Original Research Article

Ranking of districts of Andhra Pradesh according to Sustainable Livelihood Security Indices values

ABSTRACT

By computing the Sustainable Livelihood Security Indices, the current research study aimed to estimate and rank the sustainability in development and livelihood status of thirteen districts in Andhra Pradesh (SLSI). SLSI is a compound index made up of three indices: ecological security index (ESI), economic efficiency index (EEI), and social equity index (SEI). It's one of the most comprehensive yet straightforward indexes for assessing long-term security in livelihood in the research domain. For the triennium 2006, 2016, and 2017 the districts of Andhra Pradesh were ranked in three categories depending on their level of development: high, medium, and low sustainable. According to the findings, the districts viz. West Godavari, East Godavari, Guntur, Krishna, and Prakasham have stayed in the high sustainable category without modification between 2006, 2016, and 2017. Chittoor, S.P.S. Nellore, and Y.S.R. Kadapa were observed to be developing at a medium pace. In all three years, the districts of Srikakulam, Vishakapatanam, and Vizianagaram were observed to have a low degree of sustainability in SLSI category.

Key words: sustainability, indicators, livelihood security and indices.

INTRODUCTION

In 1972, during the UN Conference on the Human Environment in Stockholm, the concept - sustainable development earned its first substantial international acknowledgment. The UN coined the term "sustainable development" in its document "Our Common Future" (Brundtland *et al*., 1987). Sustainable development, according to the World Commission on

Environment and Development (WECD), is "development that meets current human needs without jeopardising future generations' ability to satisfy their own needs." It encompasses the interconnection and interplay of development's environmental, economic, and social elements (Murphy, 2012). The concept of sustainability is always articulated in juxtaposition with the concept of livelihood. Livelihood is defined as all actions that are essential to lead a life by an individual or households through acquiring all the basic necessities like food, clothing, shelter, water etc., on a sustainable basis. Sustainable livelihood explains the connection between people and their livelihood.

As the resources are scarce, there exists an imbalance between availability and actual requirement of goods and services created in catering the ever emerging needs of the population. This causes economic, environmental and social unsteadiness which consecutively affects the sustainability in development in a region or a nation. Sustainable livelihoods concept provides a ray of hope in attaining the development in a sustained manner with greater socio-economic equity.

Swaminathan (1991) proposed the SLSI as an operational measure for determining the occurrence of conditions necessary for sustainability in a specific location. The SLSI contains three interacting components that correspond to the three-dimensional idea of sustainability: ecological security, economic efficiency, and social equality. The three indicators were used for calculating SLSI for Andhra Pradesh state. The fifteen variables chosen to represent the three components of SLSI are listed below.

Ecological security is crucial to control and enhance the resource base of the economy.

Ecological Security Indicators

1. Population density
2. Proportion of geographic area under forest
3. Cropping intensity
4. Livestock density
5. Net irrigated area
6. Population growth

Economic efficiency directs the most efficient use of capital and human resources within the current technical conditions in order to cater the everyday needs of the society.

Economic Efficiency Indicators

7. Total food grain yield

8. Total milk production

9. Net sown area

10. Fertilizer consumption

Social equity ensures a wide sharing of economic benefits to society in form of sustainable and secure livelihoods, particularly for the socio-economically disadvantaged.

Social Equity Indicators

11. Literacy rate

12. Female literacy rate

13. Rural road connectivity

14. Number of the commercial bank branches

15. Number of the primary health centres

Andhra Pradesh state was selected for the study because it has a high level of inequality, poor administration, over-exploitation of natural resources, and a rapidly growing population. These have posed a threat to the state's natural equilibrium, as well as socio-economic status of households in various districts. The state's effective development of sustainable agriculture has been jeopardised by constantly rising inequality. The goal of this study is to create composite indices of three indicators: ecological security, economic efficiency, and social equity, to measure the SLS in districts of Andhra Pradesh.

MATERIAL AND METHODS

The SLSI will be calculated using the ratio approach mentioned below, by using three indices: ESI, EEI, and SEI (Mahima et al.)

