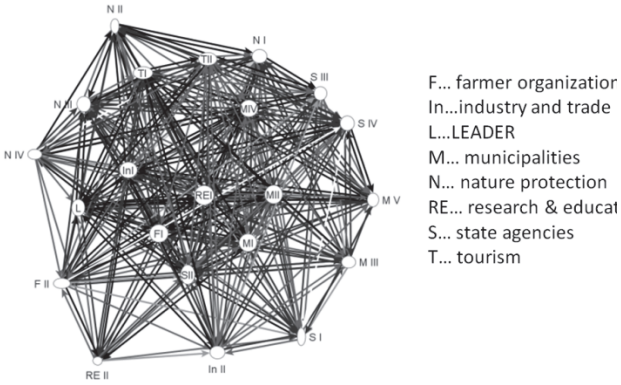

Figure 1. Model 1 visualised on actors-level (*Tie width illustrates contact intensities. The layout of the graph is based on 'betweenness centrality', thus node expanses show the characteristics of the scores. Node width is based on ties sent by an actor (outdegree) and node height on an actors' received ties (indegree).*

The overall network consists of 461 possible ties. In model 1, 76% of these ties are realised (density), 71.2% of ties are reciprocal (dyad-based reciprocity). In model 2, only 30% of possible ties are realised (n=142). Compared to model 1, model 2 also shows a lower reciprocity. Most contacts in model 1 are rather occasional; therefore the average tie value describing the average intensity of the contact is only 1.533. Looking at the conformity of strategies, the average tie value is 3.809; only one tie in the network indicates an opposite strategy combined with occasional contact intensity. Model 2 shows considerably higher average values, particularly as regards the conformity of strategies of 4.268.

As regards strategies, 'tourism', 'agricultural production' and 'regional products' are the most pursued. The respective sub-networks on network model 1 level show relatively high density scores within the groups as well as between the groups. However, it becomes apparent that institutions representing tourism don't pursue the strategy 'agriculture', while farmer organisations don't pursue the strategy 'tourism' for landscape valorisation.

DISCUSSION

The high density of more than 76% realised ties in model 1 indicates a huge potential for developing and fostering common strategies landscape valorisation. The high 'dyad-based reciprocity' indicates that actors have a very clear assessment of their communication to other actors within the network. Nevertheless, the dense network could hinder innovation and development due to personal constraints of pushing through new strategies or due to the fact that in dense networks often a reduction of the overall knowledge base takes place (Newman and Dale, 2005). However, the model 1 network is rather based on occasional contacts. Model 2 in contrast shows that higher contact intensities are coupled with an increasing conformity of strategies.

Overall, the results of the SNA indicate that within the dense 'landscape valorisation network' in our study region common strategies could be developed and fostered. However, one can see that at the moment strategy gaps exist, that should be closed. We recommend using the high potential of acquaintance in the region to close potential value chains and foster the straight implementation of commonly developed strategies, in order to increase the efficiency of landscape valorisation in the region.

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REFERENCES

Benta, M. I. (2005). Studying communication networks with AGNA 2.1. Cognitie, Creier, Comportament; *Cognition, Brain, Behavior* 9 (3), 567-574.

Cooper, T., Hart, K. and Baldock, D. (2009). *Provision of Public Goods through Agriculture in the European Union. Report Prepared for DG Agriculture and Rural Development.* Institute for European Environmental Policy: London.

Dissart, J.C. and Vollet, D. (2011). Landscapes and territory-specific economic bases. *Land Use policy*, 28, 563-573.

Hübner, R. (2013). Sozioökonomische Bewertung von Landnutzungsstrategien für den Klimaschutz - Auswirkungen auf Flächennutzung, Natur und Landschaft. Dissertation an der Technische Universität München.

Jansen, D. (2006). *Einführung in die Netzwerkanalyse: Grundlagen, Methoden, Forschungsbeispiele*. VS Verlag für Sozialwissenschaften.

Laumann, E. O., Mardsen, P. and Prensky, D. (1989). The boundary specification problem in network analysis. In L.C. Freemann, D.White and A.K. Romney (eds.), *Research Methods in Social Networks Analysis.* George Mason University Press.

Newman, L. and Dale, A. (2005). Network structure, diversity, and proactive resilience building: a response to Tompkins and Adger. *Ecology and Society* 10: r2.

Van Zanten, B., Verburg, P., Kantelhardt, J., Kapfer, M., Schaller, L., Piorr, A., Zasada, I., Lefebvre, M., Espinosa, M. and Gomez-y-Paloma, S. (2013). *Landcape services in European agricultural areas: an analytical framework to analyze the vlaue of agricultural landscapes and the role of policy.* Deliverable 3.18, CLAIM project, Amsterdam.

Wasserman, S. and Faust, K. (2009). *Social network analysis methods and applications.* 19. print., Cambridge [u.a.]: Cambridge Univ. Press.