

# REACHING OUT-OF-SCHOOL CHILDREN: SUB-REGIONAL DISPARITIES<sup>1</sup>

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## Abstract

The international discussion about EFA focuses largely on national policies to get children into school. Many studies have shown that out-of-school children are disproportionately girls from poor rural areas and households.<sup>2</sup> The regional disparities in education equality have been largely overlooked, however. This study examines the data from 30 countries and suggests the importance of the sub-national inequalities in education distribution, particularly for designing education policies. Its results indicate that countries with low national attendance rates show great regional disparity and that low attendance rates within sub-national regions usually correlate with low overall development. The most notable exception to this is Bangladesh, where most children are in school, even in the least developed regions. Bangladesh should therefore be studied as a model for good practice for bringing all children into school

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*By 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling. MDG Development Goal # 2*

## Introduction

The motivation for this study comes from the notion that geographical pockets in countries where children are more likely to be out of school are typically in more remote, under-developed regions of countries. If such pockets do exist and out-of-school children are collected in them, education policy and programs striving to reach these children should be a national focus.

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<sup>2</sup>UNESCO (2002, 2004, 2005), UN Millennium Project (2005), Filmer (2000, 2001) and Filmer and Pritchett (1998, 1999, 2001) and Wils, Carrol and Karima Barrow (2005).

Earlier research (Filmer and Pritchett are the foremost authors) has shown that poor children are much more likely to be out of school than their wealthier compatriots.<sup>3</sup> Are these poor children concentrated in particular areas? Where are they? How can they be reached? This study ventures forth from the hypothesis that these children are disproportionately collected in certain regions of the country, that there is geographical inequality, and programs and policies can be focused on certain sub-regions within countries to reach large groups of out-of-school children. As it turns out, there are indeed clear sub-national differences, and, the lower national attendance rates the greater these sub-national differences.

The study also asks whether those sub-national regions with lower attendance rates are simultaneously poor and under-developed (which one might expect, given the relation of income and school-enrollment). The results confirm this and interestingly point to some exceptions where most children are in school in sub-national regions with low development. Some factor which may have created these exceptions are proposed here.

This study covers 30 countries for the sub-national differentials and nine for the sub-national differentials with development context. The empirical evidence for the study comes from DHS surveys that are focused primarily on health.<sup>4</sup> However, these studies also provide a rich, internationally comparable source for identifying the background characteristics of children who are not in school. Armed with analyses based on these rich sources of information, policy makers can better target education sector plans and programs to reach excluded children.

The first part of the paper describes the available data on school attendance, in particular noting which sources provide internationally comparable data at the sub-national level. The second part of the paper provides an analysis of school participation, noting the role of gender, urban-rural and sub-national/regional variations. The third part of the paper examines the characteristics of these sub-national areas in a sample of nine countries using a development index to define the degree to which areas are underserved in terms of access to health services, clean water, communications, and female literacy rates. This makes it possible to describe the relationship between the development index and attendance rates. The section examines the policy and education programming context in places where attendance is higher than we would expect. The concluding section raises some of the issues that EFA strategies will need to address in light of these findings.

### **I. Scope and Data**

Indicators tracking progress towards EFA goals largely use countries as the unit of analysis. The UNESCO Institute for Statistics (UIS) and the World Bank provide annual education data and analysis that indicate how well the nations of the world are doing in terms of access to and completion of basic education for girls and boys. The collection, organization and presentation of the data have, over the past fifteen years, focused on the gender gap to

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<sup>3</sup> The results are best presented in D. Filmer and L. Pritchett (1999), "The Effect of Household Wealth on Educational Attainment Evidence from 35 Countries," in *Population and Development Review* 25(1). For graphs of education attainment by income for an ever-extending number of countries see <http://www.worldbank.org/research/projects/edattain/edattain.htm>

<sup>4</sup> Demographic and Health Surveys, sponsored by USAID have covered 53 countries in the past 5 years. DHS surveys measure school attendance (whether a child went to school during the past school year) rather than enrollment. This study therefore uses attendance as the measure.

support strategies for closing the gap between boys and girls. This was done because of equity considerations and because it was found that girls' education is socially and economically effective: better educated women have fewer and healthier children for example. This policy focus may have been successful; the great majority of countries today have much improved girls' access to and completion of primary education.

The international datasets on education compiled by UIS and the World Bank provide virtually no statistical information about regions within countries. This data gap is also largely true for other development indicators and indices provided by UN agencies. The national administrative and statistical agencies, which are the source of these international datasets, collect information at the sub-national level but aggregate it before sending it to the UN organizations. Some, but very few, of these national agencies publish sub-national education information on a timely and regular basis on their websites and in report. Even when countries publish their own sub-national statistics, they are not necessarily internationally comparable.