The SLSI was computed using the following ratio methodology:

$$\text{SLSI}_{ijk} = \frac{X_{ijk} - min_k\ X_{ijk}}{max_k\ X_{ijk} - min_k\ X_{ijk}} \dots (1)$$

$$\text{SLSI}_{ijk} = \frac{max_k\ X_{ijk} - X_{ijk}}{max_k\ X_{ijk} - min_k\ X_{ijk}} \dots (2)$$

Where,

i= Variables (1,2,3,……..,I),

j= Components (1,2,3,……..,J),

k= Districts (1,2,3,……..,K),

X_{ijk} = Value of the ith variable, j^{th} component of kth district , and

$SLSI_{ijk}$ = Value of the index for the ith variable representing the jth component of the SLSI of kth district, respectively.

Equation (1) applies to variables with positive SLSI implications, while equation (2) applies to variables with negative SLSI inference. The numerators in equation (1) represent the amount to which the kth district outperforms worst performing regions in i^{th} variable representing j^{th} component of its SLSI. The range of a given variable across districts, is the numerator.

The indices for different components of SLSI were calculated as a simple arithmetic mean of three indices with their respective variables after $SLSI_{ijk}$ was calculated for all variables., *i.e.*

$$SLSI_{jk} = \frac{\sum_{i=1}^{I} SLSI_{ijk}}{I} \quad ….(3)$$

The equal weights of indices of corresponding representative variables will be used to compute three compound indices of SLSI, namely, ESI, EEI, and SEI. The arithmetic mean of its component indices was used to generate a composite index, SLSI. The values range from 0 to 1. A score around 0 indicates a poor level of sustainability, whereas a value near one indicates a high level of sustainability. The research gap identified will be helpful to assess the level of indices to livelihood security for chosen districts. The parameters will be developed for assessing the indices to livelihood security with respect to the various kinds of livelihood security viz., food, education, economic, health and social security.

RESULTS AND DISCUSSION

Table 1. Districts classified based on level of development in ESI, EEI and SEI during year 2006.

ESI

High	Rank	Medium	Rank	Low	Rank
East Godavari	1	Krishna	6	Vishakapatanam	10
West Godavari	2	Y.S.R. Kadapa	7	Chittoor	11
Srikakulam	3	S.P.S. Nellore	8	Kurnool	12
Guntur	4	Prakasham	9	Anantapur	13
Vizianagaram	5				
EEI					
High	Rank	Medium	Rank	Low	Rank
Guntur	1	Chittoor	6	Srikakulam	10
Kurnool	2	S.P.S. Nellore	7	Vizianagaram	11
Anantapur	3	East Godavari	8	West Godavari	12
Prakasham	4	Y.S.R. Kadapa	9	Vishakapatanam	13
Krishna	5				
SEI					
High	Rank	Medium	Rank	Low	Rank
Chittoor	1	Krishna	6	Srikakulam	10
West Godavari	2	East Godavari	7	Anantapur	11
S.P.S. Nellore	3	Vishakapatanam	8	Kurnool	12
Y.S.R. Kadapa	4	Guntur	9	Vizianagaram	13
Prakasham	5				

Table 2. Districts classified based on level of development in SLSI during year 2006.

SLSI					
High	**Rank**	**Medium**	**Rank**	**Low**	**Rank**
Guntur	1	Chittoor	6	Kurnool	10
East Godavari	2	S.P.S. Nellore	7	Srikakulam	11
Prakasham	3	Y.S.R. Kadapa	8	Vishakapatanam	12
Krishna	4	Anantapur	9	Vizianagaram	13
West Godavari	5				

From the Table 2. it is clearly noticed that, during the year 2006 districts were classified under low sustainability were Kurnool, Srikakulam, Vishakapatanam and Vizianagaram. Followed by chittoor, S.P.S.Nellore, Y.S.R. Kadapa and Anantapur comes under medium

sustainable category. Further, the remaining five districts viz., Guntur, East Godavari, Prakasham, Krishna and West Godavari belongs to highly sustainable category.

Table 3. Districts classified based on level of development in ESI, EEI and SEI during year 2016.

ESI					
High	**Rank**	**Medium**	**Rank**	**Low**	**Rank**
East Godavari	1	Y.S.R. Kadapa	6	Chittoor	10
West Godavari	2	Krishna	7	Prakasham	11
Srikakulam	3	Vishakapatanam	8	Anantapur	12
Vizianagaram	4	S.P.S. Nellore	9	Kurnool	13
Guntur	5				
EEI					
High	**Rank**	**Medium**	**Rank**	**Low**	**Rank**
Guntur	1	East Godavari	6	Y.S.R. Kadapa	10
Prakasham	2	Chittoor	7	Srikakulam	11
Kurnool	3	S.P.S. Nellore	8	Vizianagaram	12
Anantapur	4	West Godavari	9	Vishakapatanam	13
Krishna	5				
SEI					
High	**Rank**	**Medium**	**Rank**	**Low**	**Rank**
West Godavari	1	Y.S.R. Kadapa	6	Anantapur	10
Krishna	2	Vishakapatanam	7	Srikakulam	11
Chittoor	3	Prakasham	8	Vizianagaram	12
East Godavari	4	Guntur	9	Kurnool	13
S.P.S. Nellore	5				

Table 4. Districts classified based on level of development in SLSI during year 2016.

