

Issue Paper

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“Gender Equality in Human Development – Measurement Revisited”

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INTRODUCTION

Gender equality and women's empowerment are integral to human development. Since the Beijing Declaration and Platform for Action in 1995, considerable progress has been made, yet in the mean while along with existing shortfalls, new and extensive challenges have emerged, pertaining both to women status and the full realization of their human rights. To take account of expanded research and knowledge on what affect these issues, and more and better data available, it is timely to review how achievement of the equality and empowerment of women may better be measured in an international context. With new sources and more data disaggregated by gender being collected and compiled, dimensions of deprivation that were previously difficult to measure may become accessible. At the same time, advances in conceptual, empirical and methodological knowledge could help design new approaches to quantified measurements of gender equality and women's empowerment. The goals, targets and indicators for the post-2015 agenda are likely to give rise to expanded sets of national indicators; regular review of progress could strengthen monitoring and sustain momentum.

The Expert Group Meeting on gender equality and its measurement is intended as an occasion to revisit the various approaches to this issue through open dialogues that will take stock of several of the most prominent measures currently in use, explore areas that need greater attention, examine methodological underpinnings, and assess the potential of emerging data to fill gaps. These discussions are especially timely given the additional emphasis given to the eradication of gender based inequalities in the post-2015 development agenda, as manifested in the Sustainable Development Goals (SDGs), targets and indicators.

1. GENDER EQUALITY AND HUMAN DEVELOPMENT

The fundamental principle of human development is for people to enlarge their choices, to realize their potential, and to enjoy the freedom to lead lives they value or have reason to value. Equal opportunities in all spheres, for all people, women and men alike, are at the heart of the human development. However, those options remain unequally distributed within and across societies and unfortunately many are still largely unavailable to women. Disadvantage and discrimination, lack of insights into what particularly affects women's lives, including health (physical and emotional), reinforced by social norms and values, institutions, and public policies, exist in every sphere of women's lives, manifested differently in different country settings. They limit women's capabilities, opportunities, and choices, resulting in less progress than men in terms of health, education, standard of living, empowerment, personal security and other critical dimensions of human development. Thus, the full potential of many women's lives cannot reach optimal level and humanity as a whole does not reap its potentials.

Since its inception in 1990, the Human Development Report (HDR) has presented many aspects of these disparities – such as those in education, work, health, political participation and often underlying issues related to data and measurement. The 1995 HDR was one of the first global development publications to bring these ideas to the fore in an integrated manner, including a presentation of the historical and political movement for gender equality within the human development paradigm.

Much progress has been made over the past 20 years in reducing these disparities; however, the unfinished tasks are still pronounced and new challenges continue to emerge, and new insight is generated through

more extensive research and attention to disaggregated and relevant data collection that also begs new measurements of progress for women. And although some convergence has occurred in ‘capabilities’ between men and women as measured by the traditional HDI indicators it appears not adequate for women’s functionings and ability to exercise the same choices and realise their potential. These differences generate unequal achievements. As a result, the full potential of many women’s lives cannot be realised.

2. MEASURING HUMAN DEVELOPMENT PROGRESS FOR MEN AND WOMEN USING COMPOSITE INDICES

Composite indices have shown to be valuable instruments to capture multi-dimensional inequalities, which help generate attention, stimulate policy debate and analysis, support advocacy and monitor progress. Different entities have put forward different measures – each unique in its own way in the data that is used and how it is put together – and gained significant experience in their use.

Much more data, from many different sources, is now available, indicating opportunities for further advancement of work in this area. Better data on gender differences in many important aspects of development are now available from official national statistical sources. These data are customarily collected in population censuses and national household surveys on labour force, household spending, time use, as well as in international surveys such as the Demographic and Health Survey (DHS) and the Multiple Indicator Cluster Survey (MICS). There are also non-official sources of sex disaggregated data such as the Gallup World Poll, the World Value Survey and a variety of so-called social barometers.