The most accessible source for internationally comparable sub-national data are two series of household surveys: the Demographic and Health Surveys (DHS) funded by the U.S. Agency for International Development (USAID), and the Multiple Indicator Cluster Surveys (MICS) undertaken in 2000, funded by UNICEF (a 2005 round of MICS surveys is underway but was incomplete at the time of writing). DHS uses a rigorous methodology of household sampling and provides national and sub-national data and analysis on the population, health, nutrition, and education of women and children in developing countries. Over the last 20 years, the DHS project has coordinated close to 200 surveys in more than 70 countries throughout Sub-Saharan and North Africa, Asia, Latin America and the Caribbean, and parts of Europe ([www.measuredhs.com](http://www.measuredhs.com)). The MICS surveys were modeled on the DHS surveys and the datasets are in many ways comparable. Those datasets were available for 43 countries at the time of this writing (early 2006). Since 2004 a new initiative, the Education Policy and Data Center in Washington D.C. (EPDC), has been collecting and compiling sub-national education statistics from these international survey series and other sources.

Household surveys provide information on health, education, income and assets, employment, and housing characteristics. While large household surveys cover only a portion of the population, the number of people interviewed runs in the thousands (sometimes tens of thousands) and is large enough that the group is statistically representative of the entire population. The population sample size is often large enough to make a detailed sub-national analysis possible. Household surveys are therefore good sources of data for this study.

## **II. Who is Not in School?**

This section analyzes attendance rates disaggregated by gender, urban-rural, and sub-national areas. National averages for attendance can mask large inequalities. The most commonly presented disaggregation is between males and females and, to a lesser extent, between urban and rural areas.

Figure 1A shows the male-female attendance differentials for 55 countries, expressed as percentage point differences, (reprinted from Wils, Carrol and Barrow, 2005). The countries are arranged in order of the gender differential. The largest gender differential is in

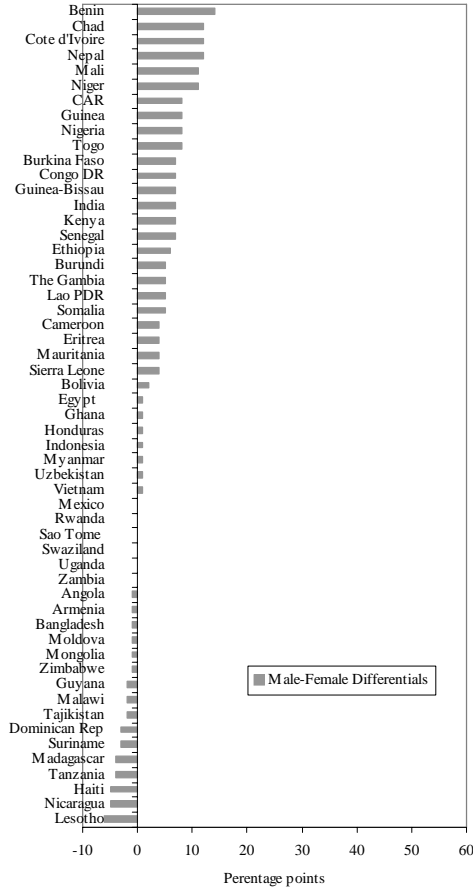
Benin, where attendance for girls is 14 percentage points lower than that for boys. There are an additional five countries with differentials exceeding 10 percent. The male-female differentials are much lower than they were a few decades ago (see UNESCO 2002).

Figure 1B. shows the percentage differential between urban and rural areas, using the same order of countries as in Figure 1A, and also showing the male-female differentials. In all but two of the countries, the attendance inequality between urban and rural residents is larger than that between boys and girls. The level of urban-rural inequality is very high in many countries, the highest being Burkina Faso (51), Ethiopia (50 percent), Guinea Bissau (45), and Niger (43). In one-third of the countries the differential exceeds twenty percentage points.

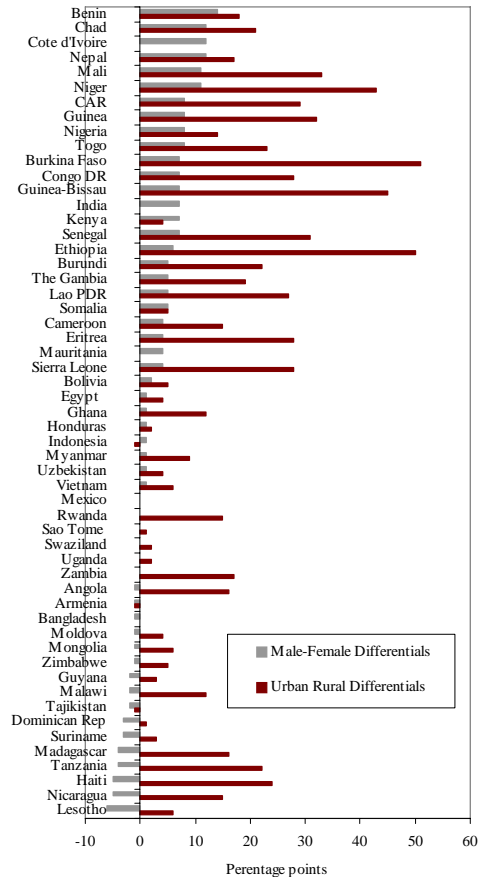
Before concluding (as one might, from the figures) that the equity focus of education should be on rural-urban differences rather than on gender, one should consider a few points. First, girls' education has social and economic benefits in particular, as mentioned above, with regards to the health of the next generation, additional income, and employment. The evidence is lacking that could determine whether the same is true of rural children, however. One could argue that as the bulk of most countries' poverty and illiteracy tends to be concentrated in the rural areas, these areas are most in need of basic, especially primary education, to develop (more educated farmers are more productive).