SLSI					
High	**Rank**	**Medium**	**Rank**	**Low**	**Rank**

East Godavari	1	Chittoor	6	Srikakulam	10
West Godavari	2	S.P.S.Nellore	7	Kurnool	11
Guntur	3	Anantapur	8	Vishakapatanam	12
Krishna	4	Y.S.R.Kadapa	9	Vizianagaram	13
Prakasham	5				

In the year 2016, from Table 4. districts fall under low level of sustainability were Srikakulam, Kurnool, Vishakapatanam and Vizianagaram. While, in medium level of sustainability districts placed were chittoor, S.P.S. Nellore, Anantapur and Y.S.R. Kadapa. Five districts viz., East Godavari, West Godavari, Guntur, Krishna and Prakasham were highly sustainable.

Table 5. Districts classified based on level of development in ESI, EEI and SEI during year 2017.

ESI					
High	**Rank**	**Medium**	**Rank**	**Low**	**Rank**
East Godavari	1	S.P.S. Nellore	6	Vishakapatanam	10
West Godavari	2	Chittoor	7	Anantapur	11
Srikakulam	3	Y.S.R. Kadapa	8	Prakasham	12
Vizianagaram	4	Krishna	9	Kurnool	13
Guntur	5				
EEI					
High	**Rank**	**Medium**	**Rank**	**Low**	**Rank**
Kurnool	1	East Godavari	6	Srikakulam	10
Guntur	2	Y.S.R. Kadapa	7	Vizianagaram	11
Prakasham	3	West Godavari	8	Chittoor	12
Krishna	4	S.P.S. Nellore	9	Vishakapatanam	13
Anantapur	5				
SEI					
High	**Rank**	**Medium**	**Rank**	**Low**	**Rank**
West Godavari	1	Y.S.R. Kadapa	6	Anantapur	10
Krishna	2	Vishakapatanam	7	Srikakulam	11

Chittoor	3	Prakasham	8	Vizianagaram	12
East Godavari	4	Guntur	9	Kurnool	13
S.P.S. Nellore	5				

Table 6. Districts classified based on level of development in SLSI during year 2017.

SLSI					
High	**Rank**	**Medium**	**Rank**	**Low**	**Rank**
East Godavari	1	Y.S.R. Kadapa	6	Anantapur	10
West Godavari	2	Kurnool	7	Srikakulam	11
Guntur	3	S.P.S. Nellore	8	Vizianagaram	12
Krishna	4	Chittoor	9	Vishakapatanam	13
Prakasham	5				

In the year 2017, from Table 6. districts under low level of sustainability were Anantapur, Srikakulam, Vizianagaram and Vishakapatanam. Followed by, medium sustainable districts viz. Y.S.R. Kadapa, Kurnool, S.P.S. Nellore and chittoor. Further, remaining five districts viz., East Godavari, West Godavari, Guntur, Krishna and Prakasham were highly sustainable.

CONCLUSION

Based on the findings, we can conclude that the districts viz. West Godavari, East Godavari, Guntur, Krishna, and Prakasham have stayed in the high-sustainability category since 2006, 2016, and 2017. In SLSI, there was no significant change in level of development in Andhra Pradesh's districts. In the SLSI, the districts viz. Chittoor, S.P.S. Nellore, and Y.S.R. Kadapa were identified as having a medium degree of development. However, no significant changes in district's performance were identified. In addition, the SLSI category for Anantapur district was identified as medium. However, the district was deemed to be in the low SLSI category in 2017. Kurnool district, which had been ranked as having a low level of development improved to a medium level in 2017. In all three years, the districts of Srikakulam, Vishakapatanam, and Vizianagaram were observed to have a low degree of development in SLSI category. SLSI highlights the kind and form of policies that should be implemented in each study area for improving livelihood security alongside with the overall development priorities.

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