SUSTAINABLE DEVELOPMENT
From Millennium 2015 to Sustainable Development Goals 2030

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ABSTRACT

In modern economies, the advancement of well-being of the citizens should be in an inclusive and sustainable way. In this respect, the sustainable welfare targets should exclusively include 3 main pillars; economic growth, social inclusion and environmental protection. These pillars consist of qualitative and non-monetary, as well as monetary and quantitative indicators to monitor. Although sustainable development today is well-appreciated in most governments' agenda, yet it is generally not a trivial task to measure its progress especially due to multidimensional nature of some targets. In this article, sustainable development is measured by using a wide range of indicators within multi-dimensional perspective of Millennium Development Goals (MDGs) 2015. Indicators cover wide spectrum of areas such as poverty reduction, health, education, gender equality and environment. An index creation method is developed for measuring the level and the performance of countries' progress through achieving MDGs. The index score levels and the rankings of countries are compared to similar indexes developed by UN. Finally, countries are classified according to their achievements relative to other countries (which is measured by the index) versus their self-achievement performances (in terms of improvement of the index over years) in a big matrix. Results demonstrate the importance of measuring country performances in both dimensions. Understanding the progress in MDGs can help settle on binding targets for achieving the country specific goals in economic and non-economic areas and on the mechanisms to implement the Sustainable Development Goals (SDGs) of the 2030 which set amid on the success of MDGs.

Keywords: Sustainable Development, Millennium Development Goals, Quality of Life, Poverty, Human Development Index, Emerging Markets

1. INTRODUCTION

Governments can have different priorities in different periods, yet raising the welfare and increasing the quality of life of their citizens often remain at the high ranks of these priorities. To demonstrate credibility, modern governments are expected to relate their development policies to the society with a sustainable system as such the well-being of the citizens should be targeted in an inclusive and sustainable way (Xue et al. 2018). This translates as that economic development should not only promise a high level of income but should also demonstrate itself through better education, health, justice, environment and other socio-economic indicators (Ramos et al. 2018). In many developed countries economic growth while bringing economic prosperity also created a bunch of new problems in the dimensions related to the former list of indicators (Fox, 2012). In the heart of the problems lies the (un)equal access of the citizens to the resources due to the uneven distrunution of income across the society (Birdsall 2005). Therefore, one can argue that economic growth cannot be entitled as success unless it comes with remedies to reduce poverty, to make income distribution fairer and to create jobs.

Sustainable development is defined as meeting the needs of the present generation without compromising the ability of future generations to meet their own needs. Economic growth, social inclusion and environmental protection are three main different pillars of sustainable development (Wichaisri and Sopadang 2018). Although no dispute arises on the importance of these three dimensions; the progress/achievements of these pillars are not easy to measure in an undisputable way (Banister et al. 2015). In this paper, sustainable development is measured by using both monetary and non-monetary indicators within multi-dimensional perspective of UN Millennium Development Goals (MDGs) of 2015. We collected data from different sources to create measures for the indicators assembled for the MDGs. MDGs cover 8 goals, 21 targets and 60 indicators related to a wide spectrum of issues such as poverty reduction, health, education, gender equality and environment. In this respect they are widely accepted as the most broadly defined development and poverty indicators at both global and country level (Reddy and Heuty 2006).

The paper further creates measures (indicators) at the target and goal levels constructed from the aforementioned indicators proclaimed by MDGs. Our aim is to use higher order indices\indicators to compare and rank countries using all the available information assembled within the definitions of MDGs. At United Nations Headquarters in New York, world leaders adopted the Millennium Declaration in September 2000. They committed their nations to a new

international partnership to reduce extreme poverty with a series of time-bound targets with the final deadline of 2015. Following the meeting, the MDGs came into the world agenda with the following explicit goals: end poverty and hunger, make universal education accessible to everyone, maintain gender equality, improve child and maternal health, combat HIV/AIDS, work through environmental sustainability and global partnership. These goals indisputably are providing worldwide reference and therefore presenting an opportunity for international country progress assessments for decision making in critical matters including but not limited to the borrowers and international funding organizations to assess the country performances (Kurniawan and Managi 2017). Table 1 summarizes the MDGs in terms of number of targets and indicators they are related to (McGillivray 2008; Haliscelik 2009).

[Table 1 here]

A new multi-dimensional Millennium Development Goals Index is constructed from the convolution of 8 goals using the 44 indicators of the aforementioned 60 (that covers 19 targets of the 21, see Table 1 for details) for 187 countries for the period of 1990-2015[1]. This index is a summary measure that enables us to compare countries within their progress through the sustainable development goals, yet it is much less daunting than doing the same for each of the goals separately which can be intractable. Still the sub-indices for all goals are constructed, in fact their indicator form versions are used for the construction of this main index. Our method and the final index is in the same lines with many major indexes available including Human Development Index (HDI) of United Nations, therefore we compare our results with it for robustness given its widely accepted position in the literature (Bilbao-Ubillos 2015). New multi-dimensional indices were intended to make a profound transformation of the foundations that builds the sustainable development agenda. The initial focus was unsurprisingly on economic development. Although economic development aspect is essential, it only supports one dimension of country progress and it is meaningful if it contributes to the larger agenda of world economies' transformation to sustainable and inclusive environments (Quental et al. 2011).

[1] Given the data limitations, we ended up with 44 indicators for which the analysis can be conducted meaningfully. For other indicators either the time series length or cross country compatibility made us decide to exclude the indicator from the analysis.

Our results show that the index score levels and the rankings of countries are comparable to the similar indexes developed by the UN. We classified countries according to their achievements relative to other countries (which is measured by the index) versus their self-achievement performances (in terms of improvement of the index over years for a country) in a big matrix to demonstrate the progress in these two dimensions. Results demonstrate the importance of measuring country performances in both dimensions. Understanding the progress in MDGs can help settle on binding targets for achieving the country specific goals in economic and non-economic areas and on the mechanisms to implement the Sustainable Development Goals (SDGs) of the 2030 which set amid on the success of MDGs. The SDGs build on the success of MDGs and aim to go further. Although, MDGs were intended for action in developing countries only, the new SDGs are universal and apply to all countries. SDGs of 2030 cover 17 goals and related 169 targets, 244 measurable indicators and have more a comprehensive list of development goals through 2030 (Spangenberg 2004). Lessons learned from MDGs can be important for better measuring and assessing the progress of SDGs of 2030. Better measurement is of immense importance to many stakeholders and would be much appreciated particularly by international funding organizations and policy makers of the beneficiary countries to implement selective policies to use funds more effectively (Allen et al. 2017).

The paper is organized as follows. Next section presents the existing indexes in the literature and compare them with the current index constructed. Data and method is discussed in the following section. Country comparisons and tabulations are presented in the next section. The final two sections display the extensions of the index by combining monetary and nonmonetary measures and the conclusion and policy recommendations consequently. Some of the larger tables and maps are provided in the Appendix of the paper.

2. MULTIDIMENSIONAL POVERTY INDEXES

Poverty is a global phenomenon. Today we even talk about poverty in developed countries which was almost unimaginable two decades ago when poverty was mainly associated with basic material needs for survival (IFAD 2010). This on the other hand underlines the relative nature of the poverty definition as such we almost surely mean different aspects of the same definition when we talk about poverty in the Sub-Saharan Africa versus for instance in the U.S.A. Nonetheless, it is a relative term and can vary depending on one's monetary and nonmonetary living conditions, as well as society's development level and environmental

conditions.

There are different approaches available for measuring poverty, but what common in all these approaches is the methodology that it is measured in several steps. First step generally is the determination of a poverty line in order to differentiate the poor from the non-poor. However, determination of the poverty line itself depends on how we define poverty (Bradshaw, 2001). Therefore, various assumptions bring multiple measures of poverty line and consequently multiple measures of poverty. Therefore, there is no consensus on a single poverty line, but instead a variety of definitions prevail. Upon determination of the poverty line, poverty measure is generally constructed as an index. Earlier approaches for constructing the index mailny focused just on the economic welfare and this sort of calculation still has remained the most widely used methodology. This does not necessarily reflect the superiority of this measure, but the reason for its long dominance is related to the vast availability of economic data for calculating poverty along this dimension (Bartolj et al. 2018). Most commonly used method to measure economic welfare is through using household consumption expenditure or household income. Those are often calculated from household surveys and they form the base data for measurement of poverty (Haughton and Khandker 2009)

Table 2 summarizes the commonly used poverty indices. For each index in the table, existence of the dimensions related to education, health, knowledge, decent standard of living, social exclusion beside income (traditional standard of living) are reported. If an index acknowledges addressing any of these dimensions, the number of indicators used to identify this dimension is reported in the subsequent colum. For instance, Human Development Index (HDI) addresses health and does it using one indicator, whereas it addresses education with 2 indicators. Contrasted with Table 1 from which we use MDGs indicator definitions for our index construction, we consider 44 indicators, 19 targets and 8 goals[2] in total to construct our poverty/sustainability index. Clearly it is more dimensional than any of the indexes in Table 2, and hence has the potential to convey better information about the country development performances.

[Table 2 here]

[2] See Footnote 1.

2.1 Multidimensional Poverty Indexes Developed by UNDP

As seen in the Table 2, poverty is mainly measured based on the income level. However, considering just income or consumption data might not be enough to measure poverty. Some socio-economic indicators, particularly education and health, can be used to better measure poverty beyond income. Therefore, multi-dimensional poverty indexes are based not only on monetary (income, consumption, expenditure) but also non-monetary indicators (Senses, 2003) for this purpose.

While stressing the impact of income on development, the UNDP has created a variety of multi-dimensional composite indexes since 1990 by taking into consideration the idea that economic growth does not always lead to human development. Many non-monetary indicators such as infant mortality rates, life expectancy at birth, literacy rate, gender equality, the enrollment rate, and access to clean drinking water and public goods, unemployment rate are used to calculate multi-dimensional poverty-development indexes. Then, the development levels and performance of the counties are measured and compared accordingly.

In this regard, Human Development Index (HDI) is the first development index developed by the UNDP in 1990. Following that, Human Poverty Index (HPI) was developed in 1997 with the idea that HDI was not covering enough the poorest part of the society. Then, the Gender Development Index (GDI) was developed by using life expectancy, education and income, also some other indicators used in the HDI. The GDI is separately calculated for men and women and it is designed to measure the gender equality. Later, the Multidimensional Poverty Index (MPI) was developed in 2010 by using 3 dimensions (education, health and living standards) and 10 related indicators to replace the previous GDI. Finally, the Gender Inequality Index (GII) is developed for measurement of gender disparity. GII is a composite measure of the loss of achievement within a country due to gender inequality by using 3 dimensions (reproductive health, empowerment, and labor market participation) and 5 related indicators. These indexes should not be seen as substitutes for each other, but rather as they have comparative strengths in different aspects of the development so can be seen as complements to each other. UNDP has measured and shared the results of the countries' performances on transforming their economic growth to human development by using these indexes (UNDP 2009), (UNDP 2010), (UNDP 2011), (UNDP 2012), (UNDP 2013), (UNDP 2014).

All but the Global Gender Gap Index (GGGI), shown in the Table 3 are developed by the UNDP. GGGI is rather developed by the World Economic Forum in 2006 to measure gender

equality and increase awareness at global and country level for gender based discrepancies in outcomes. GGGI benchmarks national gender gaps and ranks countries and regions according to how well they are leveraging their female talent pool, based on "Economic participation and opportunity", "Educational attainment", "Political empowerment" and "Health and survival" indicators. GGGI is composed of 4 dimensions with 13 indicators using weighted average method for the calculation of final index. It is an effective comparison across regions and income groups. GGGI is widely used by NGOs, researchers, media organizations, markets, governments, international organizations and individuals for various purposes. The methodology in GGCI has some similarities with that of MDGs index (World Economic Forum, 2014).

The HDI has been developed by the United Nations as a metric to assess the social and economic development levels of countries. It is a composite statistic with 3 dimensions: A long and healthy life (measured by life expectancy at birth), education (measured by mean years of schooling and expected years of schooling) and a decent standard of living (measured by GNI per capita, PPP US$). HDI with 3 dimension and related 4 indicators is used to rank countries into four tiers of human development. The computed HDI of a country is a geometric mean of normalized indexes of each of the sub-indexes related with each dimension. The dimensions and related indicators of HDI and all other related indexes are summarized in Table 3.

[Table 3 here]

In this paper, while benefiting from the methodologies of indexes mentioned above, the dimensions of sustainable development will be measured by using both the monetary and non-monetary indicators within a multi-dimensional perspective of MDGs of 2015.

3. DATA AND METHOD

3.1 Data and the Fundamentals of the Method

This section develops our method for creating the MDGs index. The very first step of our analysis is finding the right proxies for the indicators of MDGs. We searched various databases to construct the indicators for this purpose. Data for indicators are obtained from various

databases of different international organizations, however we benefited particularly from the World Bank database extensively[3].

