Recent development of Resources Times Footprint

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Introduction

Resources time footprint (RTF) was proposed in 2014[1] as one of sustainability indicators. The reason why it called a sustainability indicator is that the RTF covered the following four aspects. One is that it covers the wide range of items including material, labor, land and pollutant. Second is that the RTF can be assessed from the perspective of resource capacity that means upper-limit of each item. Thirdly, it assessed per capita consumption for these limited resources so that it covered spatial equity issue. Lastly, if the analysis time scale is set to be 100 years, the RTF assessed the intergenerational temporal equity issue. Up to now, there were several scientific studies which tried to expand the application of the RTF to various fields. In this study, the recent development of the RTF is presented and discussed.

Experimental Procedures

This study is a historical review study on the development of the RTF. After 2014 when the first RTF related paper was presented, extensive review on the RTF was conducted by collecting the RTF related studies and then summarized the development of the RTF.

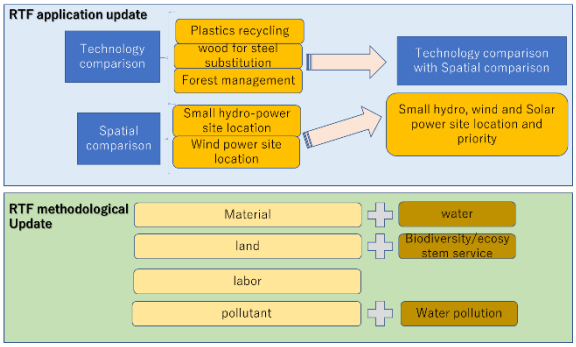

Figure 1 RTF development

Results and Discussion

The RTF was firstly developed to compare among technologies, such as, plastic recycling, wood for steel substitution [1] and then applied for forest management activities [2,3]. Recently, the application of RTF was expanded to cover a renewable energy site selection as a case study for wind power and small-hydro power generation [7,8]. After that, the RTF can also apply to cover renewable energy source priority combination with site selection [9]. In addition to energy sector application, several studies were conducted for agriculture and ecosystem service assessment [4,5]. Also, the methodological update was conducted focusing on water inclusion for the material and pollution aspects of the RTF [5], and the biodiversity and ecosystem service inclusion of land aspects of the RTF in agriculture sector [6].

However, there are several issues remained. One is that the RTF was developed focusing on a technology but there are less studies on sector, country and global application. Second is that the land aspect of the RTF is incomplete even if [6] studied the connection with biodiversity and ecosystem services. Further elaboration is required. Thirdly, the RTF is a bit high hurdle for policy maker to calculate it so the easy handling tool for a policy maker needs to be developed.

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