**Figure 1. Gender and Urban-rural Net Attendance Gaps**

**Figure 1.A. Gender differentials**



**Figure 1.B. Gender and Urban/rural**



Source: Wils, Carrol and Barrow (2005)

As it turns out, even *larger* differences appear when the data is disaggregated by regions (provinces or states) within countries and urban-rural areas. Figure 2 shows the data arranged by sub-national region for 30 countries where a DHS survey was carried out between 1999-2003 (reprinted from Wils, Carrol and Barrow, 2005). For each country, attendance rates for rural areas are represented by light-blue dots and attendance rates for urban areas by red dots. The countries are arranged in order of *national net attendance* rates.

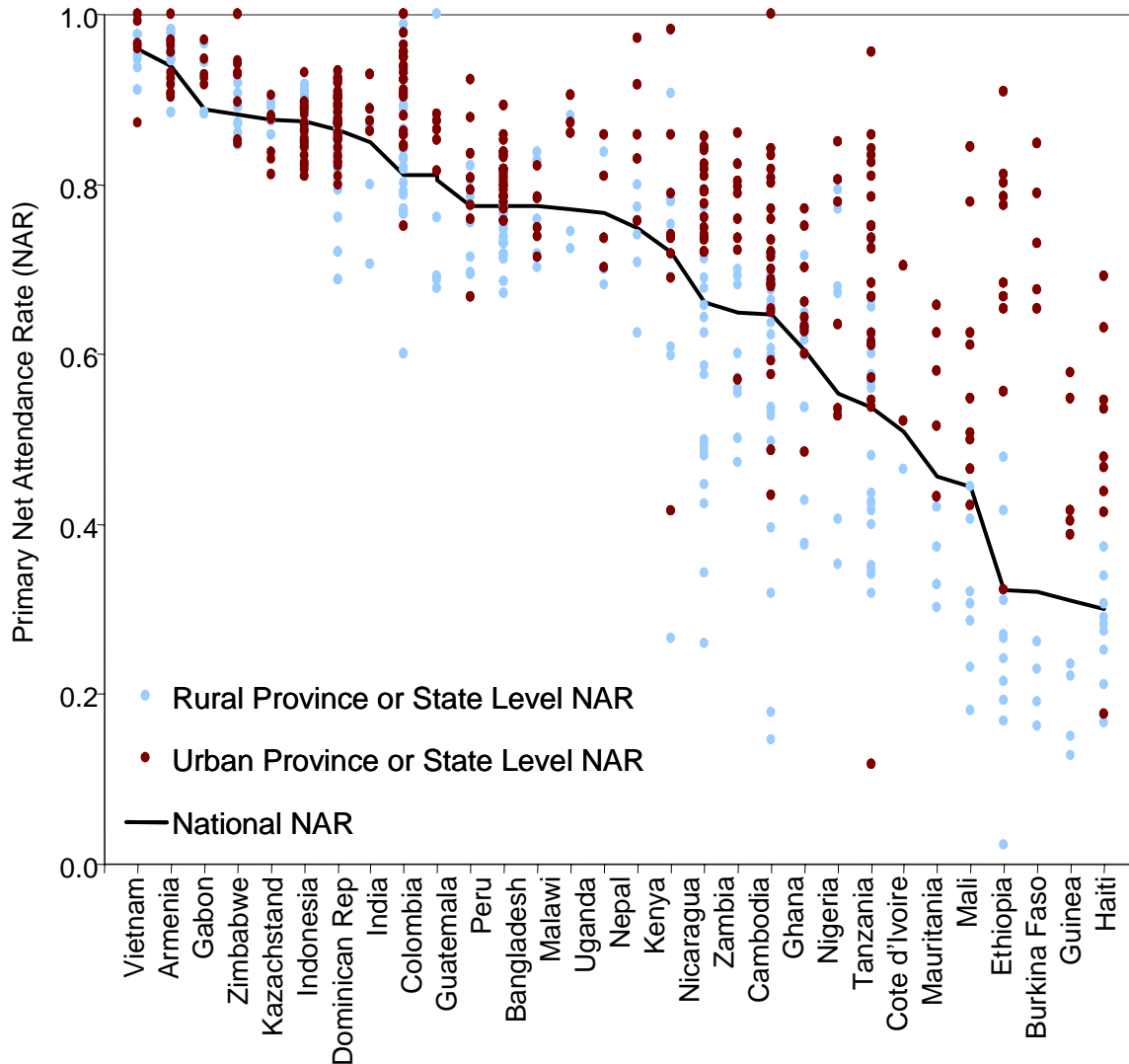
Figure 2 shows a couple of important patterns. First, those countries with high national attendance levels have dots (areas) closely spaced along the right of the figure. This means that in countries with high national attendance rates, *all regions* have high attendance rates and access to schools is uniformly high. Conversely, those countries with low national attendance levels have dots spread widely; regional inequality characterizes countries with low school attendance. Ethiopia has the largest differentials between the lowest and the highest attendance rates (91% in the urban parts of Harar region and 2% in the rural parts of

Somalia region); Burkina Faso, Mali, Tanzania and Cambodia have similarly large disparities; and there are many countries with smaller, but still substantial inequalities.

