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## Constructing an Area-based Index to Evaluate Sustainable Development for Southern Province, Sri Lanka: A Principal Components Analysis Approach

A.J. Jayasekara <sup>a\*</sup>, B.M. Sumanarathne <sup>a</sup>, Leslie Jayasekara <sup>b</sup>

<sup>a</sup> *Department of Economics, Faculty of Humanities and Social Sciences, University of Ruhuna, Sri Lanka*

<sup>b</sup> *Department of Mathematics, Faculty of Science, University of Ruhuna, Sri Lanka*

\*Corresponding author: [anne@econ.ruh.ac.lk](mailto:anne@econ.ruh.ac.lk)

### ABSTRACT

The current sustainable developmental literature lacks a uniform approach to combine indicators that result in a composite index and its application in capturing inequalities in area based development outcomes. Rather than using various abstract variables in the form of numbers or proportions separately, a single index quantifying complex conditions can be more meaningful in understanding area-level factors that shape sustainable development. The paper focuses on developing an area based sustainable development index for Southern Province, Sri Lanka, in order to understand differences in developmental outcomes and would be a very valuable opportunity to identify the current situation by comparing the region-to-region in a multivariate context. The area-based index was formulated by two different methods, z-scoring method and factor scoring method based on twelve selected variables which measuring multiple aspects of development status. Secondary data were gathered through the statistical handbooks related to the divisional secretariat's divisions in districts which published in 2018 and 2020. A Kaiser-Meyer-Olkin test and Bartlett's Test of Sphericity were used to assess the appropriateness of using Principal Components Analysis. Three factors were discovered which together explained 88.6 per cent of the total variation. Pearson's correlation coefficient of both indices is 0.99 and it showed that there is a very high positive correlation among values of both composite indices. The computed scores have ranged from 0 to 100 and divided into four developed groupings, such as "High" (75-100), "Medium-high" (50-74), "Medium-low" (25-49), and "Low" (0-24). Four Gravets in Galle district is achieved the highest rank in both indices in both years with indicating "high" development. Matara division is achieved "medium-high" development. The development has changed among in divisions in the time lag; it has caused to change the rank of the indices. However any of division in Hambanthota district couldn't enter to the top 10 Divisional Secretariats' Divisions according to the level of sustainable development obtained under both statistical methods. The multi-dimensional composite index developed here within both frameworks are provided a better picture of economic, social, cultural, and related structural conditions, and thereby, sustainable development stratification of areas across major development groupings.

**Keywords:** *Multivariate Analysis, Principal Components Analysis (PCA), Sustainable Development, Southern Province, Z-Score*