The international statistical community has put considerable efforts to generate internationally comparable gender indicators through a new initiatives such as the Evidence and Data for Gender Equality (EDGE) Initiative, a recent project executed jointly by the UN Statistics Division and the UN Women. The initiative resulted in a set of gender indicators on education and health, human rights, public life and decision making, economic activities, employment, entrepreneurship and assets.¹ Some of these indicators (47) are already available for many countries, some of them have a limited coverage, and some are in the process of development. Many of these data are now collected and reported annually allowing for the consistent tracking of the progress over time. A larger number of indicators means a better choice for empirical analyses of gender equality, but also a better choice for more efficient combining into composite indices for directing policies and specific targeting and advocacy. Concurrently, ‘Data2x: partnering for a gender data revolution’² spotlights in particular 28 key gaps in gender data across the five domains of health, education, economic opportunities, political participation, and human security.

Although a great deal of innovative work is usually needed in construction of a composite index, many subjective preferences and assumptions also enter the equations. Moreover, even a well-designed composite index has to leave things out, or needs independent corroboration. That is why it is always important to pay attention to specific indicators alongside of the composite measure to capture different aspects of the measured concept. Each such single indicator underlines the importance of related concept by exposing the poor or good performance.

¹ <http://genderstats.org/Browse-by-Indicator>

² <http://data2x.org/gender-data-gaps/>

A composite measure should meet some basic criteria. It has to be based on a solid theoretical foundation, conform to a common notion of what is being measured, and fit the purpose for which it is developed, correspond to strong policy or advocacy value, and be understandable and easy to describe,. It also has to be methodologically solid, operationally viable and easily replicable. For advocacy in particular, it should enable comparison across countries.

3. GENDER INDICES IN THE HUMAN DEVELOPMENT REPORTS AND BEYOND

The HDR launched its first set of gender related composite indices, the Gender-related Development Index (GDI) and the Gender Empowerment Measure (GEM), in the 1995 report. These two composite indices were the first of their kind in bringing together measurements of gender disparities in different dimensions of human development. Their purpose, to “engender human development”, was to highlight the gap that exists between women and men’s opportunities and capabilities, and to also examine the progress made in reducing gender disparities in the past few decades (UNDP 1995).

Using the GDI and GEM, countries were ranked on a global scale by their performance towards achieving gender equality. These indices were intended to provide important tools for governments and policy-makers to monitor the status of women and design programs to equalize opportunities provided to women and men. As stated in the 1995 report, “investing in women’s capabilities and empowering them to exercise their choices is not only valuable in itself it is also the surest way to contribute to economic growth and overall development”. Therefore, “gender equality must be an integral part of the sustainable human development paradigm (UNDP 1995)”.

However, over the years the GDI and GEM were criticized for their limitations in accurately capturing gender disparities and their weakness in reflecting critical, concurrent gender issues. Responding to these criticisms, the HDRs introduced an alternative pair of gender indices in 2010, the Gender Inequality Index (GII) and the new Gender Development Index (nGDI).

In the meantime, several other organizations/agencies have also launched measures of gender inequality. A common feature of these measures is that they are expressed as composite indices of the form

$$I = F(d_1(x_{11}, \dots, x_{1M_1}), \dots, d_K(x_{K1}, \dots, x_{KM_K})),$$

where I represents the value of the index, F the unique functional form, the $d_k, k=1, \dots, K$, the dimensions incorporated in the index and the $x_{km}, k=1, \dots, K, m=1, \dots, M_k$ the observed indicators used to assess the value of the dimension d_k . A summary of some of the more commonly prevalent measures is in Tables 1 and 2.

