



Gender Equality and Goal 5 of Sustainable Development Goals

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Review Article

Volume 7 Issue 2

Received Date: August 07, 2023

Published Date: September 06, 2023

DOI: 10.23880/whsj-16000182

Abstract

With 14 indicators distributed over nine targets, SDG-5 aims at achieving gender equality and empowerment of all women and girls by 2030 for all countries agreed to work towards achieving them. NITI Aayog of Govt. of India selected six indicators towards improvement in SDG-5. Focusing attention to SDG-5 only, the paper proposes simple method of aggregating indicators of SDG-5 and discusses properties of the proposed methods. Each of the indicators was expressed in terms of proportions which were combined to reflect overall proportion for a State/UT at current period. The proposed method of combining indicators expressed as proportions is simple, appealing and helps to assess current status (achievement) of a State by computing combined proportion. Current status of the States can similarly be combined to get current status of a country and its distance from the 2030 targets. Similar procedure may be extended to find current status of the world by combining the country-wise current status. Measures of percentage improvement or deterioration at country/State levels at a period from the previous period were discussed. Important inferences on comparison of countries may be drawn on the basis of path of improvement registered by a State or country. Future studies suggested.

Keywords: SDG-5; Combined proportions; Target vector; Achievement vector; Composite index

Abbreviations: SDGs: Sustainable Development Goals; CI: Composite Index; GRIs: Genders related Indices; OSCs: One-Stop Centres; USAID: United States Agency for International Development.

Introduction

Denying equality to half of the world's population means denying human potential to about 50% of people in the world [1]. Major dimensions of gender equality to foster global prosperity are opportunities, participation in decision-

making, access to resources, education and employment [2]. However, Global Gender Gap Report 2020 [3] indicated gender gaps in health, education and policy areas, over all forms of economic participations. Sustainable Development Goals (SDGs) by the United Nations (2015) are taken as targets to be achieved by 2030 for all countries agreed to work towards achieving them. With 14 indicators distributed over nine targets, SDG-5 aims at achieving gender equality and empowerment of all women and girls. The SDG-5 targets and corresponding indicators are presented in (Table 1).

Targets	Indicators
5.1 End of all forms of discrimination against women and girls everywhere	5.1.1 Existence of legal frameworks to promote, enforce and monitor equality and elimination of non-discrimination based on gender in following areas: (i) Overarching legal frameworks and public life; (ii) Violence against women; (iii) Employment and economic benefits; and (iv) Marriage and family.
5.2 Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation	5.2.1 Proportion of ever-partnered women and girls aged ≥ 15 years subjected to physical, sexual or psychological violence by current or former intimate partner in the previous 12 months, by form of violence and by age 5.2.2 Proportion of women and girls aged ≥ 15 years to sexual violence by persons other than an intimate partner in the previous 12 months, by age and place of occurrence.
5.3 Eliminate all harmful practices, such as child, early and forced marriage and female genital mutilation	5.3.1 Proportion of women aged 20–24 years who were married or in a union before age 15 and before age 18 5.3.2 Proportion of girls and women aged 15–49 years who have undergone female genital mutilation, by age
5.4 Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate.	5.4.1 Proportion of time spent on unpaid domestic and care work, by sex, age and location
5.5 Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision making in political, economic and public life.	5.5.1 Proportion of seats held by women in (a) national parliaments and (b) local governments 5.5.2 Proportion of women in managerial positions
5.6 Ensure universal access to sexual and reproductive health and reproductive rights.	5.6.1 Proportion of women aged 15–49 years who make their own informed decisions regarding sexual relations, contraceptive use and reproductive health care 5.6.2 Number of countries with laws and regulations that guarantee full and equal access to women and men aged 15 years and older to sexual and reproductive health care, information and education
5.a Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws.	5.a.1 (a) Proportion of total agricultural population with ownership or secure rights over agricultural land, by sex; and (b) share of women among owners or rights-bearers of agricultural land, by type of tenure 5.a.2 Proportion of countries where the legal framework (including customary law) guarantees women's equal rights to land ownership and/or control
5.b Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women.	5.b.1 Proportion of individuals who own a mobile telephone, by sex
5.c Adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels.	5.c.1 Proportion of countries with systems to track and make public allocations for gender equality and women's empowerment

Table 1: Targets and Indicators of SDG-5.