World Development Indicators (WDI) provide current and accurate development data at both national and international levels. These data which have been approved by the UN and member states, the World Bank and partner organizations, allow us to monitor progress in countries, in regions and at globe on MDGs. WDI cover more than 150 economies, 14 groups of countries and 800 indicators, and thematically includes world view, people, environment, countries, markets and global connections. The World Development Indicators CD-ROM includes time series data for more than 1000 development indicators covering the period 1960 to 2013 for the 216 economies. (World Bank 2014/a).

World Bank MDG Online Data Set is a revised version of the World Development Indicators data set in line with the MDG objectives and objectives. The data set is updated four times a year in April, July, September and December respectively. The data covers 134 indicators, including the indicators of the MDGs covering the period of 1990-2013 of the 214 countries from which we created our 44 indicators in this paper. In the analysis, we used a data set from 1990 to 2015. Therefore, we extended the time series from from this source using data from relevant international organizations, which are used in the creation of the World Bank development indicators[4]. We constructed the indexes for the same 187 countries which also covered by the HDI. This creates a possibility to check our results in comparison to the calculations from HDI.

Index values are constrained to be between 0 and 1. This is basically a normalization to allow for cross index comparisions as well as comparisons within the same index across countries. To normalize in terms of the positive or negative meaning of the underlying indicator, i.e. a higher literacy rate is a better, however a higher child mortality is a worse outcome, we constructed the index value higher for the better outcome of the specific indicator. Missing values are always a big problem in studies dealing with multiple year, multiple country datasets, and our study is not an exception. We analyzed our indicators therefore, to decide on the optimal time series length after correcting for the missing data issues. Finally, upon constructing the 1990-2015 dataset for 44 (out of 60) indicators consistently for 187 countries, we constructed

[3] World Development Indicators Online, CD-ROM and Book, Millennium Development Goals Online 2014.
[4] The data sources and the respective international organizations that are refered for completing the data set to 2015 are provided in Appendix 6. We futher supplied the links to the relevant datasets in the Appendix Table for interested reader.

target level indicators\indices[5] using the weighted average of the indicators that are defined for the corresponding target.

The weighted average chosen as the method to proceed. This needs some explanation. In the literature, generally arithmetic, geometric and weighted averages are used in index calculations. Depending on the averaging method used, significant differences may occur in the index values. We started by creating independent indices for each of the 44 indicators that could be included primarily in the calculation of the MDGs General Index. In the next step, by using the average of the relevant indicators, the indexes of the 19 targets; and then the averages of the indexes for the 8 MDGs by taking into account the averages of the targets, and finally, the MDG General Index was formed. The MDG index and success levels were calculated separately with arithmetic, geometric and weighted averages and the results were compared.

In the calculations using arithmetic average, high success in one indicator compensates for the low success level in another indicator. Since the standard deviation value was not taken into account, the index and success levels were found higher than the geometric average results. In addition, since the indicators used in the calculation of the index are given equal weight by construction, this caused one-to-one substitution of the indicators even though the precision of the information possibly had been different. When geometric average was used in the calculations, this substitution effect is naturally decreased by implicit inclusion of the standard deviation of the indicator values used in the calculation. The difference between the two index values increases as the value of standard deviation increases for the indicator values used, and the increase is in favor of the arithmetic mean method. This can be particularly problematic when large number of incidicators are used for index construction since with geometric average low indicator values gets lower weight while high indicaor values gets higher weights on average, and hence a superior performance in one indicator and/or in one sub-index can cause a large deviation in the country's overall ranking. This is a well-known problem with the construction of index functions.

In the calculations made by using the weighted average method, the above mentioned disadvantages in arithmetic and geometric mean methods have been tried to be eliminated. In this context, standard devaiation is explicitly taken into consideration and the weights are

[5] At the target level and at higher levels, the indicators and indices are basically referring to the same thing. For instance, the constructed target level indicators are weighted average of the indicators which are normalized for the respective target. From a method point of view, the target level indices are then used as indicators for constructing the goal level indices, and so on. Therefore, apart from the initial 44 indicators, the indicators and sub-indices refer to the same constructed measure.

calculated by taking the inverse of respective standard devaitions of the indicators. This method aims to favor more preceise information (lower standard deviation) in expense of less preceise one (higher standard deviation)[6].

In Table 1, we report the aggregate number of indicators for the total targets defined for a particular goal[7]. These target level indicators constructed this way are actually themselves sub-indexes, and cross country comparison along those targets can be conducted at this stage. However, though this can be an interesting research exercise, it is not the main focus of this paper and we leave it for possible future research. We further proceed to construct the goal level indices\indicators using the constructed target indicators. 8 goal level MDG indicators were calculated by taking the weighted averages of the relevant target indicators. Again we have plenty of sub-indices created at this stage at the goal level which can be of interest to be compared across countries. Finally, by taking the weighted average of these 8 goal level indicators, a general index of MDGs and subsequently from it, a MDG General Performance level index is constructed. These last wo indices are the main focus and they are used for cross country comparisons in the rest of the paper.

The stages of our index construction method are shown in Figure 1 using MDG 1: "eradicate extreme poverty and hunger" as an example. The other MDGs follow similarly. The summary of stages is further described in the Appendix.

[Figure 1 here]

The method we used to construct the MDG index and the subsequent MDG performance index falls in the same line of approaches used by other researchers/institutions previously. The followsaforementioned index by UN for instance follows a similar methodology, yet details such as the weighting scheme applied to the indicators are slightly different. However, our

[6] The comparison of the results with arithmetic, geometric and weighted averages would increase the already populated list of tables and figures, yet we believe is not critical in terms of the main contribution of the paper. One can think of it as such the method for creating our multidimentional MDG index depends on the weighting scheme we use for constructing the sub-indexes. This is true for our method, yet it is true for any index calculation methodology. However, results for the other averaging methods can be supplied upon request.

[7] We do not report the specific names and number of related indicators of each target for brevity. For more detailed information on the targets and their corresponding indicators, we refer the interested reader to UN, 2012/a, Official list of MDG indicators.

method's main difference and consequently main contribution is that a MDGs index is created by considering the average of 44 indicators, 19 targets and 8 goals applied to 187 countries for the period of 1990 to 2015. In this respect it is up to our knowledge one of the most comprehensive multi-dimensional development indexes in the current literature. We believe this alternative index can trigger further research initiatives such as comparing countries in the sub-index categories, developing combined indexes from sub-indexes of various combinations.

3.2 Calculating MDGs Index and Measuring Development Level of the Countries

As stated, the purpose of developing the current index is to compare and rank countries with respect to their multidimensional development goals in a consistent way. The development levels of the 187 countries considered in this paper are therefore, will be evaluated according to the constructed MDG Index. The index is created as such the values are constrained to be between 0 and 1. We followed a simple normalization by taking into account the range of possible values of the underlying final indicator. This normalization is considered for a better cross index comparison as well as comparisons within the same index across countries. The maximum and minimum values of the corresponding indicators in the sample are used to constraint the index between 0 and 1.

The index value is calculated as the ratio of the difference from the minimum to the difference between maximum and minimum for that particular indicator if the higher values of the indicator mean a better outcome. The procedure is changed slight as such the index value is obtained as the ratio of the absolute value of the difference from the maximum to the difference between maximum and minimum for that particular indicator if the higher values of the indicator indicates a worse outcome (such as under-5 mortality rate).

After obtaining the index values, we further rank countries in terms of a discrete scale which labels the development stages of their economies with respect to reaching the sustainable development goals. In this respect, we developed five discrete scales ranging from very low development to very high development (1-very high development, 2-high development, 3-medium development, 4-low development, 5- very low development). The grouping of the countries within each label is determined as follows. As the maximum index value is 1.00, the development level of the country having at least an index value below 0.2 standard deviation

from maximum value is determined as "very high"[8]. The next group forms the "high" and the index values for this group are between one standard deviation and 0.2 standard deviation. The "medium" group lies between one and two standard deviations interval. The "low" development group of countries are determined as such their index values are between two and three standard deviations. Finally, the "very low" group is between three standard deviations and the minimum index value in the sample. Countries are ranked according to the development index level in these five categories. Table 4 displays the method and the cut-off points of the development level of the countries for the "net primary enrolment ratio" indicator as an example. Same method was applied for all the indicators, targets and goals of MDGs.

[Table 4 here]

General MDGs Index is calculated by taking the weighted average of the 8 goal level sub-indices. Table 5 presents some of the key statistics used in the calculation of the weights and finally in the last column the weight of every MDG in the calculation of General MDGs Index. Therefore, the final MDGs Index is obtained as a weighted average where the weights are inversely related to the standard deviation of the respective MDGs index. A goal or indicator with a small variability or standard deviation then gets a larger weight within the sub-indexes or similarly within general index.

[Table 5 here]

3.3 Measuring MDGs Success (Performance) Level of the Countries

Our data set covers years from 1990 to 2015. What had unfolded between 1990 and 2015 can be one of the important and most significant remaking of the structure of the development of

[8] We applied different criteria at this stage for deciding the cut-off points for each interval that leads to the grouping from low to high. The one presented in the paper mimics the criteria UN follows and the ranking of the countries are therefore at this highest level of aggregation resembles that of UN. However, we should also note that given the 44 indicators used, rankings in the sub-indices can be quite different for countries under consideration from the main index and this, we find important for better understanding the country progress. Our method in this respect provides a unique opportunity with a comprehensive index to explore along those dimensions.

countries since MDGs came to the world agenda. In this section, we perform an exercise as such the level of success or the performance of the countries on achieving the MDGs becomes the question of interest. Therefore, different from the previous section where the general MDGs Index had produced the formula that came to be used for comparing countries, the performance level measurement of a country acknowledges us with a comparison along the same country over years. Hence, the analysis provides a solution to the monitoring of the progress in the MDGs for a particular county. This, we find important. Every country has a unique structure. Although it operates generally as one economy with a central government, as far as the multidimensional development goals are considered it is actually owned by many separate stakeholders and decision makers. Therefore, progress in different dimensions can be the compromise reached to carry out a much bigger agenda and hence achievements can be quite different along different dimensions. The performance level of countries is therefore measured by comparing the values of the related indicators, targets and goals between the base year (1990) and the target year (2015).

As the maximum rate is defined naturally as 100%, countries' success level is measured according to the projected levels in 2015 with the following formula:

Estimated Performance Level of a Country in target Year (2015) comparing with base year (1990)

$(MDG_{EstimadedValue2015} - MDG_{BaseYearValue1990}) / MDG_{BaseYearValue1990}$

Measurement of Performance Level of a Country in target Year (2015) (%)

$\text{Success/Performance Level (\%)} = \text{Min}\ (MDG_{EstimatedPerformanceLevel} / MDG_{TargetedPerformanceLevel}, \%100)$

Similar to the calculation for the index levels, we developed five discrete scales ranging from unsuccessful to very successful (1-very successful, 2-successful, 3-partially successful, 4-partially unsuccessful and 5- unsuccessful). As the maximum success is defined as 100%, the success level of the country having at least 0.2 standard deviation below of maximum value is determined as "very successful"[9]. The method for constructing the other intervals for the

[9] We applied different crtiteria at this stage for deciding the cut-off points for each interval that leads to the grouping from very successful to unsuccessful. The one presented in the paper mimics the development rankings by UN and at this highest level of aggregation are targeted to be consistent across the two metrics developed in the paper. Given the 44 indicators used, rankings in the sub-indexes can be quite different for countries under consideration from the main index and this we find important for better understanding the country progress.

successful, partially successful, partially unsuccessful and unsuccessful applies the same decision rules regarding the respective standard deviations as for the general index case. Countries are then placed according to their success levels within these discrete outcomes. Table 6 displays the method and the cut-off points of this method again using the "net primary enrolment ratio" as an example.

With this later comparison, countries achieving their goals or performing better than the announced targets are evaluated as "very successful". This method has been also applied for all indicators, targets and goals of MDG and success/performance level of the countries are calculated separately for all.

[Table 6 here]

MDG General Performance/Success level is calculated by taking the weighted average of the 8 goal level success measures. Table 7 describes the key statistics used in the calculation and final weights of every MDGs in the general success level of the countries. As before, final MDGs success level is measured by the weighted average method by taking into consideration the standard deviation of each MDGs.

[Table 7 here]

4. COUNTRY COMPARISIONS

4.1 Development Levels of the Countries

Table 8 summarizes our index and related rankings associated with it for a select group of countries. As seen in the top row of the table, Sweden is in the first place with an index value of 0.9764 and associated development category of "very high". Germany, Netherlands, Norway and Switzerland follow Sweden. When we compare the emerging economies of G20, South Korea and Mexico have the highest index values. Their ranks are 32nd and 47th respectively. Turkey, another relatively big emerging economy having an index value of 0.8419 finds its place in the "medium" development level and it is ranked 97th among 187 countries.