Table 1. Gender indices published in the Human Development Reports

Index	Focus concept	Dimension	Indicator	Indicator source	Updating frequency	Functional form	Producer	Index Coverage	Publication
GDI	Human Development	Long and healthy life	Life expectancy at birth	UNDESA	Biennially	GDI is the unweighted arithmetic mean of the inequality-adjusted dimension indices, i.e. the harmonic mean (EDEP) of male and female dimension indices. The adjusted income for women and men are calculated with similar procedure as HDI starting in 1999.	HDR, UNDP	155	Annually, 1995-2009
		Knowledge	Adult literacy rate	UIS	Annually				
			Combined gross enrolment ratio in education	UIS	Annually				
		Standard of living	Estimated earned income (\$PPP)	World Bank, ILO	Annually				
GEM	Empowerment	Economic participation and decision-making power	Female legislators, senior officials and managers	ILO	Annually	GEM is the unweighted arithmetic mean of the inequality-adjusted dimension indices, i.e. the harmonic mean (EDEP) of male and female dimension indices	HDR, UNDP	109	Annually, 1995-2009
			Female professional and technical workers	ILO	Annually				
		Political participation	Women's shares of parliamentary seats	IPU	Annually				
		Power over economic resources	Ratio of female to male estimated earned income (PPP\$)	World Bank, ILO	Annually				
GII	Empowerment	Reproductive health	Maternal mortality ratio	UN IAEG for Maternal Mortality	Biennially	GII is an inequality measure based on harmonic mean of geometric means. First, the dimension indices are aggregated separately for females and males by the geometric mean to obtain the average levels of achievements across dimensions for each gender. The average level of achievement was also calculated for the entire population irrespectively of the gender. The two gender-based geometric means are aggregated by the harmonic mean and compared to the mean calculated for the entire population. Ratio of these two means is subtracted from 1 to obtain the GII.	HDR, UNDP	152	Annually, 2010-2014
			Adolescent birth rate	UNDESA	Biennially				
		Empowerment	Female and male shares of parliamentary seats	IPU	Annually				
			Female and male shares of population with at least secondary education	UIS, Barro and Lee	Annually				
		Labour market	Female and male labour force participation rates	ILO	Annually				
nGDI	Human Development	Health	Life expectancy at birth	UNDESA	Biennially	GDI is the ratio of female HDI to male HDI	HDR, UNDP	148	Annually, 2014
		Knowledge	Mean years of schooling	UIS, Barro and Lee	Annually				
			Expected years of schooling	UIS	Annually				
		Standard of living	Estimated GNI per capita (PPP\$)	World Bank, ILO, UNDESA	Annually				

Table 2. Gender indices by other organizations

Index	Focus concept	Dimension	Indicator	Indicator source	Functional form	Producer	Index Coverage	Publication
GGGI	Gender disparities	Economic participation and opportunity	Ratio of female labour force participation over male value	ILO, KILM	GGGI is the unweighted arithmetic mean of the four subindices, which were constructed as the weighted arithmetic mean of the corresponding indicators. Higher weights are assigned to indicators with lower standard deviations. The weighting scheme of the 2006 index is used in subsequent years. All indicators are expressed as female to male ratios and are truncated at 1 as equity benchmark	World Economic Forum	142	Annually, 2006-2014
			Wage equality between women and men for similar work (female-over-male ratio)	WEF, Executive Opinion Survey				
			Ratio of female estimated earned income over male value	WEF calculations based on HDR methodology				
			Ratio of female legislators, senior officials, and managers over male value	ILO				
			Ratio of female professional and technical workers over male value	ILO				
		Educational attainment	Ratio of female literacy rate over male value	UIS, HDR				
			Ratio of female net primary enrolment rate over male value	UIS				
			Ratio of female net secondary enrolment rate over male value	UIS				
			Ratio of female gross tertiary enrolment rate over male value	UIS				
		Health and survival	Sex ratio at birth (female-over-male ratio)	CIA World Factbook				
			Ratio of female healthy life expectancy over male value	WHO				
		Political empowerment	Ratio of females with seats in parliament over male value	IPU				
			Ratio of females at ministerial level over male value	IPU				
			Ratio of number of years of a female head of state (last 50 years) over male value	WEF calculations				