Figure 2 also shows that in almost all countries, including those with the lowest attendance levels, at least some regions have high net attendance rates. The sub-national regions with high net attendance are generally large urban areas. Examples of areas with high urban attendance rates in countries where schooling is sparse elsewhere are: Harar in Ethiopia (91%), Koulikoro in Mali (84%), Dodoma in Tanzania (96%), Western Urban or Kathmandu in Nepal (97%). One positive outcome we can infer from this distribution is that even within the neediest countries there are certain areas where a high proportion of children have access to primary education; therefore the challenge is to focus on reaching the underserved areas, rather than the entire country.

**Figure 2. Net attendance rates by region and urban-rural residence in 30 countries.**

Source: Wils, Carrol and Barrow (2005)



The extent of the regional disparities is not correlated to education disparities by income. For example, in Bangladesh there is very little regional disparity but large education disparities by income. In other countries -- Ethiopia, Mali, and Burkina Faso -- the reverse is true (smaller education disparities by income and larger by sub-national variation). In an ongoing study employing a regression model that includes region, income, gender, and urban/rural location, the EPDC has found there are independent regional effects on a child's likelihood to be in school<sup>5</sup>. The fact that geographical education differentials differ from income patterns suggests that there are independent, regional effects. These may have to do with different cultural preferences for school, or different lifestyles, but may also be the result of variations in the supply or quality of schools.

The international discussion on EFA has paid too little attention to regional disparities that suggest that policies and programs should be designed for sub-national areas with sizeable underserved populations. This need is all the greater if poverty is disproportionately concentrated in particular regions. To make effective policies and programs requires understanding the characteristics of the underserved populations. Why do fewer children in one part of the country go to school than in another part of the same country? Are the regions with lower attendance also poorer on average? What policies and strategies can address the development and education conditions in these areas? The next sections address these questions.

### III. Characteristics of Underserved Areas

Our first hypothesis is that, generally, areas with low enrollment levels are also under-served and under-developed in other ways, so policies directed at these regions must also address the needs of a poor population with little access to services overall. The relationship between development and education has been underscored in a wide range of studies (*e.g.*, Becker, 1994; Psachoropoulos and Patrinos, 2002). Amartya Sen, in his seminal work *Development as Freedom* argues that *a general expansion of education and literacy in a region can facilitate social change...and help to enhance economic progress from which others too benefit* (Sen, 1999, p.129). Filmer and his colleagues at the World Bank have done significant work documenting the positive correlation between wealth and enrollment using DHS surveys (Filmer, 2000, 2001; Filmer & Pritchett, 1998, 2001).

The literature proposes causative, reciprocal mechanisms in the relationship between education, development, health, and empowerment. A substantial body of research indicates that poor households, with many children, pressing economic needs, and dependency on child labor, keep children out of school (*e.g.* Tietjen, 1991). Poor, rural households may have a lower demand for education from which they perceive few benefits. In addition, children in poorer health and malnourished are not only more often absent from school, but are less able concentrate and retain information (*e.g.* Levinger, 1994). Thus, in any given region, we expect to see school attendance correlated with health, income, and empowerment; this correlation would apply at the sub-national and national levels.

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<sup>5</sup> These results are still very preliminary. The multi-country study uses DHS surveys to look at a child's likelihood to be in school controlling for gender, wealth, sub-national location, urban/rural household. The EPDC's intention is to complete the study by mid-2006.

To measure this relationship, we construct an index of development for wealth, health and empowerment, to correlate with school attendance. It is also possible to run a regression model with wealth, health, and empowerment separately, and this may be done in a follow-on analysis to this study. The index for development used in this study is built from two UNDP (2004) indices for well-being: the Human Development Index (HDI) and the Human Poverty Index. The HDI is comprised of: i) a long life (measured by life expectancy at birth); ii) knowledge (measured by adult literacy and the gross attendance rate), and iii) the standard of living (measured by income per capita in real terms). The Human Poverty Index (HPI-1) includes the same concepts, but is measured differently. A long life is measured as probability at birth of not surviving to 40, knowledge as the adult literacy rate, and the standard of living as a combination of percentage of population without access to an improved water source and percent of children underweight by age.

