

# Development of Analytical Methodology of Sustainable Development by Regional Circular and Ecological Sphere

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## [Abstract]

Key Words: Sustainable development, Regional circular and ecological sphere, Integrated approach, Multi-target solutions, Sustainability indicator, Local scenario, Local value added.

To apply the idea of “Regional Circular and Ecological Sphere (R-CES)”, the following nine requirements were identified. Five “goals” are climate change, resource recycling, coexistence with nature, social issues, and economic issues; two “methods” are inter-regional cooperation and utilization of local resources; and two “conditions” are self-reliance and decentralization, and symbiosis. These nine requirements can be used like a checklist. Compared to previous ideas for sustainable regions, the concept of R-CES is more artificial, has a stronger normative aspect to actively create, and is more integrated, including multiple fields. The activities of R-CES can be broken down into components such as regional resources, regional issues, initiatives, effects, and regional goals. In concrete activities, these components can be listed, and their relationships are illustrated to provide a bird’s eye view of the whole. In developing the quantification method to analyze R-CES, we first extracted indicators corresponding to the nine requirements above from currently available statistical data, etc., and further divided them into three levels based on ease of access. To evaluate these indicators for specific individual projects, we developed a tool to qualitatively evaluate six of the nine requirements (five goals and “self-reliance and decentralization”). Using the developed methodology, we analyzed renewable energy projects, housing construction projects using locally produced timber, and community development projects in various regions, and showed that to increase the effect on the region, it is important to have local ownership of the project, to build a supply chain within the region, and to collaborate and develop initiatives in various fields. On the other hand, we extended the existing regional integrated assessment model to describe energy supply and demand within and outside the region in detail to create a future vision of the entire community. The model was used in several regions to assess the overall effect of multiple initiatives on population retention, employment, and decarbonization in the future.

## [References]

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