Index	Focus concept	Dimension	Indicator	Indicator source	Functional form	Producer	Index Coverage	Publication	
SIGI	Social norms and discrimination in social institutions	Discriminatory family code	Legal age of marriage	SIGI country profiles	Each subindex is aggregated from variables using a reasonable weighting scheme (through a polychoric Principal Component Analysis procedure). SIGI is an unweighted arithmetic mean of a non-linear function of the subindices. The non-linear transformation (square each subindex) means that high inequality penalized in one dimension can only be partially compensated with low inequality in another dimension	OECD Development Centre	108	2009, 2012, 2014	
			Early marriage	UN World Marriage Data, DHS, MICS					
			Parental authority	SIGI country profiles					
			Inheritance	SIGI country profiles					
		Restricted physical integrity	Violence against women	SIGI country profiles, DHS, MICS, World Value Survey, WHO, International Violence Against Women Survey, European Union Agency for Fundamental Rights					
			Female genital mutilation	WHO, MICS, DHS					
			Reproductive autonomy	DHS, MICS, WHO					
		Son bias	Missing women	CIA, UNPD					
			Fertility preferences	DHS, MICS, EUROSTAT, National household surveys					
		Restricted resources and assets	Secure access to land	SIGI country profiles					
			Secure access to non-land assets	SIGI country profiles					
			Access to financial services	SIGI country profiles					
		Restricted civil liberties	Access to public space	SIGI country profiles					
			Political voice	SIGI country profiles, World Bank, IPU					
GEI	Gender disparities	Education	Primary school enrolment	UIS	The ratio of female to male performance for each of the eleven indicators is computed and rescaled to generate an index ranging from 0 to 100. The indicators are weighted by population to account for the gender differences in population share in each country, and then aggregated by unweighted arithmetic mean into dimension indices. GEI is the unweighted arithmetic mean of these three dimension indices	Social Watch	154	2004-2007, 2008, 2009, 2012	
			Secondary school enrolment						
			Tertiary education enrolment						
			Adult literacy rate						
		Economic participation	Labour force gap	ILO					
			Non-vulnerable employment						
			Estimated income gap						
		Women empowerment	Seats in parliament	IPU					
			Legislators, senior officials, and managers						ILO
			Professional and technical workers						
Women in ministerial positions	IPU								

Index	Focus concept	Dimension	Indicator	Indicator source	Functional form	Producer	Index Coverage	Publication
EGI	Gender equality and women's empowerment in the environmental sector	Gender based rights and participation	Data for 27 indicators were compiled from national and international statistics	Seven new data sets compiled by the EGI team and two new external data sets: UNFCCC, UNCCD, CBD, CEDAW, Agenda 21, WSSD, Rio+20, MDGs, CSW 2008, Fourth World Conference on Women 1995, as well as main data sources from the World Bank, FAO, UNICEF, UNESCO, EPI, WHO, IPU, Freedom House, and national statistics offices	The overall EGI score for each country is based on the weighted averages of the six categories and scaled from 0 to 100, where 100 stands for gender equality	Global Gender Office of International Union for Conservation of Nature (IUCN)	72	2013-
		Ecosystem						
		Gender based education and assets						
		Governance						
		Country reported activities						
		Livelihood						
EU-GEI	Measure of gender equality as a multidimensional concept	Work	Participation	Eurostat-EU LFS	The overall Index is composed of 6 major domain indices and 12 sub-domain indices, all of them bound between [1,100], where 1 stands for complete gender inequality, with any value above indicating a proportional increase of gender equality, with full gender equality at 100. The EU-GEI provides lower levels of compensability at sub-domain and domain levels since it relies on geometric means. In addition, because it uses equal weights and arithmetic aggregation at the level of variables, it allows higher compensability within sub-domains. At the domain level, the robustness analysis selects a combination of weights that relies on those provided by using the Analytic Hierarchy Process with the network of EIGE's experts (mean experts' weights). These weights are equally shared at sub-domain and indicator level	European Institute for Gender Equality (EIGE)	27	Biennially, 2013-
			Segregation	Eurostat-EU LFS				
			Quality of work	Eurostat-EU LFS, Eurofound-European Working Conditions Survey				
		Money	Financial resources	Eurostat-Structure of Earnings Survey, Eurostat-EU Statistics on Income and Living Conditions				
			Economic situation	Eurostat-EU Statistics on Income and Living Conditions				
		Knowledge	Educational attainment	Eurostat-EU LFS				
			Segregation	Eurostat-UNESCO/OECD/Eurostat (UOE) questionnaires on Educational Statistics				
			Lifelong learning	Eurostat-EU LFS				
		Time	Economic activities	-				
			Care activities	Eurofound-European Working Conditions Survey				
			Social activities	Eurofound-European Working Conditions Survey				
		Power	Political power	EC-DG Justice-Women and Men in Decision Making				
			Social power	-				
			Economic power	EC-DG Justice-Women and Men in Decision Making				
		Health	Status	Eurostat-EU Statistics on Income and Living Conditions, Eurostat-demographic statistics				
			Behavior	-				
			Access	Eurostat-EU Statistics on Income and Living Conditions				
		Intersecting inequalities	Population groups in specific age, citizenship, disability, ethnicity, marital status, religion, sexual orientation, and social class					
			Discrimination and other social grounds	Eurostat-EU LFS				
		Violence	Direct violence	FRA survey on violence against women				
Indirect violence	Eurobarometer							