The index used in this study differs somewhat from the UNDP indices, because the necessary data were not all available at the sub-national level, including life expectancy and income. Our efforts were to find the best possible proxies for the UNDP indicators within the constraints of the available information. In addition to approximating the UNDP welfare indices, factor analysis<sup>6</sup> was utilized to select four indicators which provided the greatest discrimination from a larger set of candidate indicators. The four indicators that were selected are: i) proportion of women with access to medical services (proxy for health); ii) female literacy rate in the age group 15-49; iii) access to clean water, and iv) access to mass media. While this choice has an unavoidable element of arbitrary selection, calculations with a larger set of indicators show that the findings presented here remain valid even with different baskets of development measures.

The unit of analysis is a sample of 165 sub-national regions in nine countries in Asia, Africa, and Latin America: Bangladesh, Egypt, Ghana, Guatemala, Guinea, Malawi, Nicaragua, Uganda, and Zambia. The nine countries all have large household DHS surveys available, and are at risk for not achieving EFA goals.<sup>7</sup> Although this is a limited sample, it provides a fair representation of countries at risk. The net attendance rates in this group range from 31% in Guinea to 85% in Egypt at the time of the DHS survey; the group includes extremely poor countries -- Malawi and Guinea, middle income countries -- Egypt and Guatemala, and spans three continents.

Appendix A gives a selection of summary graphs showing the distribution of the four development measures and female school attendance values. A correlation analysis found positive relations between the variables throughout, for all 165 regions together and for regions within countries separately. This means, for example, that in a place where many women have access to health services, there is also likely to be higher literacy and greater availability of clean water, schooling, and mass media. The correlation matrices are shown in Appendix B. This preliminary analysis confirms what much of the literature suggests: one can speak of a “basket” of social development indicators that interact to form an index.

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<sup>6</sup>See Tabachnick & Fidell (2001) for a description of the factor analysis used in SPSS version 12.

<sup>7</sup>[www.uis.unesco.org/TEMPLATE/pdf/efa/efasuiivi\\_en.pdf](http://www.uis.unesco.org/TEMPLATE/pdf/efa/efasuiivi_en.pdf)

### Development Index in 165 Sub-national Regions

The development index puts the four indicators into one basket (leaving school attendance out as the dependent variable). Factor analysis was used to weight the indicators in the index/basket and the index was normalized to range from 0 to 1. The highest index value of 1 is reached if the value for all contributing indicators is 100%. The nearer the index is to 1, the higher the overall level of approximated development.

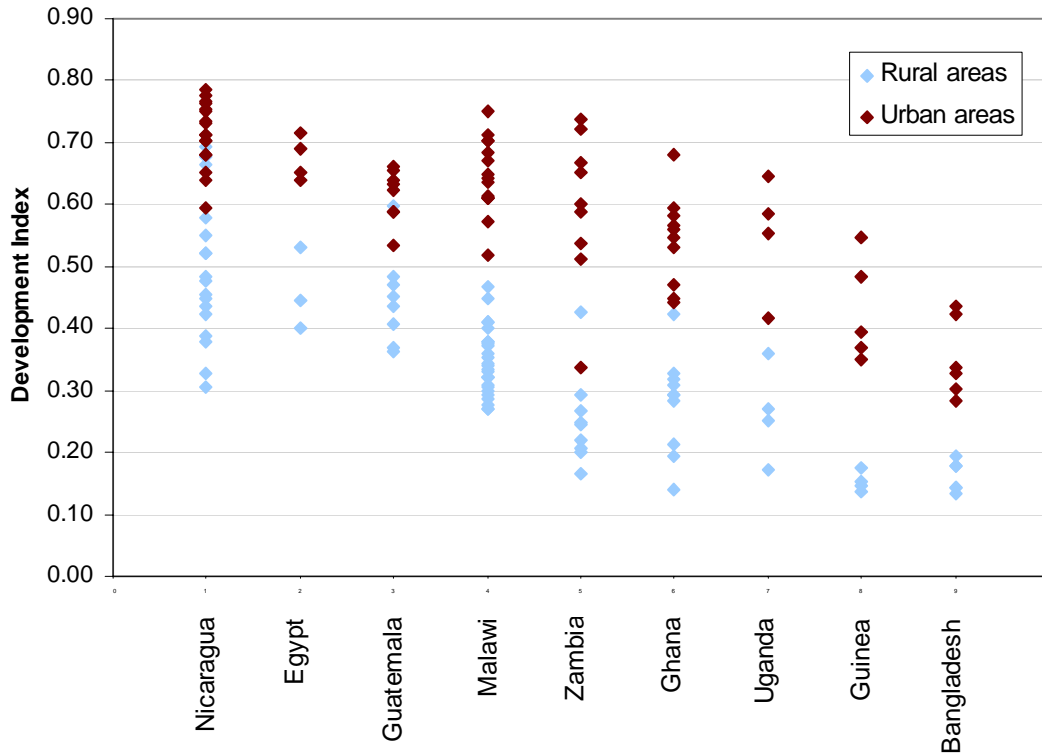
The values for the development index at the national, urban, and rural levels are shown in Table 1. At a national level the values for the development indices vary from 0.26 in Bangladesh to 0.60 in Nicaragua. Within countries, the variation between urban and rural areas as a whole was about as large as the difference between the highest and the lowest country values.

