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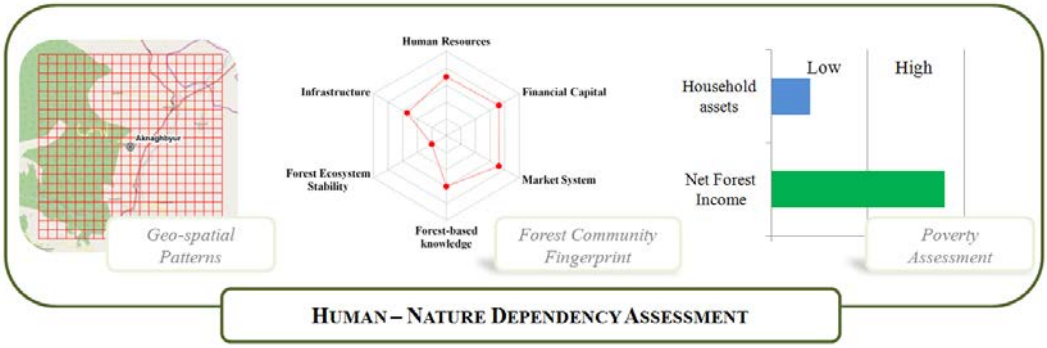
The Forest Community Fingerprint (FCF) is a novel approach to more accurately estimate the human-nature dependency structure in boreal and temperate forest ecosystems and to document drivers of sustainability and efficiency of interactions between communities and their surrounding forest ecosystem resources. The FCF concept utilizes specific data gathered during targeted household surveys as well as information derived via remote sensing techniques.



Satellite imagery provides a fundamental means to make assumptions about the resilience of forest-dependent communities, without the need of performing extensive field visits in each of these communities. Hence, our approach is a timesaving and cost-effective way to i) optimize investment decisions that aim in improving a communities' economic status and resilience as well as for ii) pre-verification of targeted interventions or by confirming that the investments done produced the desired results. Developed for and applied to communities located in northern temperate and boreal forest ecosystems, the FCF is a universially applicable tool, that due to its flexible character, can be applied to other forest ecosystems such as tropical rainforests or even, after some further adaptation, non-forested ecoregions.

The FCF concept has a flexible nature and can potentially be adjusted to measuring the overall levels of community poverty and forest productivity. Each parameter is calculated based on a set of weighed input variables, which can be adapted and changed to reflect the local conditions of the region of interest. Further, additional information can be used to complement the analysis and to provide an even more detailed assessment of the six FCF parameters (e.g. greenhouse gas emissions, gross domestic product). All variables are scored and a relative ranking is applied, where the upper and lower limits are defined by the the best and the poorest functioning community, respectively. Parameters are assessed on an ordinal scale ranging from 1 (very poor) to 5 (very good), meaning that an ideal community would score very well on every parameter, while an instable community would score very poor. An example of the hypothetical assessment of a community is provided in Figure 2.

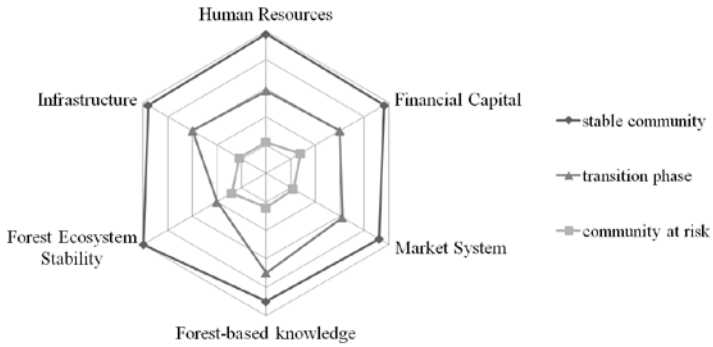


Figure 1: Forest Community Fingerprint – Hypothetical assessment of a well-functioning community (circle), a community in the transition position (triangle) and a poorly functioning community (square).