[Table 8 here]

An immediate observation emerges such that index values vary according to the region (See Figure 2). MDGs index values are higher in the European Union, Europe and Central Asia, where per capita incomes are also higher than those of other regions. On the other hand, South Asia and Sub-Saharan Africa regions typically having lower incomes per capita have also lower index values than those of other regions.

[Figure 2 here]

In other words, not surprisingly there is a high positive correlation between per capita incomes and development levels of the countries. Indeed, based on the rankings from our index, Chad is in the last row of the list with an index value of 0.5441. Central African Republic (0.5619), Sierra Leone (0.5841), Democratic Republic of Congo (0.5990) and Liberia (0.6050) follow Chad at the bottom of the list. The same result can be seen from the development levels of these countries in the fourth column in Table 8 in which these countries located in Africa have "very low" development levels. Rest of the columns in the table present the rankings of the countries with respect to the eight goal level indices. There is more variation across the rankings at the goal level and some interesting patterns emerge. Indonesia for instance although classified as "medium" in the general development level, finds a place in the "high" category for the MDG 2 related to education. Similarly, Turkey is in the "medium" group in the overall level, yet grouped as "very high" regarding education and "high" regarding child and maternal health. Certainly none of the development indices of the world's major institutions neither ours would ever achieve to summarize all the dimensions of development with a single index, therefore there remains much valuable information along the sub-index categories. This, particularly makes our index valuable as such we expect that the disparity of these sub-indexes could trigger a better understanding of the evolution of the development process as well as country specific contingencies.

We further present in Figure 3 and Figure 4 that there are significant differences among the

income groups in their MDGs index values that persist over periods. Figure 3 shows the progress in the index values of the countries in different income groups over the period from 1990 to 2015 using World Bank income level classification. The most dramatic change of all groups is in low income countries. Their index values start as very low in 1990, and improves the most. Lower-middle countries demonstrate a similar pattern. Though being low compared to higher income countries, their index values are much higher than the low income counties. For these groups, from 1990 to 2000, and then from 2000 to 2010, index values improve considerably. This sharp increase is most likely to be related to the already low (if not lack of) starting resources in the dimensions that are evaluated in the sustainable development indices. For countries that are upper-middle or higher, index values improve modestly. In comparison across income groups, there emerges a pegging order in terms of income of the country where in any year, the average index value for a particular income group counties are larger than the preceding income group countries.

Figure 4 makes the compassion across income groups for the year 2015 using the eight goal sub-indices. From this comparison, we can infer that there is more variation across goals, and income matters more in some goals more than others. However, also a clear pattern emerges as such upper-middle and higher income counties mostly perform close to each other while low and lower-middle countries clearly are separated. An immediate policy action would be to contemplate a separate and possibly a more intense sustainable development agenda for achieving certain targets in these later group of countries.

[Figure 3 here]

From the 187 countries sin our sample we calculated the average value of World MDGs index. In our method, the corresponding number is 0.8076 and the development level is "medium". To get some perspective, we also calculated averages of the World Bank income classifications of countries. According to this later calculations, low-income countries has an average MDG index value of 0.6795 and their development level is "low". Middle income countries has an average MDG index value of 0.8033 and their development level is obtained as "medium" and finally high income countries" average MDG index value is 0.9287, and their development level is "high". According to these results, our method not surprisingly verifies the main characteristics of country facts in the development. Also the time series patterns confirm that for all income

groups, index values increase over time (Figure 3). It is worth noting that the positive correlation between the per capita income and the MDG index scores are captured as mentioned before (Figure 4).

[Figure 4 here]

4.2 Success and Performance Levels of the Countries

Table 9 presents the results of MDGs general success level, rank and success level of the countries for the main aggregate as well as for each goal level. As seen in the table, according to the estimated level of achievement (performance) in 2015, Sweden takes the first place by achieving 89.27% of the MDGs on average. Its success/performance level is assigned as "very successful" according to our method. Singapore, Norway, Poland and Ireland follow Sweden in the list. When we compare the emerging economies of G20, China (16th) and South Korea (29th) have the best performances. Turkey on average achieves 79.50% of the MDGs, has an index value of 0.8419 which corresponds to the "partially successful" performance level. Furthermore, Turkey is ranked 88th among 187 countries. The strong positive association between success levels (performance) and per capita income of countries is not as clear as the case between their development levels and their per capita income. Results vary depending on the countries considered. Still, however high income OECD countries are the most successful, and low income countries are in the least successful group.

[Table 9 here]

Success rates are higher in the European Union, Europe and Central Asia, where per capita incomes are also higher. Similar to the development levels, South Asia and Sub-Saharan Africa regions with relatively lower per capita income have lower General MDGs success level than other regions. Based on the success ranking, Chad with a 59.70% success level is on the bottom of the list. Central African Republic, Ivory Coast, Nigeria and Sierra Leone comes after Chad respectively. According to our results, the aforementioned countries located in Africa have the "unsuccessful" performance level (Figure 5). Similar to Table 8, rest of the columns in Table 9

present the rankings of the countries with respect to the eight goal level achievements. We can immediately see that there is a lot of variation across the rankings at the goal level within a given general success level.

[Figure 5 here]

As shown in Figure 5 and Figure 6, there are significant differences between the regions and income groups. However, contrasted with Figure 2 and Figure 4, these differences are somewhat less subtle. For instance, success levels of some of the goals in Sub-Saharan Africa region are comparable to others regions. Moreover, in Figure 6, we can observe better outcomes for upper-middle income countries than high income OECD and high income non-OECD countries.

[Figure 6 here]

World MDGs average success rate is calculated as %76.17 and its performance level is determined as "partially successful" with our method. Based on the World Bank income classifications, low-income countries' MDG average success rate is calculated as 72.93 and the corresponding performance level is assigned as "partially unsuccessful". Middle income Countries' MDG average success rate is obtained as 77.52 and their performance level with our method is assigned as "partially successful". Finally, MDG average success rate of high income countries are calculated as 83.68, while their performance level is considered as "successful" (Figure 6).

4.3 Comparing the Results of the Development (Index) and Success (Performance) Levels of the Countries

A matrix is created to compare the results of the development (index) and success (performance) levels of the countries. Figure 7 presents a matrix of 187 countries' MDG indexes and success levels. While the horizontal axis of the matrix shows the MDG success

(performance) level of the countries, the vertical axis presents the MDG index value and development levels, respectively. Matrix consists of 25 (5X5) cells.

While MDG development (index) and success (performance) level index for some countries have similar results, some countries are subject to significant deviations. Only 7 countries (Germany, Australia, France, Sweden, Switzerland, Luxembourg and Norway) have "very high" development levels, while, at the same time, they have "very successful" performance levels on achieving MDGs. The matrix cell represented by “medium” development level and "partially successful” performance level in our method, has the largest number of countries. There are 40 countries in this cell including the big emerging countries such as Turkey and Indonesia.

[Figure 7 here]

5. EXTENSIONS

5.1 Extended MDGs Index

A goal or index with a small variability or in other words with a small standard deviation gets a larger weight within the sub-indexes or similarly within the general index. MDG index does not include the per capita income, which is obviously considered as an important ingredient of countries’ development levels. To address this deficiency, an extended MDGs index is created by using the weighted average of the income index (which we refer also as a monetary indicator) and our MDG Index (consisting of non-monetary indicators already developed in the previous sections).

[Figure 8 here]

Figure 8 presents a matrix of the 187 countries’ MDG and Income indexes. While the horizontal axis of the matrix shows the Income index (calculated according to 2013 per capita GDP in PPP), the vertical axis shows the MDG index value and development levels of the countries, respectively. Matrix consists of 25 (5X5) cells. As shown in the figure, while MDG development index and Income level index for some countries have similar results, some

countries are subject to the significant deviations. Only 12 countries (Germany, Australia, Belgium, Denmark, France, the Netherlands, Sweden, Switzerland, Iceland, Canada, Luxembourg and Norway have "very high" development levels, while, at the same time, they are among the countries having “very high" income index values. In other words, these countries have very high development levels in terms of both monetary indicator and non-monetary indicators (MDGs). The matrix cell represented by “medium” development levels in terms of both monetary and non-monetary indicators, has the largest number of countries that includes big emerging economies of Turkey and Indonesia. In total, there are 44 countries in this cell.

On the other hand, as shown in Table 10, when MDG index results compared with the results of the Extended MDGs (E-MDGs) index, significant differences are found for some countries in terms of their index values, rankings, and their corresponding development levels. The vast majority of poor countries have failed to converge to developed countries in terms of monetary indicator. Possible reasons for this could be the unfair income distribution in many of these countries, though this paper does not bring a causal explanation for this phenomenon. Possibly future research can shed some light on this issue. However, we observe from the table that when the non-monetary index (MDGs) is considered, the gap between these countries has gradually decreased. In other words, the convergence of poor countries to developed countries in terms of non-monetary indicators has been relatively more successful than for the monetary indicator.

[Table 10 here]

5.2 SDGs of 2030 and Lessons Learned from MDGs of 2015

Following the MDGs of 2015, further processes and goals for achieving sustainable development has been needed in both global and country level immediately. This gap was filled when on 25 September 2015, the 194 countries of the UN General Assembly adopted the Sustainable Development Goals (SDGs), officially known as “Transforming our world: the 2030 Agenda for Sustainable Development”. SDGs is a set of 17 global goals including ending poverty and hunger, improving health and education, achieving gender equality, promoting inclusive and sustainable economic growth, making cities more sustainable, combating climate change, and protecting oceans and forests that scans 169 targets and related 244 indicators.

The roots of this new initiative with a common global vision for an economically, socially and

environmentally sustainable future for the planet and for present and future generations was addressed at the Rio+20 Conference in June 2012. In this conference, it was agreed to develop universal sustainable development goals (SDGs). UN special event took stock of the efforts made towards achieving the Millennium Development Goals (MDGs) in 2013. The main point was to accelerate progress until 2015 and start exchanging ideas on what could follow after the target year of 2015. There has been still unfinished business of the current MDGs. These gaps accordingly should be completed during the SDGs of 2030 by taking into consideration lesson learned from MDGs. SDGs are fundamental and overarching objective for the continuous improvement of quality of life for current and future generations (European Commission, 2013). To ensure prosperity for all as a part of a new sustainable development climate, 17 Sustainable Development Goals (SDGs) of the 2030 agenda officially came into force with specific targets to be achieved over the following 15 years. The SDGs were built on the success of MDGs and were carefully crafted to go even further to end all forms of poverty and achieve further beyond. In comparison to 8 MDGs with 21 targets and 60 indicators, 17 SDGs comes with 169 targets and therefore are more detailed and broader in scope. Governments have the primary responsibility for follow-up and review at the national, regional and global levels regarding the progress made in implementing the SDGs and targets until deadline of 2030. They are expected to take ownership and establish national frameworks. Table 11 summarizes the SDG goals and associated number of targets and indicators. As seen in the table, 17 SDGs and 169 targets will be monitored and reviewed in the new agenda with 244 global indicators (UN, 2017). This SDG framework already has started to be the global standard to measure development and success level of the countries with respect to sustainable development.

[Table 11 here]

We believe that there are certain lessons to be learned from MDGs both conceptually and in terms of measurement issues that can proved to be useful for SDGs. In terms of the later, analyses and methods (starting with collecting raw data, processing the data, calculations and evaluation of the results) created for MDGs may be benefited for measuring development level and the performance of the countries on achieving the SDG targets. In this respect our method in this paper can be a useful input to the process.

Figure 9 describes graphically how our method can be adapted in the SDGs context. First step

would be to obtain the proxies for the indicators. Following, each of the 244 indicators should be analyzed and then by using the weighted average of these indicators, the related 169 targets should be constructed. So the sub-indexes for the level of success and development of the countries should be created both for indicators and related targets. next 17 goals of SDG should be calculated as averages of the relevant targets. Finally, by taking the weighted average of these 17 goals, a general development level index and similarly a general performance level index for SDGs can be created. Such an index can be used similarly as the index we created for MDGs in this paper, and has a potential to be a policy assessment tool of country development.

[Figure 9 here]

6. CONCLUSION AND POLICY RECOMENDATIONS

International funding organizations, with different missions, scope and priorities and specialization in different aspects of development, should complete each other in coordination and harmonization of their activities by taking into account the priorities of the beneficiary countries. International organizations, taking into account their comparative advantages, should implement necessary policies to achieve today's and future's development goals. If they work together, they can use funds more economically, efficiently and effectively on achieving MDGs, SDGs and other desired development results.

Standard, understandable and measurable development goals should be in the best interest of every stakeholder in the process and especially should be considered as country/region performance indicators by the international funding organizations, which often provide the necessary funds for the projects and programs on achieving targets for both global and country-level issues. In addition, beneficiary countries (in fact all countries) should adopt these indicators for the same purpose to increase transparency and also better monitor their progress in achieving sustainable development.