**Table 1. Urban and Rural Development Indices**

|            | National | Urban | Rural |
|------------|----------|-------|-------|
| Bangladesh | 0.26     | 0.35  | 0.16  |
| Egypt      | 0.58     | 0.67  | 0.46  |
| Guinea     | 0.31     | 0.43  | 0.15  |
| Ghana 2003 | 0.41     | 0.54  | 0.28  |
| Guatemala  | 0.53     | 0.62  | 0.45  |
| Malawi     | 0.50     | 0.65  | 0.35  |
| Nicaragua  | 0.60     | 0.73  | 0.51  |
| Uganda     | 0.41     | 0.55  | 0.26  |
| Zambia     | 0.42     | 0.60  | 0.25  |

Figure 3 shows the distribution of the development indices within the 165 regions of the nine countries. This graph splits the urban and rural regions (from Table 1) over countries' provinces or states. First, the graph shows that larger sub-national differences emerge at this more disaggregated level. The largest development index range is in Zambia, with values from .16 in the rural Luapula to 0.74 in the urban Western region. Similarly, large ranges exist in Nicaragua, Malawi, and Ghana. The countries with the smallest development differentials are Bangladesh (0.13 to 0.44), Guatemala (0.36 to 0.66), and Egypt (0.40 to 0.71). Second, there is a very strong urban/rural split. With very few exceptions, the rural areas are all below the urban areas. Third, in seven of the nine countries in the sample there exist at least some regions with high development indices. Only Guinea and Bangladesh have no urban areas with a high development index. In some countries, for example Nicaragua, some of the rural regions with lower development indices (relative to other values in Nicaragua) have a higher development index value than the urban areas in other countries (for example, Guinea).

**Figure 3. Development Indices for 165 Sub-national Regions in Nine countries, by Country**



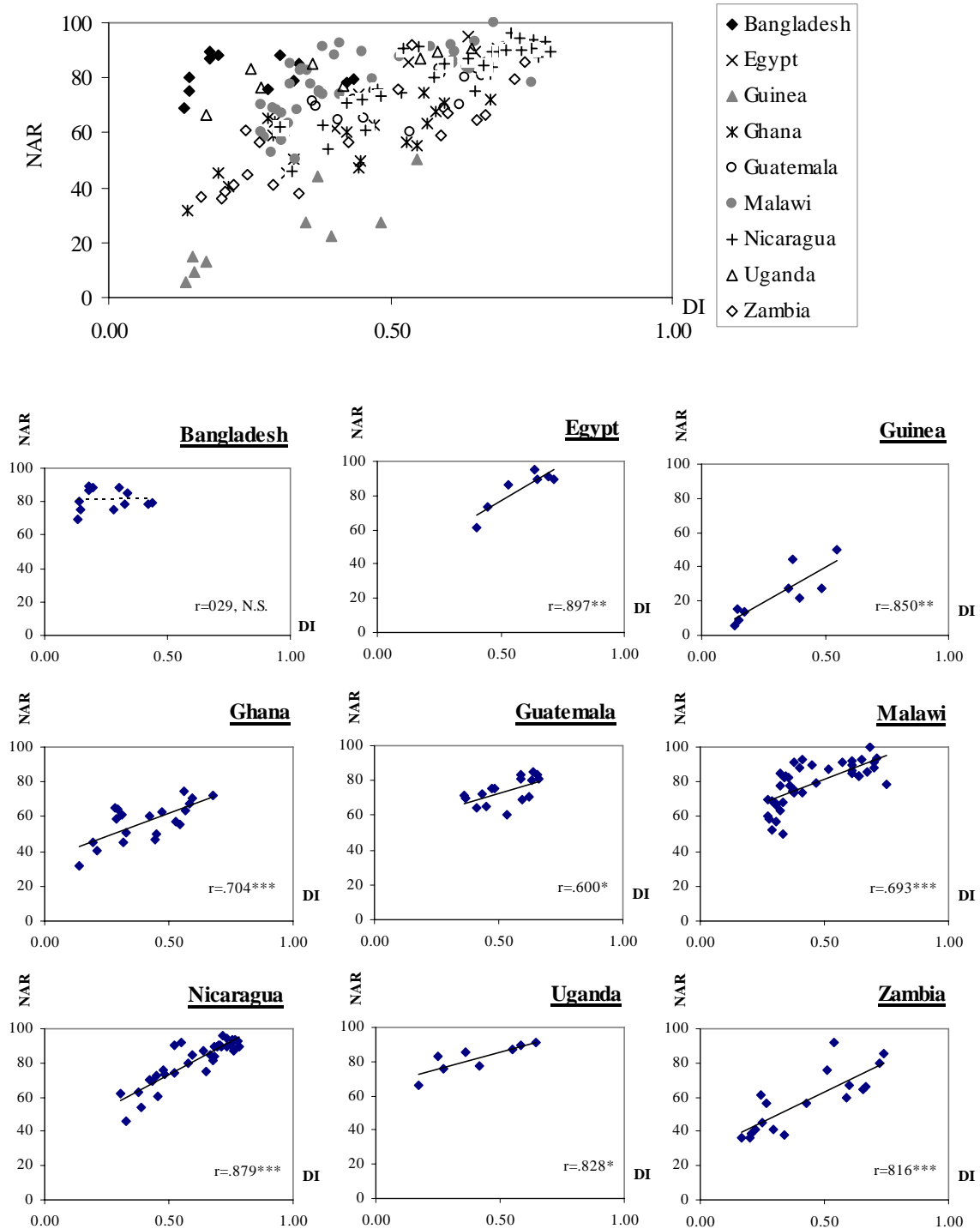
Source: own calculations based on DHS survey datasets.