Apart from the indices recorded in the table above, researchers in this area have proposed several methodologies to improve the measurement of gender equality in human development. White (1997)'s *Gender Equality Index* and Forsythe et al. (2003)'s *Gender Inequality* are alterations of HDRs' GDI.³ Dijkstra and Hammer (2000)'s *Relative Status of Women Index* tackles on three main dimensions: (1) ratio of the female and male index for education, (2) ratio of the female and male index for life expectancy, (3) relative female and male returns to labour. In a following work, Dijkstra (2002)'s *Standardized Index of Gender Equality* serves as a measure of relative position of female to male across countries. The *African Gender and Development Index* was developed by the United Nations Economic Commission for Africa (UNECA) in 2004. This index is the first effort to successfully measure and document gender equality and women's empowerment for the African countries. It has two major components: (1) the *Gender Status Index*, capturing quantitatively measurable issues related to gender disparities, and (2) the *African Women's Progress Scoreboard*, a qualitative evaluation of governments' performance in their implementation of specific treaties, declarations, and resolutions. Recent proposals include Permanyer (2008)'s *Multidimensional Gender Equity Index*, which is weighted by measure of degree to which gender inequality favors one sex, and Beneria and Permanyer (2010)'s *Women Disadvantage Index*, which decomposes multidimensional gender disparities to explain the influence of different subcomponents on the overall levels of gender inequality. Klasen and Schüller (2011)'s *Gender Gap Index*, which was the precursor of HDRs' nGDI that measures male and female human development achievements separately. Economic Intelligence Unit (2012)'s *Women's Economic Opportunity Index* consists of five dimensions: (1) labour policy and practice (2) women's economic opportunity, access to finance (3) education and training (4) women's legal and social status (5) gender business environment and 26 indicators. This index shows the extent to which underlying institutions affect women's equality of access to opportunities, in relation to women's participation and economic opportunity. These efforts have been accompanied also in efforts towards improving the quality and availability of gender related data.

4. COMPARISONS AND CONCLUSIONS

The presence of several different measures is indicative of the multiple, inter-related dimensions along which gender-based deprivations can occur. A simple empirical analysis identifies that while these measures are inter-related, they are also distinct. A pair-wise correlation analysis of values and ranks based on 8 indices, GII, nGDI, SIGI, GGGI, GEI, EU-GEI, GDI and GEM see Table 3 and Figure 1, has shown that the correlation ranges from low (nGDI and EU-GEI) to high (nGDI and GEI), (GGGI and GEI), (GGGI and EU-GEI) and (SIGI and EU-GEI).