There are still open issues of MDGs which can prove useful in understanding SDGs. These gaps should be filled during the early era of SDGs of 2030 by taking into account the lessons learned from MDGs. SDGs has been built amid the success of MDGs and now are the international benchmark of development, sustainability and continuous improvement of quality

of life. They are with 17 goals, 169 targets and related 244 indicators are broader in scope than the MDGs. Furthermore, SDGs are broader in targets as such conntinious improvements for rich and middle-income counties are far more strongly emphasized than it was for MDGs. In this respect, data analyses, method and results of our study can be generalized to the SDG context and make contribution on measuring UN Sustainable Development Goals of 2030.

The paper reports the MDGs Index value and MDGs success level of the 187 countries analyzed in our sample. Countries are classified according to their achievements relative to other countries (which is measured by the created index) versus their self achievement performances (in terms of improvement of the index over years for a country) in a big matrix. Findings suggest the importance of measuring country performances in both dimensions. General MDGs Index produces a method that can be used for comparing countries, the performance level measurement on the other hand acknowledges us with a comparison along the same country over years. Hence, our analysis provides a method for monitoring the progress for a particular county by both comparing it with respect to other counties and within itlself. We provide this distinction across all the MDG goals separetly since progress in different dimensions can be a compromise of a much biger agenda and hence achievements can be quaite different along different dimensions. Finaly, the analysis can contribute to the implementation of selective policies since the method presented in the paper allows the countries to be ranked according to well defined objective success rankings based on indicators from objective data.

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Table 1: MDGs Goals, Number of Related Targets and Indicators

MDGs	# of Targets	# of Indicators
MDG 1: Eradicate extreme poverty and hunger	3	9
MDG 2: Achieve Universal Primary Education	1	3
MDG 3: Promote Gender Equality And Empower Women	1	3
MDG 4: Reduce Child Mortality	1	3
MDG 5: Improve Maternal Health	2	6
MDG 6: Combat HIV/AIDS, Malaria, and Other Diseases	3	10
MDG 7: Ensure Environmental Sustainability	4	10
MDG 8. Develop a Global Partnership for Development	6	16
TOTAL	**21**	**60**

Source: UN, 2012/a, Official list of BKH indicators, Effective 15 January 2008 Retrieved 30.12.2013 http://unstats.un.org/unsd/BKH/host.aspx?content=indicators/officiallist.htm

Table 2: Dimensions and Indicators of Some Development and Poverty Indexes

Dimensions /Indicators	Human Development Index (HDI)		Human Poverty Index (HPI-1)		Gender Development Index (GDI)		Multidimensional Poverty Index (MPI)	
	Dimension	Indicator	Dimension	Indicator	Dimension	Indicator	Dimension	Indicator
Income (Standard of Living)	+	1					+	6
Education	+	2					+	2
Health	+	1					+	2
Long and healthy life			+	1	+	2		
Knowledge			+	1	+	4		
A decent standard of living			+	1	+	2		
Social Exclusion			+	1				
#Total Dimension/ Indicator	**3**	**4**	**4**	**4**	**3**	**8**	**3**	**10**

Sources: Compiled from various tables published by the UNDP & World Bank

Table 3: Dimensions and Related Indicators of UNDP Development & Poverty Indexes

Indexes/ Method	Dimensions & Related Indicators		
	Income- A decent standard of living	**Education- Knowledge**	**Health- Long and healthy life**
Human Development Index (HDI) & Inequality-adjusted Human Development Index (IHDI) 3 Dimensions 4 Indicators **Geometric Mean**	• GNI per capita (PPP $)	• Mean years of schooling • Expected years of schooling **Education index is calculate by using arithmetic mean**	• Life expectancy at birth
Gender Development Index (GDI) 3 Dimensions 3 Indicators **Geometric Mean**	• GNI per capita (PPP $)	• Adult literacy • School enrollment	• Life expectancy at birth
Human Poverty Index (HPI-1) 3 Dimensions 4 Indicators **Arithmetic Mean**	• Unweighted average of population without sustainable access to an improved water source • children under weight for age	• Adult literacy	• Probability at birth of not surviving to age 40
Multidimensional Poverty Index (MPI) 3 Dimensions 10 Indicators **Geometric Mean**	• Cooking fuel • Toilet • Water • Electricity • Floor • Assets	• Years of schooling • Children enrolled	• Child mortality • Nutrition
Gender Inequality Index (GII) 3 Dimensions 5 Indicators **Geometric & Harmonic Mean**	**Dimension 1: Labor market** • Female and male labor force participation rates	**Dimension 2: Empowerment** • Female and male shares of parliamentary seats • Female & male population with at least secondary education	**Dimension 3: Reproductive Health** • Maternal mortality ratio • Adolescent fertility rate
*** Global Gender Gap Index** **(GGGI)** 4 Dimensions 13 Indicators **Weighted Average**	**Dimension 1: Economic Participation And Opportunity** • Ratio: female labor force participation over male value • Wage equality between women and men for similar work & Ratio: female estimated earned income over male value • Ratio: female legislators, senior officials and managers over male value • Ratio: female professional and technical workers over male value	**Dimension 2: Educational Attainment** • Ratio: female literacy rate over male value • Ratio: female net primary enrolment rate over male value • Ratio: female net secondary enrolment rate over male value • Ratio: female gross tertiary enrolment ratio over male value	**Dimension 3: Health and Survival** • Sex ratio at birth (converted to female-over-male ratio) • Ratio: female healthy life expectancy over male value **Dimension 4: Political Empowerment** • Ratio: females with seats in parliament over male value • Ratio: females at ministerial level over male value • Ratio: number of years with a female head of state (last 50 years) over male value

Sources: Compiled from various tables and documents: UNDP, Human Development Reports 2013 and 2014; UNDP Website; (*): World Economic Forum, The Global Gender Gap Report 2013, pg:1-5

Table 4: Measurement of the Development Level of the Countries for "Net Primary Enrolment Ratio" Indicator

Max-(0.2*SD) <= I<= Max	Max-(1*SD) <= I<= Max-(0.2*SD)	Max-(2*SD) <= I<= Max-(1*SD)	Max-(3*SD) <= I<= Max-(2*SD)	Min
0.975	0.877	0.754	0.631	0.486
VERY HIGH	HIGH	MEDIUM	LOW	VERY LOW
0.975<= I<= 1	0.877<=I< 0.975	0.754<=I<0.877	0.631<=I< 0.754	I < 0.631

I:MDG Index= Millennium Development Goals Index
Max: Maximum Value of the data set =1
Min: Minimum Value of the data set =0.486
SD=Standard Deviation of the data set=0.122

Table 5: Weight of Each MDGs in the Calculation of General MDGs Index

MDGs	Standard Deviation of MDGs (A)	Standard Deviation for every %1 Change (B=0.01/A)	Weight (C=B/0.6377)	Weight % (D=C*100)
MDG 1	0.1372	0.0729	0.1143	11.4265%
MDG 2	0.1161	0.0862	0.1351	13.5106%
MDG 3	0.1328	0.0753	0.1181	11.8072%
MDG 4	0.1077	0.0928	0.1455	14.5549%
MDG 5	0.1465	0.0683	0.1071	10.7065%
MDG 6	0.1033	0.0968	0.1518	15.1796%
MDG 7	0.1253	0.0798	0.1252	12.5187%
MDG 8	0.1523	0.0657	0.1030	10.2960%
TOTAL		**0.6377**	**1.00**	**100.00%**

Table 6: Measurement of the Success Level of the Countries for "Net Primary Enrolment Ratio Indicator

Max-(0.2*SD) <= MDG <= Max	Max-(1*SD) <= MDG<= Max-(0.2*SD)	Max-(2*SD) <= MDG<= Max-(1*SD)	Max-(3*SD) <= MDG<= Max-(2*SD)	Min
98.1630	90.8149	81.6298	72.4446	37.8300
VERY SUCCESFUL	SUCCESSFUL	PARTIALLY SUCCESSFUL	PARTIALLY UNSUCCESSFUL	UNSUCCESSFUL
98.16<=MDG<=100	90.81<=MDG< 98.16	81.63<=MDG<90.81	72.44<=MDG<81.63	MDG < 72.44

MDG= Millennium Development Goals Success Level
Max: Maximum Success Level of the data set =100
Min: Minimum Success Level of the data set =37.83
SD= Standard Deviation of the data set =9.19

Table 7: Weight of Each MDGs in the Calculation of General MDGs Success Level

MDGs	Standard Deviation of MDGs (A)	Standard Deviation for every %1 Change (B=0.01/A)	Weight (C=B/0.007569)	Weight % (D=C*100)
MDG 1	8.569288	0.001167	0.1542	15.4165%
MDG 2	9.688065	0.001032	0.1364	13.6362%
MDG 3	11.45462	0.000873	0.1153	11.5332%
MDG 4	12.83802	0.000779	0.1029	10.2904%
MDG 5	12.49072	0.000801	0.1058	10.5765%
MDG 6	10.47412	0.000955	0.1261	12.6128%
MDG 7	9.609839	0.001041	0.1375	13.7472%
MDG 8	10.83994	0.000923	0.1219	12.1872%
TOTAL		**0.007569**	**1**	**100.00%**

Table 8: The Results of Each MDG Index, Rankings and Development Level of Countries Calculated by the Weighted Averaged Method (2015)[*]

Countries/ MDGs General Index Value and Rank	MDG Index Value (2015)	MDG Rank 2015	MDG DEVELOPMENT LEVEL	MDG 1 POVERTY	MDG 2 EDUCATION	MDG 3 GENDER EQUALITY	MDG 4 CHILD HEALTH	MDG 5 MATERNAL HEALTH	MDG 6 HIV/AIDS OTHER DISEASES	MDG 7 ENVIRONMENT	MDG 8 GLOBAL PARTNERSHIP
Sweden	0.9764	1	VERY HIGH	9	16	5	9	9	1	15	13
Germany	0.9663	2	VERY HIGH	14	21	14	15	17	33	5	7
Netherlands	0.9656	3	VERY HIGH	17	24	6	21	5	15	22	11
Norway	0.9611	4	VERY HIGH	3	6	7	19	26	6	39	37
Switzerland	0.9596	5	VERY HIGH	12	74	29	55	1	23	7	2
South Korea	0.9169	32	HIGH	24	32	101	1	6	26	76	43
Mexico	0.8911	47	HIGH	86	40	28	61	96	74	44	76
Argentina	0.8868	49	HIGH	72	47	21	85	75	89	92	56
Russia	0.8864	51	HIGH	49	26	74	36	52	118	108	26
Saudi Arabia	0.8803	56	HIGH	41	57	150	27	63	69	62	39
China	0.8738	62	HIGH	107	59	51	41	50	53	132	74
Brazil	0.8697	70	HIGH	104	108	98	46	82	87	25	63
Turkey	0.8419	97	MEDIUM	100	37	141	51	94	60	109	110
Indonesia	0.8012	122	MEDIUM	128	80	114	132	128	151	96	114
South Africa	0.7653	135	LOW	140	133	18	135	112	184	159	62
India	0.7379	142	LOW	167	121	163	149	136	110	137	120
Liberia	0.6050	183	VERY LOW	185	185	161	160	183	133	172	170
Congo Dem.	0.5990	184	VERY LOW	184	180	181	184	159	154	141	180
Sierra Leone	0.5841	185	VERY LOW	159	179	175	186	176	181	164	163
C. African Rep.	0.5619	186	VERY LOW	171	184	174	187	182	175	160	184
Chad	0.5441	187	VERY LOW	153	186	186	183	187	160	180	167

**MDGs index (also sub-indexes for every indicators, targets and goals) is created by considering 187 countries for the period of 1990-2015.*

Table 9: MDGs Success Level of the Countries and Their Ranks (2015)[*]

Countries/ MDGs Success Level and Rank	MDGs SUCCESS LEVEL (%)	RANK	MDGs GENERAL SUCCESS LEVEL	MDG 1 POVERTY	MDG 2 EDUCATION	MDG 3 GENDER EQUALITY	MDG 4 CHILD HEALTH	MDG 5 MATERNAL HEALTH	MDG 6 HIV/AIDS OTHER DISEASES	MDG 7 ENVIRONMENT	MDG 8 GLOBAL PARTNERSHIP
Sweden	89.269	1	VERY SUCCESSFUL	103	16	2	69	41	27	13	5
Singapore	88.501	2	VERY SUCCESSFUL	36	4	48	79	32	6	26	46
Norway	88.226	3	VERY SUCCESSFUL	113	6	7	35	45	43	30	18
Poland	87.595	4	VERY SUCCESSFUL	69	5	44	8	10	4	28	148
Ireland	86.987	5	VERY SUCCESSFUL	91	3	54	83	22	75	2	17
China	85.999	16	VERY SUCCESSFUL	34	59	59	2	44	17	114	61
S. Korea	84.512	29	SUCCESSFUL	38	32	105	93	89	10	67	48
Brazil	83.531	45	SUCCESSFUL	28	108	94	5	57	56	94	78
Mexico	82.017	56	SUCCESSFUL	154	40	32	19	103	49	43	154
S.Arabia	81.465	58	SUCCESSFUL	77	57	153	14	35	110	79	73
Argentina	79.898	80	PARTIALLY SUCCESSFUL	173	47	24	107	121	113	61	40
Russia	79.674	83	PARTIALLY SUCCESSFUL	168	26	68	10	51	128	34	178
Turkey	79.500	88	PARTIALLY SUCCESSFUL	160	37	146	13	40	25	107	161
Indonesia	77.983	107	PARTIALLY SUCCESSFUL	44	81	117	82	95	176	118	86
India	75.462	133	PARTIALLY SUCCESSFUL	65	121	167	128	53	86	121	153
S. Africa	73.171	145	PARTIALLY UNSUCCESSFUL	153	133	10	157	129	182	120	134
Sierra	64.681	183	UNSUCCESSFUL	61	181	176	170	168	185	135	136
Nigeria	64.402	184	UNSUCCESSFUL	161	174	172	185	185	100	176	131
Ivory	64.222	185	UNSUCCESSFUL	183	183	182	166	172	73	166	66
C. African	63.653	186	UNSUCCESSFUL	49	184	170	187	184	74	165	179
Chad	59.698	187	UNSUCCESSFUL	17	186	187	180	187	172	163	185