The lowest values for the development index are found in Ghana (in rural Northern, Upper East, and Upper West regions), Zambia (rural Luapula), Uganda (rural Northern), Guinea (all rural regions), and Bangladesh (all rural regions). Those familiar with these countries and regions will note that the underserved areas are generally the most distant from the metropolitan centers, have the weakest transportation and communications infrastructure, and frequently have populations that include high proportions of ethnic and cultural minorities. Some areas are also marked by social and armed conflict.

### 1.1 Development and School Attendance

Figure 4 shows a cross-tabulation of female attendance and the development index in each of the nine countries – for all countries together and in small figures separately. The correlation is clear in eight of the nine countries. The rule is that low attendance rates exist within a context of overall underdevelopment. The correlation statistics for each country are generally high, ranging from 0.897 in Egypt (significant at  $p < 0.01$ ) to 0.600 in Guatemala (significant at  $p < 0.10$ ), except for Bangladesh, which has a very low correlation.

**Figure 4. Female Net Attendance Rates and Development Indices in 165 Regions in Nine Countries. Linear Regression Lines, Correlation Values and Level of Statistical Significance.**



\* p< .1; \*\*p< .01; \*\*\* p<.001

Source: DHS surveys

Bangladesh is a true outlier in this group. Some of its regions have among the lowest in adult female literacy, health, clean water, and information, yet have among the highest school attendance rates in the study. Bangladesh has been able to send almost all children to school in all sub-national regions. In fact, there is no correlation between the development index and girls' enrollment. Uganda also has relatively high net attendance rates in its underdeveloped regions. Northern Ghana is another exception which is not, however, visible from the figures where attendance rates doubled from 1998-2003 in the absence of radical change in other aspects of development.<sup>8</sup> These examples should be studied for lessons on how to achieve full primary schooling within a context of poverty and dismal access to other services.

It is interesting to note that in five of the nine countries, the slopes of the regression are nearly equal (Egypt, Guinea, Ghana, Nicaragua, and Zambia). However, the correlation lines for the 5 countries fall at different levels on the graphs. Our interpretation of this finding is that there are certain general factors at work that cause similar correlations between school attendance and other aspects of development, but that there are important country-specific factors, having to do with the policy environment and perhaps culture and geography, that alter those relationships. The next section turns to an interpretation of the exceptional position of Bangladesh, Uganda, and Northern Ghana.

### **The Exceptions: Bangladesh, Uganda and Northern Ghana**

Bangladesh stands out among the nine countries. Its development level is the lowest of all countries but the net attendance of girls is over 80% and the rural girl attendance rate is the highest among all the rural areas in the nine countries. What underlies this remarkable educational achievement? Bangladesh has not experienced exceptionally fast economic growth (in fact, it has been rather slow, see Wils, Carrol and Barrow, 2005); expenditure on education is moderate; the proportion of people working in formal education is not high. But Bangladesh is outstanding for the presence of a very large number of non-government and NGO schools, most notably Bangladesh Rural Advancement Committee (BRAC); and for the stipend program for poor children. BRAC's efforts, initially targeting rural areas, have been able to reach an increasing number and proportion of girls in rural areas over the past twenty years. This has transformed educational opportunity for underserved areas.

#### **BRAC NON-FORMAL PRIMARY EDUCATION PROGRAM**

BRAC (Bangladesh Rural Advancement Committee) introduced its Non-Formal Primary Education Program (NFPE) in 1985. This program emphasized the education of girls in rural areas giving them the opportunity to attain higher levels of education by providing flexible learning hours and scholarships depending on educational performances. The program started with 22 experimental schools. Today, the number of schools surpasses 34,000, catering to over 1.1 million students of which 70% are girls. BRAC teachers are chosen from among the most educated women in each village. Teachers must have at least nine years of schooling. Presently, 97% of all teachers are women. Each year, almost 90% of the students who graduate from the BRAC schools go on to the formal schools in higher classes. Additionally, BRAC has also undertaken projects to provide villages with libraries and community centers. The organization offers all this to villagers with funds from foreign countries and by collecting minimal fees from the students to supply them with books and other materials.

<sup>8</sup>Longitudinal results for 1998 and 2003 not shown but available from the authors.

