

## Development of Indices to Quantify Community Capitals

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The Community Capital Framework (CCF) is a tool to improve the understanding of the resources that intervene in the development of communities. All communities have assets, resources or capitals that allow them to manage their livelihoods. These capitals are classified as: human, social, financial, built, natural, cultural, and political, and allow for a systemic analysis of community development. The CCF approach is being increasingly used in rural socio-ecological studies on natural resource management, life strategies and well-being of rural households, community tourism, technology adoption, organic certification, social vulnerability, food security, rural-ecotourism, regeneration, level organizational and community resilience, and climate change adaptation strategies.

The quantification of each capital is done with a series of indicators that vary depending on the objective of the study and the capital. The generally used methodology consists of rescaling the indicators of each capital to an interval  $[0,1]$ , where 0 is the lowest value of the indicator and 1 is the highest value in the dataset. When the indicator is negative, for example, number of days without access to the farm (built capital), these are inverted by subtracting the  $[0,1]$ -rescaled indicator from 1. Because the capitals generally have different numbers of indicators, it may be necessary to rescale the sum of the indicators of each capital back to  $[0,1]$  to obtain an index score for each capital. The rescaling of these scores for each capital is intended to give each capital the same weight. Finally, the capital indices are averaged or summed to obtain a global indicator called the total capital index or welfare index.

The objective of this research is to develop a standard methodology to calculate CCF indices that considers the presence of inherently missing data, can be compared across different regions or occasions, and has a meaningful interpretation in the context of the study. Different alternatives are evaluated to address the problems of appropriate rescaling, weighting, and handling missing data. An improved method is proposed and compared to the generally used methodology to construct these indices. Possible extensions to construct other ecological indices using water and soil quality parameters is discussed.

**Keywords:** social studies, human wellbeing, weighted indices.