**MDGs success level (also success level for every indicators, targets and goals) is created by considering 187 countries for the period of 1990-2015.*

Table 10: Compression of the MDGs Results with Extended MDGs Results

COUNTRIES	MDGs INDEX RESULTS (2013)			EXTENDED MDGS INDEX (E-MDGs) RESULTS (2013			COMPARISON of E-MDGs & MDGs	
	MDGs Index	MDGs RANK	MDGs DEVELOPMENT LEVELS (2013)	E-MDGs Index	E-MDGs RANK	E-MDGs DEVELOPMENT LEVELS (2013)	(E-MDGs) – (MDGs) Index	(E-MDGs Rank) – (MDGs Rank)
Barbados	0.913	33	HIGH	0.852	56	HIGH	-0.061	-23
Brunei Dar.	0.916	30	HIGH	0.943	7	VERY HIGH	0.027	23
Central Africa	0.544	186	VERY LOW	0.445	187	VERY LOW	-0.099	-1
Chad	0.514	187	VERY LOW	0.481	185	VERY LOW	-0.033	2
China	0.866	66	HIGH	0.813	75	MEDIUM	-0.054	-9
Congo Dem. R	0.577	184	VERY LOW	0.451	186	VERY LOW	-0.126	-2
Costa Rika	0.894	42	HIGH	0.837	63	HIGH	-0.057	-21
Ecuador	0.870	59	HIGH	0.808	80	MEDIUM	-0.062	-21
Equatorial Guinea	0.690	152	LOW	0.735	120	MEDIUM	0.044	32
Germany	0.960	2	VERY HIGH	0.944	6	VERY HIGH	-0.016	-4
Grenada	0.879	51	HIGH	0.815	72	MEDIUM	-0.064	-21
Kuwait	0.871	58	HIGH	0.917	22	VERY HIGH	0.046	36
Liberian	0.585	182	VERY LOW	0.485	184	VERY LOW	-0.100	-2
Liechtenstein	0.894	43	HIGH	0.932	11	VERY HIGH	0.038	32
Luxembourg	0.949	6	VERY HIGH	0.954	3	VERY HIGH	0.005	3
Malawi	0.675	156	LOW	0.540	176	VERY LOW	-0.135	-20
Netherlands	0.956	3	VERY HIGH	0.941	8	VERY HIGH	-0.015	-5
Nicaragua	0.812	109	MEDIUM	0.724	129	MEDIUM	-0.088	-20
Niger	0.579	183	VERY LOW	0.489	183	VERY LOW	-0.090	0
Norway	0.956	4	VERY HIGH	0.963	1	VERY HIGH	0.007	3
Oman	0.854	74	MEDIUM	0.875	43	HIGH	0.021	31
Qatar	0.870	60	HIGH	0.916	23	VERY HIGH	0.047	37
Sierra Leone	0.557	185	VERY LOW	0.514	182	VERY LOW	-0.043	3
Singapore	0.936	19	HIGH	0.957	2	VERY HIGH	0.021	17
Slovenia	0.948	7	VERY HIGH	0.911	27	HIGH	-0.037	-20
Sweden	0.971	1	VERY HIGH	0.952	5	VERY HIGH	-0.020	-4
Switzerland	0.955	5	VERY HIGH	0.953	4	VERY HIGH	-0.002	1
Turkey	0.835	94	MEDIUM	0.818	71	MEDIUM	-0.017	23
U.A.E	0.869	61	HIGH	0.902	31	HIGH	0.033	30
USA	0.927	25	HIGH	0.934	10	VERY HIGH	0.007	15
WORLD AVERAGE	0.795		MEDIUM	0.775		MEDIUM		

Note: Compression is based on E-MDGs Results. While positive values indicate E-MDGs have better results than MDGs results, negative values indicate opposite.

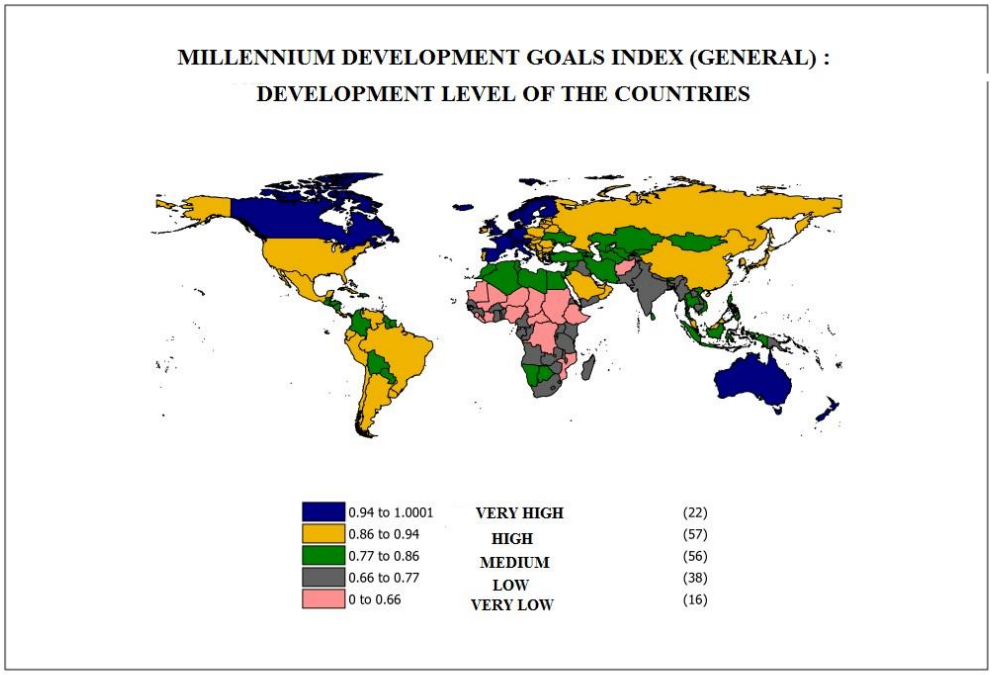
Table 11: SDG Goals, Number of Related Targets

SDGs	# of Targets	# of Indicators
SDG 1: End poverty	7	14
SDG 2: End hunger, achieve food security	8	13
SDG 3: Ensure healthy lives and promote wellbeing for all at all ages	13	27
SDG 4: Ensure inclusive and equitable quality education	10	11
SDG 5: Achieve gender equality and empower all women and girls	9	14
SDG 6: Ensure availability and sustainable management of water	8	11
SDG 7: Ensure access to affordable, reliable, sustainable and modern energy	5	6
SDG 8: Promote sustained, inclusive and sustainable economic growth	12	17
SDG 9: Build resilient infrastructure, promote inclusive and sustainable industrialization	8	12
SDG 10: Reduce inequality within and among countries	10	11
SDG 11: Make cities and human settlements inclusive, safe, resilient and sustainable	10	15
SDG 12: Ensure sustainable consumption and production patterns	11	13
SDG 13: Take urgent action to combat climate change and its impacts	5	8
SDG 14: Conserve and sustainably use the oceans, seas and marine resources	10	10
SDG 15: Protect, restore and promote sustainable use of terrestrial ecosystems	12	14
SDG 16: Promote peaceful and inclusive societies for sustainable develop.	12	23
SDG 17: Strengthen the means of implementation and revitalise the global partnership	19	25
TOTAL	**169**	**244***

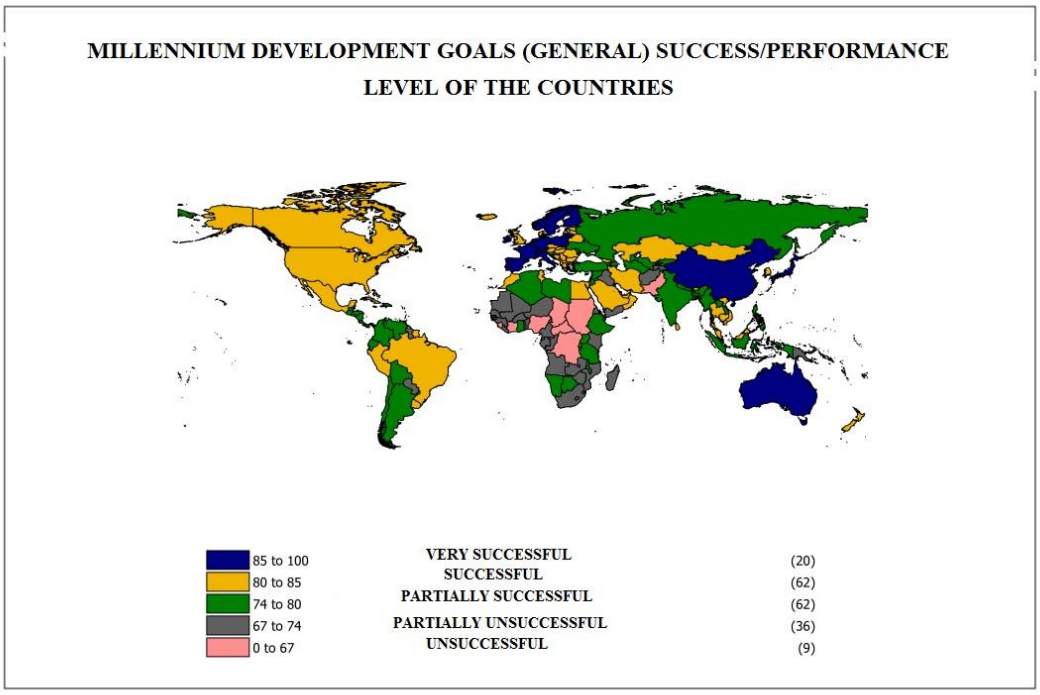
Source: UN, 2017, Official list of SDG indicators, *: The total number of indicators listed in the final indicator proposal is 244. However, since 9 indicators repeat under 2 or 3 different targets, the actual total number is 232, Retrieved 18.05.2017, http://unstats.un.org/sdgs/indicators/indicators-list/

Appendix

Appendix 1: General MDGs Index (Development Level) of the Countries on World Map (2015)



Appendix 2: MDGs Success Rate (Performance Levels) of the Countries on World Map (2015)



Appendix 3: Comparing the Results and Rank of the Countries (Calculated by Weighted Average Method)
MDGs Index (Development Level) and the MDGs Success Rate (Performance Levels) 2015