The following may be noted:

- The indicator corresponding to Goal -5c is measured considering whether a given country has systems in place to track and make publicly available information about budget allocations for gender equality and women's empowerment. This definition does not reflect the extent or quality of spending on gender equality and women's empowerment programs.
- Data availability for the indicator 5.3.2 is problematic.
- Data gaps exist across countries for the indicator 5.2.2. Internationally comparable data is not yet available for this indicator.

Each indicator needs to be measured in quantitative terms and aggregated to a Composite Index (CI) for each country by methodologically sound procedures to facilitate (i) Comparison of countries at a given year, (ii) Reflection of progress made by a country across time and (iii) Measure how far a country is from the SDG -5. Additional analysis may be carried out to investigate influence of SDG -5 in other SDGs like No Poverty(SDG-1), Quality Education(SDG-4), Sustainable Cities and Communities (SDG-11), Responsible Consumption and Production(SDG-12), Peace, Justice and Strong Institutions (SDG-16), etc.

However, concept of gender in SDG-5 focusing on few woman-specific roles is narrow [4]. Gender inequality may result in different approaches and levels of expenditure in developing a girl child and a male child and affects justice in opportunities, leading to economic inefficiency and thus inhibiting growth and global SDG [5]. Focusing attention to SDG-5 only, the paper proposes simple method of aggregating indicators of SDG-5 and discusses properties of the proposed methods.

Literature survey

A number of Genders related Indices (GRIs) are there as composite index (CI) combining appropriately different number of chosen indicators. Construction of CIs involves various measurement issues for meaningful aggregations and comparisons over time and space. Methodological shortcomings and empirical inconsistencies of GRIs using arithmetic aggregations have been discussed by various researchers like [6-9] etc. Multiplicative aggregation (GRI_{GM}) to assess gender inequality and gender similarity index (GSI) using cosine similarity was proposed [10]. Both avoid scaling, selection of weights and satisfy desired properties including inverse relationship between GRI_{GM} and GSI as expected.

Achievements in India towards SDG-5

For a country like India with deeply rooted patriarchal attitudes, gender-based violence, and socioeconomic

disparities, achieving the SDG-5 goal has been challenging. The Government of India has come out with a single valued index called SDG India Index ($I_{SDG_{India}}$). The SDG India Index covers 13 of the 17 SDGs excluding SDG 12, 13, 14, and 17. (SDG India Index 2018 Baseline Report 2018, www.niti.gov.in). However, the $I_{SDG_{India}}$ may not be comprehensive due to limited data availability.

A number of legislations enacted for equal opportunities and dignity of life for women like:

- Protection of Women from Domestic Violence Act, 2005,
- Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013,
- Prohibition of Child Marriage Act, 2006,
- Medical Termination of Pregnancy Act, 1971,
- Equal Remuneration Act, 1976.

In addition, a number of national level schemes adopted like:

- Beti Bachao Beti Padhao (Save the girl child, educate the girl child) campaign to promote education of girls and address the issue of female foeticide.
- Sukanya Samridhi Yojana, a savings scheme with higher interest rate and tax benefits to promote financial security of the girl children.
- Mahila E-Haat, an online platform to promote women's entrepreneurship and to showcase their products and services.
- Pradhan Mantri Ujjwala Yojana, to provide clean cooking fuel to women from economically weaker sections and thereby improve women's health and to reduce indoor air pollution caused by the use of traditional cooking fuels.
- Maternity Benefit Program to provide financial assistance to pregnant and lactating women and to health and well-being of women and their children and reduce maternal and child mortality.
- One-Stop Centers (OSCs) to provide support and assistance to women who are victims of violence and include a range of services like medical assistance, legal aid, and counseling.
- Women's Reservation Bill to reserve one-third of the seats in the Lok Sabha and state legislative assemblies for women and thus, increase women's political representation and participation in decision-making, etc.
- Various State level schemes have also come out aiming at improved welfare, support and capacity building of women and girls.

