

# Eco-Efficiency of Local Development by Local Governments Using LCA and Stated Preference Method

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In recent years, Japanese local governments prioritize local needs when they undertake their own local development. These needs, however, have no limit, and some have tremendous environmental impacts and consume large amounts of resources. Local governments, therefore, should consider not only the environment and residents' needs, but also ecosystems and human health in the larger area. This requires an assessment of regional development using the life-cycle thinking. Furthermore, it is important to quantitatively compare the results of LCA with the benefits brought about by the local development. In order to accomplish this, we argue that the concept of eco-efficiency is an effective method for comparing the tradeoffs. The concept of eco-efficiency has been used for the assessment of corporations and their products.

As a case study, we analyzed the development of a commercial district (about 10ha) in Taki Town, Mie prefecture, Japan. In this study, we defined "the Eco-Efficiency of a local development" as follows:

*"the Eco-Efficiency of a local development" = "the local benefits produced by the development" / "the life-cycle environmental impact from development"*

Because the benefits differ between stakeholders, first the benefits to both residents and workers in Taki were estimated separately by using Conjoint Analysis, a method which was developed in the field of marketing and environmental economics. This method allows us to estimate a subset of the possible combinations of product features that are used to determine the relative importance of each feature in decision-making. Next, we calculated the life cycle environmental impact of this development by using LIME (Life-cycle Impact assessment Method based on Endpoint modeling), which is one of the LCIA methods. Finally, we compared various project plans and investigated influences to the plan's efficiency (factor) when some aspects of the plan were changed. From these analyses, this study made it possible to draw relative comparisons between local development proposals, based on residents' preference and LCA.