COUNTRIES	COUNTRIES RANK AND DEVELOPMET LEVELS FOR GENERAL AND EACH MDGs*											COUNTRIES RANK AND PERFORMANCE LEVELS FOR GENERAL AND EACH MDGs**										
	MDGs GENERAL DEVELOPMET LEVELS	INDEX VALUE	MDGs GENERAL RANK	MDG 1 RANK	MDG 2 RANK	MDG 3 RANK	MDG 4 RANK	MDG 5 RANK	MDG 6 RANK	MDG 7 RANK	MDG 8 RANK	MDGs GENERAL PERFORMANCE LEVELS	SUCCESS RATE	MDGs GENERAL RANK	MDG 1 RANK	MDG 2 RANK	MDG 3 RANK	MDG 4 RANK	MDG 5 RANK	MDG 6 RANK	MDG 7 RANK	MDG 8 RANK
Afghanistan	VERY LOW	0,6355	178	178	101	183	177	175	113	186	178	PARTIALLY	70,3688	164	102	104	184	159	144	90	178	120
Albania	MEDIUM	0,8588	77	110	79	95	63	41	67	104	97	SUCCESSFUL	81,2031	63	124	79	95	43	48	107	54	123
Algeria	MEDIUM	0,8424	96	113	68	115	91	78	104	112	69	PARTIALLY	77,9497	108	105	68	124	58	59	134	156	97
Andorra	HIGH	0,9116	39	4	169	8	26	57	4	59	25	SUCCESSFUL	84,7463	25	30	169	1	41	19	1	40	181
Angola	LOW	0,6810	160	158	168	125	178	172	159	138	119	PARTIALLY	70,1539	168	9	168	129	151	134	170	173	162
Antigua Barb.	MEDIUM	0,8130	115	34	128	96	37	79	187	98	23	PARTIALLY	78,3202	105	37	128	91	73	33	187	60	42
Argentina	HIGH	0,8868	49	72	47	21	85	75	89	92	56	PARTIALLY	79,8981	80	173	47	24	107	121	113	61	40
Armenia	MEDIUM	0,8485	90	55	106	113	72	93	80	84	118	PARTIALLY	77,2977	118	52	106	110	22	114	159	128	143
Australia	VERY HIGH	0,9448	15	6	31	40	43	12	24	53	6	VERY SUCCESSFUL	86,74066	9	60	31	43	118	49	16	25	13
Austria	VERY HIGH	0,9422	18	13	56	12	111	18	49	10	34	SUCCESSFUL	84,9459	22	130	55	16	101	4	114	70	19
Azerbaijan	MEDIUM	0,8429	95	74	39	84	146	117	43	145	51	PARTIALLY	79,5705	85	26	39	84	103	155	53	96	133
Bahamas	HIGH	0,8821	54	22	77	69	89	71	94	94	55	PARTIALLY	79,5181	87	22	77	64	149	84	152	42	127
Bahrain	HIGH	0,8734	63	56	20	146	32	20	42	139	49	SUCCESSFUL	81,7735	57	128	20	142	62	61	48	57	59
Bangladesh	LOW	0,7179	149	170	153	155	113	163	134	154	133	PARTIALLY	77,3434	117	41	153	157	31	125	77	95	130
Barbados	HIGH	0,9159	34	38	28	54	107	66	7	100	9	PARTIALLY	78,5929	103	169	28	52	178	52	95	103	28
Belarus	HIGH	0,9120	38	36	55	27	4	15	92	70	41	SUCCESSFUL	82,7153	51	74	56	29	7	3	173	47	167
Belgium	VERY HIGH	0,9501	10	28	27	9	18	3	81	11	10	VERY SUCCESSFUL	85,04458	20	112	27	13	72	72	144	22	9
Belize	MEDIUM	0,8466	92	80	112	126	77	113	119	8	125	PARTIALLY	75,0564	135	136	112	122	76	98	165	46	183
Benin	LOW	0,6953	157	131	159	184	169	153	98	127	156	PARTIALLY	72,7923	149	35	159	183	135	147	78	184	10
Bhutan	MEDIUM	0,8034	120	87	127	149	123	123	131	41	134	SUCCESSFUL	80,2100	74	11	127	144	45	47	139	81	110
Bolivia	MEDIUM	0,8086	118	146	110	67	133	134	137	71	94	PARTIALLY	78,7647	100	182	110	76	66	93	59	115	32
Bosnia and Her	HIGH	0,8623	76	106	82	55	23	55	64	135	100	SUCCESSFUL	81,4255	59	138	82	57	17	65	65	66	138
Botswana	MEDIUM	0,8061	119	130	65	121	131	106	174	73	77	PARTIALLY	77,5396	115	89	65	116	173	110	13	157	75
Brazil	HIGH	0,8697	70	104	108	98	46	82	87	25	63	SUCCESSFUL	83,5311	45	28	108	94	5	57	56	94	78
Brunei Dar.	HIGH	0,9236	29	11	11	37	22	46	85	49	40	PARTIALLY	77,6886	114	139	11	14	139	78	125	158	113
Bulgaria	HIGH	0,9219	31	71	22	36	71	84	28	20	42	SUCCESSFUL	84,5015	30	73	22	38	109	102	15	39	63
Burkina Faso	LOW	0,6727	163	175	178	156	170	157	112	144	146	PARTIALLY	71,1389	159	101	178	155	134	152	69	167	72
Burundi	LOW	0,6678	167	181	149	136	158	165	82	171	185	PARTIALLY	70,8010	161	151	149	149	137	162	47	153	158
Cambodia	LOW	0,7695	134	141	132	93	119	124	162	129	149	SUCCESSFUL	83,5496	44	19	132	97	47	38	52	132	21
Cameroon	LOW	0,7324	146	144	155	110	161	177	97	118	111	PARTIALLY	71,4098	154	134	156	119	161	180	120	142	57
Canada	VERY HIGH	0,9476	13	10	1	31	13	16	18	54	21	SUCCESSFUL	83,9560	38	110	1	33	132	119	38	21	20
Cape Verde	MEDIUM	0,8102	117	48	86	75	92	133	141	158	142	SUCCESSFUL	82,8817	50	14	86	74	49	100	85	139	41
Cent.African R	VERY LOW	0,5619	186	171	184	174	187	182	175	160	184	UNSUCCESSFUL	63,65262	186	49	184	170	187	184	74	165	179

Chad	VERY LOW	0,5441	187	153	186	186	183	187	160	180	167	UNSUCCESSFUL	59,69831	187	17	186	187	180	187	172	163	185
Chile	HIGH	0,8707	68	61	91	102	94	80	125	52	48	PARTIALLY SUCCESSFUL	79,2405	92	24	91	104	121	75	145	149	38
China	HIGH	0,8738	62	107	59	51	41	50	53	132	74	VERY SUCCESSFUL	85,99871	16	34	59	59	2	44	17	114	61
Colombia	MEDIUM	0,8515	85	121	120	89	79	89	121	28	84	PARTIALLY SUCCESSFUL	75,6447	131	144	120	88	91	107	135	134	121
Comoros	LOW	0,6752	162	169	148	180	163	146	106	173	172	UNSUCCESSFUL	67,60592	178	119	148	178	162	150	178	171	107
Congo Dem. R	VERY LOW	0,5990	184	184	180	181	184	159	154	141	180	UNSUCCESSFUL	65,99318	181	122	179	180	186	159	105	170	126
Congo, Rep.	LOW	0,7208	148	156	125	166	171	149	170	87	109	PARTIALLY UNSUCCESSFUL	71,4756	153	39	125	166	182	146	142	133	132
Costa Rica	HIGH	0,9050	42	98	62	19	48	103	58	13	66	PARTIALLY SUCCESSFUL	77,5283	116	141	62	18	127	143	115	123	104
Cote d'Ivoire	VERY LOW	0,6462	176	154	183	182	176	173	152	103	157	UNSUCCESSFUL	64,22216	185	183	183	182	166	172	73	166	66
Croatia	HIGH	0,9127	36	90	100	43	29	36	17	64	19	PARTIALLY SUCCESSFUL	79,7078	82	177	100	45	33	118	2	44	180
Cuba	HIGH	0,9000	43	43	67	17	2	67	47	61	122	SUCCESSFUL	84,8935	23	33	67	5	44	128	18	35	165
Cyprus	HIGH	0,9124	37	42	43	79	81	31	34	60	24	SUCCESSFUL	84,0308	36	117	43	72	61	17	101	11	101
Czech Rep.	HIGH	0,9098	40	53	12	59	3	10	99	17	72	SUCCESSFUL	84,3732	32	165	12	58	9	5	62	29	141
Denmark	VERY HIGH	0,9549	6	18	84	11	24	7	10	26	20	SUCCESSFUL	84,4484	31	148	83	12	52	106	138	8	11
Djibouti	VERY LOW	0,6570	172	129	187	169	167	129	177	163	154	UNSUCCESSFUL	65,48141	182	99	187	169	167	113	127	145	187
Dominica	MEDIUM	0,8539	82	70	58	82	47	98	140	65	116	PARTIALLY UNSUCCESSFUL	73,1573	146	185	58	79	147	96	82	160	95
Dominican R.	MEDIUM	0,8400	98	124	122	62	128	118	103	29	79	PARTIALLY SUCCESSFUL	77,6913	113	45	122	65	124	130	57	119	155
Ecuador	HIGH	0,8782	58	119	13	22	100	107	120	12	104	PARTIALLY SUCCESSFUL	79,5715	84	66	13	21	78	86	141	169	100
Egypt, Arab R.	MEDIUM	0,8160	113	92	99	176	97	116	111	75	78	SUCCESSFUL	80,8076	67	82	99	175	46	26	80	109	35
El Salvador	MEDIUM	0,8537	83	105	72	80	84	104	75	93	92	SUCCESSFUL	82,3709	52	57	73	87	42	108	71	93	64
Equatorial Gu.	LOW	0,7103	151	84	164	177	182	140	156	101	103	PARTIALLY UNSUCCESSFUL	70,2625	166	18	164	179	181	81	174	122	124
Eritrea	LOW	0,6860	159	136	181	142	120	168	88	183	173	PARTIALLY UNSUCCESSFUL	71,2508	157	20	180	143	36	153	44	180	186
Estonia	HIGH	0,9159	35	39	49	42	33	30	117	32	17	SUCCESSFUL	82,3041	53	176	50	41	39	1	175	49	54
Ethiopia	VERY LOW	0,6395	177	180	172	100	165	181	147	169	183	PARTIALLY SUCCESSFUL	74,4041	140	64	172	111	89	173	72	152	47
Fiji	MEDIUM	0,8547	81	78	104	134	88	102	78	45	70	PARTIALLY SUCCESSFUL	77,9319	109	51	103	133	148	138	131	23	87
Finland	VERY HIGH	0,9429	17	25	14	3	8	8	54	38	46	VERY SUCCESSFUL	86,79786	8	68	14	4	68	55	68	37	33
France	VERY HIGH	0,9521	7	29	18	25	73	19	48	6	8	VERY SUCCESSFUL	86,97739	7	83	18	25	94	21	66	15	16
Gabon	LOW	0,7698	133	85	136	147	159	141	172	34	95	PARTIALLY UNSUCCESSFUL	73,5304	143	76	136	145	177	156	126	6	159
Gambia	LOW	0,7044	152	103	171	179	145	167	149	90	159	PARTIALLY SUCCESSFUL	74,1462	141	7	171	181	104	167	161	62	26
Georgia	MEDIUM	0,8566	78	133	33	81	101	88	62	68	108	SUCCESSFUL	80,5490	71	171	33	78	125	104	87	41	24
Germany	VERY HIGH	0,9663	2	14	21	14	15	17	33	5	7	VERY SUCCESSFUL	86,67996	11	104	21	17	88	13	67	51	7
Ghana	LOW	0,7540	138	143	147	144	148	145	83	123	105	PARTIALLY SUCCESSFUL	76,6521	125	56	147	141	144	135	42	154	14
Greece	HIGH	0,9223	30	81	35	56	7	35	21	24	54	SUCCESSFUL	84,7344	26	116	35	56	65	56	34	19	77
Grenada	HIGH	0,8861	53	96	157	15	83	59	9	57	53	PARTIALLY SUCCESSFUL	74,9074	137	186	155	20	136	54	21	82	122
Guatemala	MEDIUM	0,7953	126	151	131	127	117	144	130	33	99	PARTIALLY SUCCESSFUL	74,4692	139	129	131	127	77	163	143	131	89
Guinea	LOW	0,6674	168	102	166	185	179	178	146	107	152	PARTIALLY UNSUCCESSFUL	69,1280	174	25	166	185	145	174	149	89	160
Guinea-Bissau	VERY LOW	0,6554	173	115	161	178	181	180	161	121	165	PARTIALLY UNSUCCESSFUL	68,1546	176	32	161	177	174	182	180	97	112
Guyana	MEDIUM	0,7960	125	117	135	60	108	143	108	143	128	PARTIALLY UNSUCCESSFUL	73,3201	144	123	135	71	117	170	181	126	69
Haiti	LOW	0,6667	169	155	170	97	174	174	127	184	162	PARTIALLY UNSUCCESSFUL	71,3255	156	53	170	93	146	179	83	181	83
Honduras	MEDIUM	0,8242	108	127	105	73	98	139	105	66	115	PARTIALLY SUCCESSFUL	79,1249	94	70	105	75	60	133	64	168	71
Hong Kong	HIGH	0,9277	26	15	61	68	104	13	66	2	47	SUCCESSFUL	84,0748	33	78	61	63	1	25	50	138	53
Hungary	HIGH	0,8863	52	73	66	91	10	72	31	31	121	SUCCESSFUL	80,5522	70	184	66	85	4	116	8	3	137
Iceland	VERY HIGH	0,9511	8	2	41	1	57	37	5	56	38	SUCCESSFUL	83,9400	39	71	41	6	59	31	121	48	140
India	LOW	0,7379	142	167	121	163	149	136	110	137	120	PARTIALLY SUCCESSFUL	75,4616	133	65	121	167	128	53	86	121	153
Indonesia	MEDIUM	0,8012	122	128	80	114	132	128	151	96	114	PARTIALLY SUCCESSFUL	77,9828	107	44	81	117	82	95	176	118	86