Such initiatives have helped India to improve sex ratio at birth from 918 in 2014-15 to 933 in 2022-23. In addition, the Indian government and United States Agency

for International Development (USAID) have entered into a partnership covering various issues with a mix of public and private organizations, to ensure women in India have equitable access to quality healthcare, sanitation, education,

nutrition, finance, household decision-making, and more. Several humanitarian organizations connected with USAID's efforts in India are also working for improved gender equality in India (Table 2).

SDG 5 targets	Selected indicators	
	Indicators and numbers	2030 targets
5.1	$I_1 = \frac{\text{Number of females}}{\text{Number of Males (in thousand)}}$	954
	$I_2 = \frac{\text{Average wages per day by regular female employee aged 15 – 59}}{\text{Average wages per day by regular male employee aged 15 – 59}}$	1
5.2	$I_3 = \frac{\text{Number of married women aged 15 – 59 experienced spousal violence}}{\text{Total number of married women aged 15 – 59}} \times 100$	0
5.5	$I_4 = \frac{\text{Number of seats won by ladies in Parliament and State legislative assembly}}{\text{Total number of seats in Parliament and State legislative assembly}} \times 100$	50
	$I_5 = \frac{\text{Female labour force participation rate}}{\text{Male labour force participation rate}}$	1
5.6	$I_6 = \frac{\text{Number of women aged 15–59 using modern methods of family planning}}{\text{Total number of women aged 15–59}} \times 100$	100

Table 2: Based on data availability ensuring compatibility over States and Union Territories (UTs), NITI Aayog of Govt. of India selected the following six indicators towards improvement in SDG-5.

Method followed by NITI Aayog to aggregate scores of indicators for a particular, say SDG-5 are as follows:

- Normalization of raw scores of i-th indicator (x_i) by Min.-Max function i.e. $y_i = \frac{x_i - \text{Min. } x_i}{\text{Targeted } x_i - \text{Min. } x_i} * 100$ where y_i is

the normalized value of the i-th indicator and $\text{Min. } x_i$ is the minimum observed value in the data set

- SDG Index Score for the i-th State/UT corresponding to the j-th goal (I_{ij}) as arithmetic mean of the normalized values of all indicators (with equal weights) within the Goal i.e. $I_{ij} = \frac{\sum_{K=1}^{N_{ij}} I_{ij}}{N_{ij}}$ where N_{ij} denotes number of

indicators where non-zero targets.

- Composite SDG India Index Score was obtained as arithmetic mean of I_{ij} s of all SDGs. Normalization using Min.- Max function depends heavily on $\text{Min. } x_i$. The X - Y curve is not linear [11]. Y-score of an indicator is a relative measure and not an absolute one. Arithmetic aggregation suffers from substitutability effect where low value of an indicator gets compensated by higher value of another indicator.

Proposed method

The indicators can be translated in terms of proportions which can be combined to reflect overall proportion for a State/UT. For example, at a time point C, six proportions of a State/UT are as follows:

$$P_1 = \frac{X_1}{n_1}, P_2 = \frac{X_2}{n_2}, P_3 = \frac{X_3}{n_3}, P_4 = \frac{X_4}{n_4}, P_5 = \frac{X_5}{n_5} \text{ and } P_6 = \frac{X_6}{n_6}$$

Thus, $X_i = p_i * n_i$ Find $\sum_{i=1}^6 X_i = \sum_{i=1}^6 p_i n_i$ and $\sum_{i=1}^6 n_i$

The combined proportion for the m-th State/UT at time point C is given by

$$P_{Cm} = \frac{\sum_{i=1}^6 X_i}{\sum_{i=1}^6 n_i} \quad (1)$$

Equation (1) gives a single value of achievement of a State/UT at time period C by P_{Cm} as combination of the six chosen indicators.