³ See White (1997)'s Gender Equality Index formulated as GDI/HDI and Forsythe et al. (2003)'s Gender Inequality formulated as $(HDI-GDI)/HDI$.

Table 3. Pairwise correlations of selected indices across countries

a) Values

	GII	nGDI	SIGI	GEI	GGGI	EU-GEI	GDI	GEM
GII	1 (152)							
nGDI	-0.684 (136)	1 (148)						
SIGI	0.692 (98)	-0.768 (91)	1 (108)					
GEI	-0.709 (139)	0.848 (129)	-0.697 (98)	1 (152)				
GGGI	-0.532 (132)	0.663 (129)	-0.707 (88)	0.840 (131)	1 (142)			
EU-GEI	-0.608 (27)	0.131 (27)	-0.844 (10)	0.733 (27)	0.820 (27)	1 (27)		
GDI	-0.888 (136)	0.734 (148)	-0.681 (91)	0.691 (129)	0.418 (129)	0.790 (27)	1 (148)	
GEM	-0.709 (91)	0.546 (91)	-0.637 (50)	0.700 (93)	0.800 (93)	0.796 (26)	0.545 (91)	1 (109)

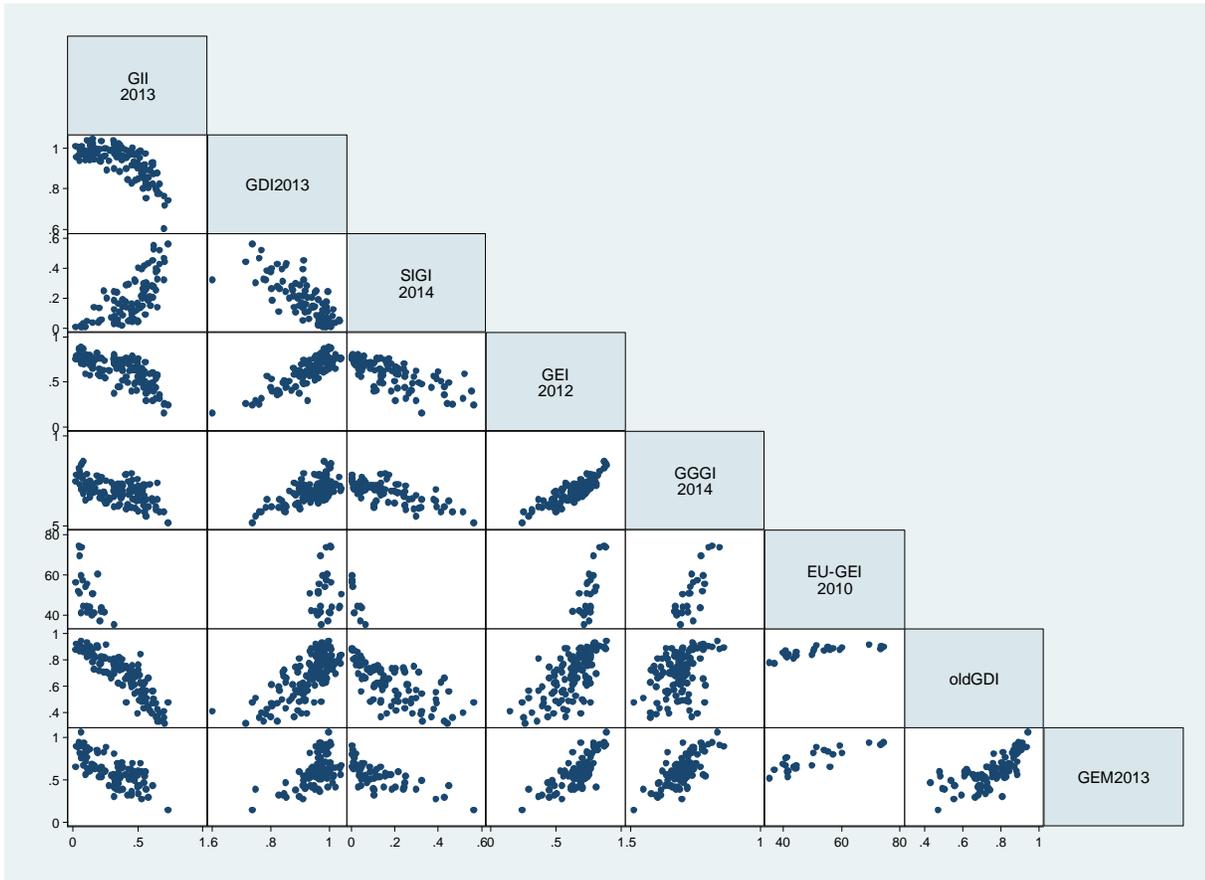
Note: The number in the brackets denotes the number of countries used for computation of correlations.