Iran	MEDIUM	0,8499	87	112	2	173	69	38	25	128	64	SUCCESSFUL	81,3548	62	97	2	174	15	2	58	90	151
Iraq	LOW	0,7430	140	135	162	168	151	108	68	176	82	PARTIALLY UNSUCCESSFUL	69,3996	172	142	162	171	184	122	104	92	163
Ireland	HIGH	0,9319	25	31	3	58	50	2	37	55	12	VERY SUCCESSFUL	86,98737	5	91	3	54	83	22	75	2	17
Israel	HIGH	0,9394	21	8	23	39	20	11	38	72	5	SUCCESSFUL	81,3866	60	111	23	40	28	11	150	77	171
Italy	VERY HIGH	0,9413	19	46	38	24	66	34	8	14	58	VERY SUCCESSFUL	86,73831	10	150	38	28	63	23	36	18	31
Jamaica	MEDIUM	0,8245	107	109	109	85	86	100	109	125	129	PARTIALLY SUCCESSFUL	74,9308	136	145	109	80	116	136	117	102	170
Japan	HIGH	0,9246	28	26	7	117	5	39	29	36	27	VERY SUCCESSFUL	85,29019	19	108	7	109	81	29	9	64	29
Jordan	MEDIUM	0,8371	100	93	98	153	76	73	56	133	90	PARTIALLY SUCCESSFUL	77,0028	121	86	98	152	96	66	54	175	74
Kazakhstan	MEDIUM	0,8489	88	40	103	34	75	69	116	177	65	SUCCESSFUL	80,6885	68	59	102	35	27	64	166	87	115
Kenya	LOW	0,6995	153	174	126	120	143	160	166	175	144	PARTIALLY UNSUCCESSFUL	70,2677	165	140	126	121	154	177	155	179	70
Kiribati	MEDIUM	0,7834	129	32	88	106	137	115	142	122	186	PARTIALLY SUCCESSFUL	77,0699	120	175	88	106	141	63	111	91	56
Korea, Rep.	HIGH	0,9169	32	24	32	101	1	6	26	76	43	SUCCESSFUL	84,5124	29	38	32	105	93	89	10	67	48
Kuwait	HIGH	0,8744	61	35	60	140	38	28	12	161	36	PARTIALLY SUCCESSFUL	78,9976	96	47	60	138	138	109	24	137	84
Kyrgyz Rep.	MEDIUM	0,8142	114	77	75	53	93	86	144	149	168	PARTIALLY SUCCESSFUL	79,1007	95	50	75	60	23	94	183	113	103
Lao PDR	LOW	0,7623	137	152	116	92	152	151	135	124	107	PARTIALLY SUCCESSFUL	78,2137	106	63	117	99	99	74	153	86	94
Latvia	HIGH	0,9161	33	63	78	38	44	60	44	35	33	SUCCESSFUL	83,1767	48	125	78	39	71	62	124	7	68
Lebanon	MEDIUM	0,8516	84	64	44	167	110	44	39	131	57	SUCCESSFUL	83,8264	41	85	44	165	75	12	14	73	51
Lesotho	LOW	0,6643	170	163	152	32	172	154	185	178	153	PARTIALLY UNSUCCESSFUL	68,4852	175	149	152	34	183	169	171	162	150
Liberia	VERY LOW	0,6050	183	185	185	161	160	183	133	172	170	PARTIALLY UNSUCCESSFUL	69,3486	173	146	185	160	80	181	97	127	116
Libya	MEDIUM	0,8512	86	58	76	138	59	25	61	157	60	PARTIALLY SUCCESSFUL	78,9437	98	88	76	139	12	14	136	147	129
Liechtenstein	HIGH	0,8973	46	1	139	111	39	58	164	1	1	PARTIALLY SUCCESSFUL	77,9161	110	94	139	115	18	18	118	141	169
Lithuania	HIGH	0,9062	41	67	85	35	62	42	76	43	32	VERY SUCCESSFUL	86,41899	14	96	85	37	53	7	60	12	88
Luxembourg	VERY HIGH	0,9480	12	19	117	46	12	21	2	19	4	VERY SUCCESSFUL	86,47468	12	72	116	47	29	139	40	17	1
Macedonia	HIGH	0,8723	66	126	69	23	14	90	96	77	87	SUCCESSFUL	80,1250	76	180	69	26	21	82	33	36	177
Madagascar	LOW	0,6633	171	186	165	112	166	147	157	174	143	PARTIALLY UNSUCCESSFUL	72,0471	150	181	165	114	114	90	96	108	146
Malawi	LOW	0,6960	156	177	141	154	139	148	165	117	179	PARTIALLY SUCCESSFUL	78,5191	104	40	141	159	56	91	98	146	50
Malaysia	HIGH	0,8864	50	89	30	108	56	47	77	51	50	SUCCESSFUL	80,6393	69	98	30	108	115	16	133	116	49
Maldives	HIGH	0,8683	71	62	93	105	31	105	35	58	126	VERY SUCCESSFUL	86,97917	6	5	93	100	16	27	7	85	81
Mali	VERY LOW	0,6083	181	165	182	160	180	179	167	168	161	PARTIALLY UNSUCCESSFUL	71,6037	152	92	182	156	163	176	156	83	3
Malta	HIGH	0,8991	44	37	90	99	54	14	41	116	3	SUCCESSFUL	80,8857	66	143	90	101	133	58	99	38	22
Mauritania	VERY LOW	0,6504	175	148	163	133	162	164	180	187	139	PARTIALLY UNSUCCESSFUL	71,2455	158	6	163	136	164	171	168	187	12
Mauritius	HIGH	0,8728	64	65	97	87	64	68	55	126	52	PARTIALLY SUCCESSFUL	76,9198	123	159	97	92	140	137	106	72	85
Mexico	HIGH	0,8911	47	86	40	28	61	96	74	44	76	SUCCESSFUL	82,0171	56	154	40	32	19	103	49	43	154
Micronesia	MEDIUM	0,7842	128	95	87	131	127	87	45	110	187	SUCCESSFUL	80,4882	72	1	87	125	158	42	22	106	157
Moldova	MEDIUM	0,8258	105	101	96	44	96	76	136	134	147	PARTIALLY SUCCESSFUL	77,8120	111	158	96	42	122	117	184	1	91
Mongolia	MEDIUM	0,8162	111	134	63	64	90	83	114	167	117	SUCCESSFUL	84,0369	35	93	63	61	3	79	41	98	43
Montenegro	HIGH	0,8887	48	94	92	66	70	51	46	40	71	SUCCESSFUL	81,1963	64	133	92	67	54	105	11	78	156
Morocco	MEDIUM	0,7975	124	125	123	148	99	127	150	89	101	SUCCESSFUL	80,0909	77	121	123	150	51	70	119	56	36
Mozambique	VERY LOW	0,6338	179	179	167	130	156	158	182	162	182	PARTIALLY UNSUCCESSFUL	71,0406	160	48	167	132	70	154	162	185	125
Myanmar	LOW	0,7535	139	147	129	123	142	132	169	105	138	PARTIALLY SUCCESSFUL	79,7248	81	10	130	118	126	71	132	84	62
Namibia	MEDIUM	0,7872	127	149	134	49	138	122	168	81	112	PARTIALLY SUCCESSFUL	75,9150	130	42	134	51	129	132	129	148	135
Nepal	LOW	0,7365	143	120	156	145	130	170	107	115	151	PARTIALLY SUCCESSFUL	76,8031	124	23	157	158	57	142	63	105	119
Netherlands	VERY HIGH	0,9656	3	17	24	6	21	5	15	22	11	VERY SUCCESSFUL	85,97745	17	156	24	8	85	88	30	20	8
New Zealand	VERY HIGH	0,9442	16	23	15	10	45	43	72	16	14	SUCCESSFUL	84,0589	34	131	15	15	105	92	45	53	25
Nicaragua	MEDIUM	0,8221	109	108	150	33	87	121	100	63	150	PARTIALLY SUCCESSFUL	79,5680	86	46	150	30	38	67	158	112	105

Niger	VERY LOW	0,6079	182	164	175	162	175	186	148	181	177	PARTIALLY UNSUCCESSFUL	69,7016	171	106	175	164	87	186	91	172	60
Nigeria	VERY LOW	0,6286	180	183	174	172	185	184	101	166	67	UNSUCCESSFUL	64,40209	184	161	174	172	185	185	100	176	131
Norway	VERY HIGH	0,9611	4	3	6	7	19	26	6	39	37	VERY SUCCESSFUL	88,22581	3	113	6	7	35	45	43	30	18
Oman	HIGH	0,8657	74	52	19	164	40	62	20	150	44	SUCCESSFUL	83,8781	40	16	19	162	6	6	23	159	82
Pakistan	LOW	0,6713	165	157	177	171	168	155	91	152	164	UNSUCCESSFUL	66,97205	179	120	176	173	156	151	32	174	182
Palau	HIGH	0,8711	67	20	81	30	115	92	57	21	181	SUCCESSFUL	84,7305	27	2	80	9	131	83	29	14	152
Panama	HIGH	0,8668	72	79	53	103	68	111	93	47	75	PARTIALLY SUCCESSFUL	78,7705	99	12	53	98	110	124	92	124	142
Papua New G.	LOW	0,6706	166	75	176	170	157	156	173	170	158	UNSUCCESSFUL	67,88768	177	31	177	163	175	175	148	164	108
Paraguay	MEDIUM	0,8299	104	118	138	88	103	95	128	69	89	PARTIALLY UNSUCCESSFUL	69,7983	170	187	138	90	95	99	177	63	166
Peru	HIGH	0,8624	75	116	111	77	82	81	79	48	81	SUCCESSFUL	83,3913	46	54	111	83	37	15	46	58	149
Philippines	MEDIUM	0,8161	112	142	113	48	116	130	143	113	80	PARTIALLY SUCCESSFUL	79,2897	90	109	113	50	113	140	70	80	65
Poland	HIGH	0,9268	27	66	5	41	6	22	22	18	85	VERY SUCCESSFUL	87,59509	4	69	5	44	8	10	4	28	148
Portugal	HIGH	0,9376	22	51	10	20	11	23	70	23	15	VERY SUCCESSFUL	86,06701	15	90	10	23	20	46	112	33	44
Qatar	HIGH	0,8782	59	30	51	122	49	24	63	153	30	SUCCESSFUL	84,7639	24	8	51	103	40	8	94	129	79
Romania	HIGH	0,8810	55	76	89	83	80	74	40	50	96	SUCCESSFUL	81,3844	61	172	89	81	48	37	12	52	168
Russian Fed.	HIGH	0,8864	51	49	26	74	36	52	118	108	26	PARTIALLY SUCCESSFUL	79,6744	83	168	26	68	10	51	128	34	178
Rwanda	LOW	0,7360	144	173	160	61	118	137	124	155	169	SUCCESSFUL	81,1680	65	127	160	36	26	73	81	117	15
Samoa	MEDIUM	0,8162	110	60	137	132	121	109	90	74	127	PARTIALLY SUCCESSFUL	79,3067	89	4	137	126	160	111	108	68	52
Sao Tome	MEDIUM	0,7785	131	68	115	94	129	138	145	142	166	PARTIALLY SUCCESSFUL	79,2815	91	58	115	96	108	123	140	76	30
Saudi Arabia	HIGH	0,8803	56	41	57	150	27	63	69	62	39	SUCCESSFUL	81,4648	58	77	57	153	14	35	110	79	73
Senegal	LOW	0,7150	150	161	173	129	140	162	138	85	148	PARTIALLY UNSUCCESSFUL	70,6970	162	126	173	128	100	166	169	161	37
Serbia	HIGH	0,8659	73	88	54	13	65	33	50	106	171	SUCCESSFUL	82,0360	55	167	54	19	50	68	19	71	164
Seychelles	MEDIUM	0,8487	89	83	95	4	52	135	139	95	131	PARTIALLY SUCCESSFUL	76,5353	126	115	95	3	152	160	163	88	102
Sierra Leone	VERY LOW	0,5841	185	159	179	175	186	176	181	164	163	UNSUCCESSFUL	64,68103	183	61	181	176	170	168	185	135	136
Singapore	HIGH	0,9396	20	5	4	47	28	4	14	86	22	VERY SUCCESSFUL	88,50134	2	36	4	48	79	32	6	26	46
Slovak Rep.	HIGH	0,9356	23	45	50	50	25	32	13	4	73	SUCCESSFUL	84,9622	21	155	48	49	55	39	3	10	145
Slovenia	VERY HIGH	0,9500	11	54	36	16	17	27	51	3	18	SUCCESSFUL	83,9753	37	178	36	22	32	69	20	31	76
Solomon Isl.	MEDIUM	0,7703	132	50	130	152	126	125	123	136	176	PARTIALLY SUCCESSFUL	76,9464	122	13	129	140	172	127	88	50	99
South Africa	LOW	0,7653	135	140	133	18	135	112	184	159	62	PARTIALLY UNSUCCESSFUL	73,1707	145	153	133	10	157	129	182	120	134
Spain	VERY HIGH	0,9510	9	47	9	2	16	70	27	9	31	VERY SUCCESSFUL	85,32408	18	80	9	11	64	158	28	9	55
Sri Lanka	MEDIUM	0,8431	94	139	83	137	30	40	86	30	132	SUCCESSFUL	80,0315	79	81	84	135	74	20	79	99	144
St. Kitts and N.	HIGH	0,8787	57	16	143	124	42	85	3	83	68	SUCCESSFUL	84,6317	28	43	142	120	25	28	31	100	6
St. Lucia	MEDIUM	0,8115	116	132	140	63	78	99	179	82	61	PARTIALLY UNSUCCESSFUL	73,0373	147	170	140	62	155	80	154	140	117
St. Vincent and	MEDIUM	0,8257	106	7	119	107	106	91	176	91	102	PARTIALLY SUCCESSFUL	75,6214	132	3	118	107	171	97	179	111	128
Sudan	VERY LOW	0,6552	174	172	154	135	154	185	163	182	123	UNSUCCESSFUL	66,30269	180	95	154	137	153	183	164	186	147
Suriname	MEDIUM	0,8474	91	59	73	118	124	126	95	46	83	SUCCESSFUL	80,0702	78	21	74	113	90	157	123	32	98
Swaziland	LOW	0,6990	154	150	146	159	141	119	186	130	130	PARTIALLY UNSUCCESSFUL	72,8450	148	75	146	154	169	85	157	104	111
Sweden	VERY HIGH	0,9764	1	9	16	5	9	9	1	15	13	VERY SUCCESSFUL	89,26909	1	103	16	2	69	41	27	13	5
Switzerland	VERY HIGH	0,9596	5	12	74	29	55	1	23	7	2	VERY SUCCESSFUL	86,45636	13	132	72	31	123	30	51	5	2
Syrian	MEDIUM	0,7994	123	97	70	158	134	97	122	147	88	PARTIALLY SUCCESSFUL	76,1031	128	162	70	161	120	43	130	75	118
Tajikistan	LOW	0,7633	136	138	29	143	136	131	155	146	145	PARTIALLY UNSUCCESSFUL	70,6944	163	157	29	151	112	149	186	65	176
Tanzania	LOW	0,7425	141	182	124	72	122	169	153	114	136	PARTIALLY SUCCESSFUL	74,0007	142	152	124	86	24	161	103	183	139
Thailand	MEDIUM	0,8550	80	91	118	70	53	56	132	67	91	SUCCESSFUL	80,2272	73	27	119	69	11	126	109	130	106
Timor-Leste	LOW	0,7349	145	176	142	71	155	142	158	99	141	PARTIALLY SUCCESSFUL	76,0814	129	166	143	77	84	87	84	74	172
Togo	LOW	0,6974	155	145	151	151	173	166	84	156	174	PARTIALLY UNSUCCESSFUL	71,3653	155	87	151	147	168	164	116	182	23