Similarly, combination of six targets expressed in proportion can be obtained by

$$P_{T\text{arget},India} = \frac{\sum_{i=1}^6 T_i}{\sum_{i=1}^6 \hat{n}_i} \quad (2)$$

where is \hat{n}_i the estimate of the denominator of the i-th indicator $\neq 0$ and T_i is the numerator of the target for the i-th indicator. Computation of $P_{T\text{arget}}$ requires pre-adjustment

of I_3 since the target is zero. Change target of I_3 from zero to a small value say 0.001.

Distance of a State/UT at time point C could be taken as

$$Distance_{cm} = \frac{P_{cm}}{P_{T\text{arget}}} * 100 \text{ or} \quad (3)$$

$$Distance_{cm} = \sqrt{(P_{T\text{arget}} - P_{cm})^2} \quad (4)$$

Alternatively, the indicators for the current period may be expressed as a six dimensional vector

$$C_{6 \times 1} = (I_{1C}, I_{2C}, \dots, I_{6C})^T \text{ and the targets by a vector}$$

$$T_{6 \times 1} = (I_{1T}, I_{2T}, \dots, I_{6T})^T \text{ . Distance between}$$

achievements of the m-th State/UT at current period and 2030 targets may be computed as the distance and

$$P_{cm} = \sqrt{(I_{1C} - I_{1T})^2 + (I_{2C} - I_{2T})^2 + (I_{3C} - I_{3T})^2 + (I_{4C} - I_{4T})^2 + (I_{5C} - I_{5T})^2 + (I_{6C} - I_{6T})^2} \quad (5)$$

To find value of achievement of a country, say India can be found by combining all the for the time period C i.e.

$$P_{CIndia} = \frac{\sum_m \sum_{i=1}^6 X_{im}}{\sum_m \sum_{i=1}^6 n_{im}} \quad (6)$$

and targets of India $P_{T\text{arget},India}$ can be modified as

$$= \frac{\sum_{i=1}^6 T_i}{\sum_{i=1}^6 \hat{n}_i} \quad (7)$$

where \hat{n}_i is the estimate of India's population relevant to the i-th indicator.

How far India is at C-th time period from the SDG target 2030 can be found through a measure of distance between P_{CIndia} from equation (6) and $P_{T\text{arget},India}$ from equation

(7) by say

$$Distance_{PCIndia} = \frac{P_{CIndia}}{P_{T\text{arget},India}} * 100 \quad (8)$$

or

$$Distance_{PCIndia} = \sqrt{(P_{T\text{arget},India} - P_{CIndia})^2} \quad (9)$$

While equation (8) gives percentage distance from the 2030 targets, equation (9) is the Euclidian distance from the targets. Both fail to indicate the indicator or indicators where the country is lagging behind. Distance between achievement vector C and target vector T computed considering indicator-wise distance helps to identify the indicator(s) lying at far from the corresponding target and facilitates adoption of appropriate policy actions.

Discussion

The proposed method of combining indicators expressed as proportions is simple and appealing. The method helps to assess current status (achievement) of a State (or region within a country) by computing combined proportion, based on which, the States can be ranked. Percentage improvement or deterioration at State levels at period C from the previous period can be reflected by $\frac{P_{Cm} - P_{(C-1)m}}{P_{(C-1)m}} * 100$ where

$(P_{Cm} - P_{(C-1)m}) > 0$ implies improvement. The States can

also be ranked in terms of improvement from the previous year.

Current status of the States can similarly be combined to get current status of a country and its distance from the 2030 targets. Similar procedure may be extended to find current status of the world by combining the country-wise current status. It is possible to undertake time series investigation by observing status of a State or country across time i.e. plotting the path of improvement registered by a State or country. Important inferences on comparison of countries may be drawn on the basis of such paths.

Conclusion

Each indicator of SDG-5 can be shown as a proportion. The simple method of combined proportions is recommended. Empirical investigations to study properties of the proposed method may be undertaken as future studies.

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