With respect to the utility of forest resources, the FCF may depend on the level of poverty in the respective community. Hence, a poverty-wealth assessment is implemented to differentiate between comparable spider web diagrams from different communities, which may be significantly different in terms of resilience and level of poverty and hence their susceptibility to climate change, forest fires and other disturbances. In order to account for the poverty level of a community, the net forest income is related to the total assets of a community. In general it is presumed that a community generating high forest income while having high assets is more resilient to risk situations than a community which has a

very low forest income and is lacking the necessary assets to overcome a stress situation. Four categorical relationships are considered, which include 1) low assets - low forest income, 2) low assets - high forest income, 3) high assets - low forest income and 4) high assets - high forest income. The combination of the net forest income and the value of assets provides an insight into the relative potential risk of a community and are considered for interpreting and standardizing the results of the spider web diagrams.

Extending knowledge derived from FCFs

Although the FCF-concept provides a sophisticated and detailed schematic of the interactions between the socio-economic and resource-based parameters of a rural community, it prevents its application to a large number of communities due to the need of extensive household data collection. For this reason, a statistical link between the ground-based survey data and the ecosystem profiles derived from Earth Observation (EO) information was developed that allowed the spatial expansion of the approach on a broader range of communities. By doing so, it was possible to derive calculated assumptions about rural communities that are not included in the field surveys, but are situated within the focus region. The approach to extend knowledge derived from the FCF to a set of unsurveyed rural communities required a series of subsequent analysis steps, which are shown in Figure 3 and outlined in more detail in the following section.

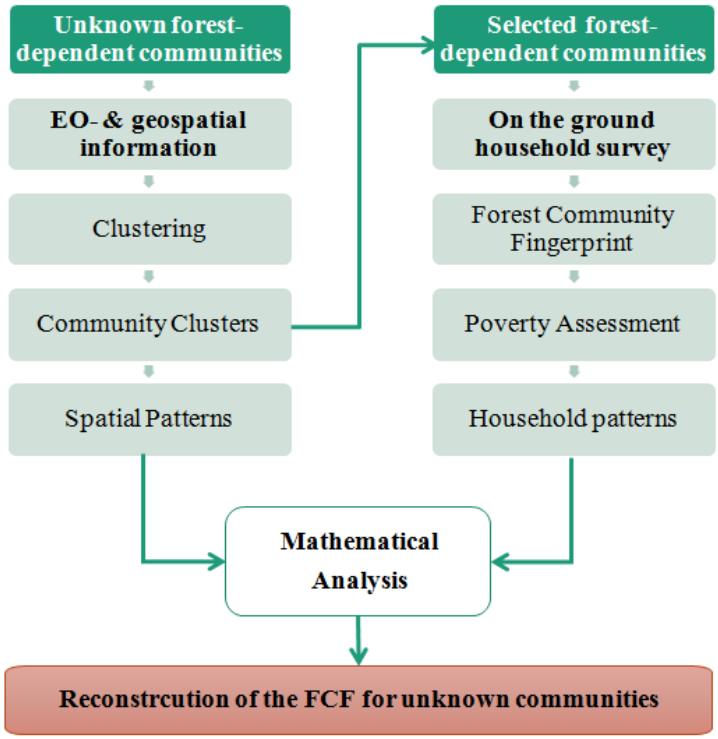


Figure 2: Steps needed to extent knowledge derived from the Forest Community Fingerprint to un-surveyed rural communities

The FCF is not a rigid framework. The points on the FCF may be changed, reduced, or increased. It is possible to use existing data, but may require some ground checks to verify the reliability of data. However, local expertise is utilized and assess to determine to what extent this is required. The FCF has been created by utilizing the experience and skills developed by the implementers who are able to adapt the FCF to different circumstances, parameters and geographic eco-regions. While further testing is always necessary statistical methods have been well utilized to verify and document relationships between parameters and variables in order to examine accuracy and potentially erroneous information. Refinement continues but indications thus far are extremely encouraging.