Tonga	MEDIUM	0,8026	121	162	48	139	58	101	36	102	175	PARTIALLY SUCCESSFUL	78,9453	97	164	49	134	106	145	5	59	96
Trinidad and	HIGH	0,8699	69	44	46	26	109	114	59	165	35	PARTIALLY SUCCESSFUL	78,6211	102	55	46	27	143	112	147	125	80
Tunisia	MEDIUM	0,8561	79	111	34	90	74	53	102	88	106	SUCCESSFUL	82,9205	49	135	34	102	30	24	137	24	92
Turkey	MEDIUM	0,8419	97	100	37	141	51	94	60	109	110	PARTIALLY SUCCESSFUL	79,5005	88	160	37	146	13	40	25	107	161
Turkmenistan	MEDIUM	0,8336	101	99	8	65	125	65	65	179	86	PARTIALLY SUCCESSFUL	77,7098	112	62	8	66	111	101	61	150	174
Uganda	LOW	0,6912	158	166	158	119	144	161	171	151	155	PARTIALLY SUCCESSFUL	74,8508	138	100	158	130	67	148	151	136	39
Ukraine	MEDIUM	0,8378	99	57	45	86	112	61	126	148	113	PARTIALLY SUCCESSFUL	77,2922	119	107	45	82	130	50	167	4	184
United Arab E.	HIGH	0,8764	60	33	114	128	60	64	32	119	28	SUCCESSFUL	80,1869	75	147	114	131	98	60	37	55	58
United Kingd.	VERY HIGH	0,9458	14	27	17	45	34	45	16	27	16	SUCCESSFUL	83,3862	47	114	17	46	92	131	122	27	4
United States	HIGH	0,9336	24	21	52	57	67	29	11	42	29	SUCCESSFUL	82,1097	54	67	52	53	142	120	35	69	34
Uruguay	HIGH	0,8986	45	69	25	78	35	54	30	80	59	SUCCESSFUL	83,5766	43	118	25	70	34	77	93	16	90
Uzbekistan	MEDIUM	0,8320	102	122	64	104	114	49	129	120	93	PARTIALLY SUCCESSFUL	78,7272	101	137	64	112	97	34	89	45	173
Vanuatu	MEDIUM	0,7813	130	123	107	157	147	120	52	97	160	PARTIALLY SUCCESSFUL	75,3935	134	29	107	148	176	115	26	101	175
Venezuela, RB	HIGH	0,8727	65	82	71	76	95	110	115	37	45	PARTIALLY SUCCESSFUL	76,5046	127	79	71	73	119	141	160	144	67
Vietnam	MEDIUM	0,8441	93	114	42	52	105	77	71	111	140	SUCCESSFUL	83,5831	42	15	42	55	102	36	102	110	45
West Bank	MEDIUM	0,8313	103	137	102	109	102	48	19	140	137	PARTIALLY SUCCESSFUL	79,2047	93	84	101	89	165	9	55	143	109
Yemen, Rep.	LOW	0,6796	161	160	145	187	164	152	73	185	98	PARTIALLY UNSUCCESSFUL	71,8530	151	163	145	186	150	76	39	151	93
Zambia	LOW	0,6715	164	187	144	165	153	171	178	78	124	PARTIALLY UNSUCCESSFUL	70,2329	167	174	144	168	86	178	76	155	114
Zimbabwe	LOW	0,7282	147	168	94	116	150	150	183	79	135	PARTIALLY UNSUCCESSFUL	69,9563	169	179	94	123	179	165	146	177	27

MDGs index and MDGs success/performance level are created by considering 187 countries for the period of 1990-2015. Results of Sub-indexes for every indicators, targets and goals and General MDGs index and success/performance level created by using different average method (arithmetic, geometric and weighted) are also available. Countries' development and performance levels are determined by taking into consideration the results of each MDGs index and success rate in 2015.

**Development levels of the Countries are classified according to MDGs index value in five categories from "VERY HIGH" to "VERY LOW". Each color in the cells of table represents standard development levels where "VERY HIGH" countries are represented by blue color … and "VERY LOW" countries are represented by pink color.*

***Performance levels of the Countries are classified according to MDGs success rate in five categories from the "VERY SUCCESSFUL" to "UNSUCCESSFUL". Each color in the cells of table represents a standard performance levels where "VERY SUCCESSFUL" countries are represented by blue color … and "UNSUCCESSFUL" countries are represented by pink color.*

Appendix 4:

- ✓ Collecting the raw data for the indicators
  - World Bank database (World Development Indicators Online –CDROM and Book, Millennium Development Goals Online) (World Bank, 2012b, 2014a, 2014b, 2014c).
  - Relevant International Organizations Online Data sets (see Appendix 6 Table)
- ✓ Selection of Analysis Period and Countries
  - Base Year:1990 and Final Year:2015
  - 187 countries covered also by HDI
- ✓ Completion of Missing Data and Prediction of the Value for Target Year (2015). Interpolation using Eviews 8 and SPSS 20 softwares. (Çilingirtürk and Altaş, 2010)
- ✓ Deciding the averaging method:

  Although indexes are calculated and compared by using all 3 average methods (arithmetic, geometric and weighted), weighted average method has considering its advantages on other methods.
- ✓ Analysis of the produced indexes (Indexes for Indicators, Targets and Goals): 44 of 60 indicators, 19 of 21 targets and 8 of 8 goals are forecasted and analyzed. 16 indicators and 2 targets dropped from the analysis mainly due to lack of data availability.
- ✓ Determination of the countries' development level and the MDGs Index Ranking by using index formula.
- ✓ Determination of the country's MDG Achievement Levels and their Performance by using success formula.

Appendix 5:

Index calculation if the higher values of the indicator indicates a better outcome:

$$\text{Indeks } X_{ijt} = (X_{ijt} - X_{Min}) / (X_{Max} - X_{Min})$$

Index calculation if the higher values of the indicator indicates a worse outcome:

$$\text{Indeks } X_{ijt} = (X_{Max} - X_{ijt}) / (X_{Max} - X_{Min})$$

Term in the Formula	**Meaning of the term**
Index X_{ijt}=	index value of j. country for i. Indicator in t. year
j=1, ……187	# of Countries
i=1,……. 60	# of Indicators
i=1,……..21	# of Targets
i=1,……8	# of Goals
i =1	General Index of MDGs
t=1990, 1991,.2015	Analysis period: 1990-2015
X_{Min}=	Min value of i. indicator in data set
X_{Max}=	Max value of i. indicator in target year of 2015 or in the data

Appendix 6: Other Data Sources Used for MDGs Analyses

GOALS	DATA SOURCES	RELATED WEB SITE
MDG 1 Eradicate extreme poverty and hunger	World Bank, Development Research Group	http://iresearch.worldbank.org/PovcalNet/index.htm
	International Labor Organization (ILO), Labor Market Database Basic Indicators	http://www.ilo.org/global/statistics-and-databases/lang--en/index.htm
	World Health Organization (WHO), Global Database on Child Development and Malnutrition	http://www.who.int/nutgrowthdb/en/
	EUROSTAT – Income, Social Exclusion and Living Conditions Statistics	https://ec.europa.eu/eurostat/web/income-and-living-conditions/overview
	UN MDGs Database	https://millenniumindicators.un.org/unsd/mdg/Data.aspx
	United Nations Food and Agriculture Organization (FAO)	http://www.fao.org/faostat/en/#data
MDG 2 Achieve Universal Primary Education	UN Educational, Scientific and Cultural Organization (UNESCO)	http://stats.uis.unesco.org/unesco/TableViewer/tableView.aspx?ReportId=210
	EUROSTAT – Education and Training Statistics	https://ec.europa.eu/eurostat/web/education-and-training
	UN MDGs Database	https://millenniumindicators.un.org/unsd/mdg/Data.aspx
MDG 3 Promote Gender Equality And Empower Women	UN Educational, Scientific and Cultural Organization (UNESCO)	http://data.uis.unesco.org/?ReportId=211
	International Labor Organization (ILO), Labor Market Data Set Basic Indicators	http://www.ilo.org/global/statistics-and-databases/lang--en/index.htm
	UN MDGs Database	https://millenniumindicators.un.org/unsd/mdg/Data.aspx
	UN Women Indicators and Statistics Database	http://www.ipu.org/wmn-e/world.htm
MDG 4 Reduce Child Mortality	UN Children's Fund (UNICEF) Statistics on Monitoring the Status of Children and Women	http://www.childinfo.org/statistical_tables.html
	World Health Organization (WHO)	http://www.who.int/gho/database/en/
MDG 5 Improve Maternal Health	UN Children's Fund (UNICEF) Data and Statistics	https://www.unicef.org/sowc2017/l
MDG 6 Combat HIV/AIDS, Malaria, and Other Diseases	The Joint United Nations Programme on HIV/AIDS (UNAIDS) Data Analysis	http://www.unaids.org/en/dataanalysis/
	UN MDGs Database	https://millenniumindicators.un.org/unsd/mdg/Data.aspx
	World Health Organization (WHO), Global Health Observatory Data Warehouse	http://apps.who.int/gho/data/
MDG 7 Ensure Environmental Sustainability	UN MDGs Database	https://millenniumindicators.un.org/unsd/mdg/Data.aspx
	CO2 Information Analysis Center, Department of Environmental Sciences	http://cdiac.ornl.gov/trends/emis/meth_reg.html
	International Energy Agency (IEA Statistics)	https://www.iea.org/statistics/
	United Nations Food and Agriculture Organization (FAO), AQUASTAT Data	http://www.fao.org/nr/water/aquastat/data/query/index.html
MDG 8 Develop a Global Partnership for Development	OECD Database	http://www.oecd.org/statistics/
	OECD Official Development Assistance Committee, Capital Flows to Developing Countries	http://www.oecd.org/development/aidstatistics/
	World Trade Organization (WTO), Global Partnerships for Development	https://www.wto.org/english/res_e/res_e.htm
	International Telecommunication Union (ITU), Information and Communication Development Statistics	http://www.itu.int/ITU-D/ict/index.html
	UN MDGs Database	https://millenniumindicators.un.org/unsd/mdg/Data.aspx