b) Ranks

	GII	nGDI	SIGI	GEI	GGGI	EU-GEI	GDI	GEM
GII	1							
nGDI	0.671	1						
SIGI	0.734	0.772	1					
GEI	0.722	0.803	0.728	1				
GGGI	0.475	0.596	0.663	0.808	1			
EU-GEI	0.653	0.255	0.788	0.591	0.722	1		
GDI	0.906	0.699	0.729	0.688	0.403	0.816	1	
GEM	0.682	0.574	0.668	0.725	0.678	0.740	0.747	1

A moderate correlation of the GII and the SIGI with other indices underlines their distinctive compositions. The low correlation of the nGDI with EU-GEI might indicate the limited suitability of the GDI in capturing gender disparities in developed countries. The GDI and GII seem to be highly correlated pointing out that the design of both indicators was aimed at capturing inequality through the use of general means of higher order.

Figure 1. Scatterplot matrix of values of selected gender indices



The experience with these (and other) indices over the last quarter century have helped identify some of the desirable characteristics of a suitable measure. These include:

- i. Well-founded theoretical basis, including understanding of range of applicability;
- ii. Clarity of and simplicity of interpretation;
- iii. Inter-dimensional relationships consistent with accepted knowledge in the field;
- iv. Well-defined, globally comparable indicators;
- v. Ability to stimulate policy debate and analysis and advocacy
- vi. Not reductive, but builds on current insights and experiences with other indices

In addition to these characteristics, for a global index it is also important that it is based on globally adequate indicators, so-called universality. While, for example genital mutilation/cutting is a powerful indicator of gender inequality in some countries, it is not a representative indicator globally. An index should be able to stimulate debate that touches on such gross rights violation.

Although significant progress has been made over the past few decades, gender inequality remains a major barrier to human development. Women in every society still face various disadvantages and

discriminations. Such disadvantages and discriminations have changed form over time and across societies. For example, between 1990-2012 convergence towards gender equality in education at all levels has been taking place. However, women's progress in capacity has not translated uniformly into economic opportunities and outcomes. Wage gaps and occupational segregation between women and men continue to persist, with the exact extent varying across countries.

At the same time, deeper understanding of the issues and the continuing progress in the availability of gender disaggregated data – for example relating to time use, care and unpaid work, gender based violence and intimidation and harassment etc. – make it possible to present a more comprehensive picture of the divergences that need to be addressed to truly advance human development. More extensive use of opinion surveys and polls may also complement more traditional data in revealing barriers for women to claim their rights and realize their potential.

As a pioneer the HDR will continue to engage in debates with stakeholders about the importance of gender issues, focusing on equality of opportunities and women's empowerment. This paper serves as a reference for reviewing these past efforts and for reigniting thinking to push progress forward.

The meeting will bring a better understanding of different approaches; the relevance of composite indices in measuring gender inequality will be addressed; the complementarity of various indices will be discussed; the desired properties of indices will be examined and the real world examples will be provided. All of these will aid the Human Development Report Office in its quest for a policy and advocacy relevant gender inequality measure.

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