Uganda also has high enrollment relative to the development index in some regions. There is a statistically significant relationship between the development index and female school attendance, but the slope is low. It may be that this is due, in part, to the elimination of school fees in 1996, which resulted in an enormous influx of pupils. Whereas in 1997 there were 2.3 million children enrolled in school, by 2001 there were 6.9 million children enrolled in school. Uganda was also able to greatly reduce the attendance gaps between rich and poor, girls and boys, and between regions. Uganda used public information to tackle corruption and mismanagement so that in recent years, over “90% of the greatly increased central funding reaches schools instead of the dire 28% in 1996” (Wils, Carrol and Barrow, 2005:53). While issues of quality and dropout remain difficult, the achievements of Uganda to expand education to underdeveloped regions deserve notice.

Northern Ghana is another case where the provision of education outpaces an area development index. Its development index is among the lowest of the 165 regions. Between 1998 and 2003 (years of two DHS surveys), however, girls’ net attendance rates almost doubled, going from 17% to 32%. This is an increase of approximately 26,000 -30,000 female students.<sup>9</sup> Within this period, the School for Life program expanded in Northern Ghana to reach underserved children. From 1996-2003, 50,000 children enrolled. In 2000, 9,000 children were enrolled of whom half were girls.<sup>10</sup> This implies that Schools for Life is responsible for about one-fifth of the enrollment growth in this area.

#### **SCHOOLS FOR LIFE IN NORTHERN GHANA**

School for Life in the Northern Region of Ghana provides a nine-month education program for youth aged 8 to 15 years in rural villages where there is no or very low access to primary education. It provides literacy in the mother tongue, numeracy and general knowledge equivalent to three grades of primary schooling. Approximately 70% of the students in School for Life continue on to formal primary school at grade 4. From 1996 through 2003, School for Life enrolled 50,000 children and youth, of whom 50% (25,150) were girls. This number has made a considerable impact on the rate of girl’s attendance in primary education in Northern Ghana, as indicated by the rapid increase in this rate during the years 1998 to 2003. This program continues to expand and is now reaching out to new districts and regions in northern Ghana.

#### **Concluding Observations**

The report addresses the sub-national distribution of education inequality and the effect of the overall development context in sub-national regions on attendance levels. The analysis is based on sub-national data extracted from DHS and MICS household surveys. Regarding sub-national distribution of education inequality, the report demonstrates that there are large,

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<sup>9</sup>The estimate is based on the following. The 2000 population census counted 1.805 million people in Northern Ghana. According to the 2003 DHS survey, the school-age girls made up 11% of the total population, or, 200 thousand. If the net attendance rate increased by 15 percentage points (from 17 to 32) this is approximately 30,000 pupils. Another way to estimate this is that in 2002 there were 100,000 female pupils, and an estimated GER of 57. Combining pupils and GER gives an estimated school-age girl population of 175,000. Using this population as a base, the 15 percentage point increase would be 26,000.

<sup>10</sup>See Hartwell, Ash (2005), *School for Life Case Study*. EQUIP2.

sub-national differences in school attendance in many countries. Those countries with the largest sub-national inequalities are also those with the lowest national level attendance rates. Preliminary research implies the regional effects are independent of other factors, such as average income levels within sub-national regions. This suggests that to reach EFA, these countries must target the under-served regions and channel development strategies, target resources, and direct funding to areas where children need it most. National education and development indicators do not provide an adequate basis for developing strategies and programs for addressing EFA and Millennium Challenge Goals. To reach EFA requires bridging sub-national differentials and the conditions of underserved areas.

In addition to sub-national educational disparities, other inequalities exist: gender differentials have declined at the national level, so that *within* regions girls may still be very much disadvantaged (in particular, in regions with low overall enrollment). Filmer Wealth and poverty are also important inequality factors (Filmer 2000, 2001; Filmer and Pritchett 1998, 2001). However, our development index suggests that poverty itself is geographically concentrated, so it may be that to address the vector of poverty *also* requires at least some regional focus.

Regarding the strong relationship between school attendance and overall development (proxied by a development index), Bangladesh is an exception in that no relationship exists between school attendance rates and regional development levels. Similarly in Uganda, the relationship is also rather flat. It appears that where development and school enrollment are correlated, certain common factors are at work that cause similar correlations between school attendance and other aspects of development. But there are also important country-specific factors having to do with the policy environment and perhaps culture and geography that shift those correlations up or down.

The research also demonstrates that the common mold with rural, underserved areas of a country suffering low school enrollment rates is not universal, as evidenced by Bangladesh, Uganda, and North Ghana. Given the right factors – be they social, cultural, policy/program interventions – there are underserved areas that have broken restrictions on school access that traditionally accompany under-development.

With regards to the exceptional position of Bangladesh, the presence of a large number of NGO schools, including BRAC schools is a distinguishing characteristic. In Uganda, the strong government commitment to universal primary education and the elimination of school fees in 1996 may be critical factors for the position of Uganda. The third special case is the northern region of Ghana, where there was an exceptionally high increase in attendance in the absence of development growth in other areas. The alternative Schools for Life may have played a role in this case. These cases, and perhaps others to be identified in an expanded version of this analysis, may be useful for policy makers to learn how to formulate focused strategies that bring underserved children into school.

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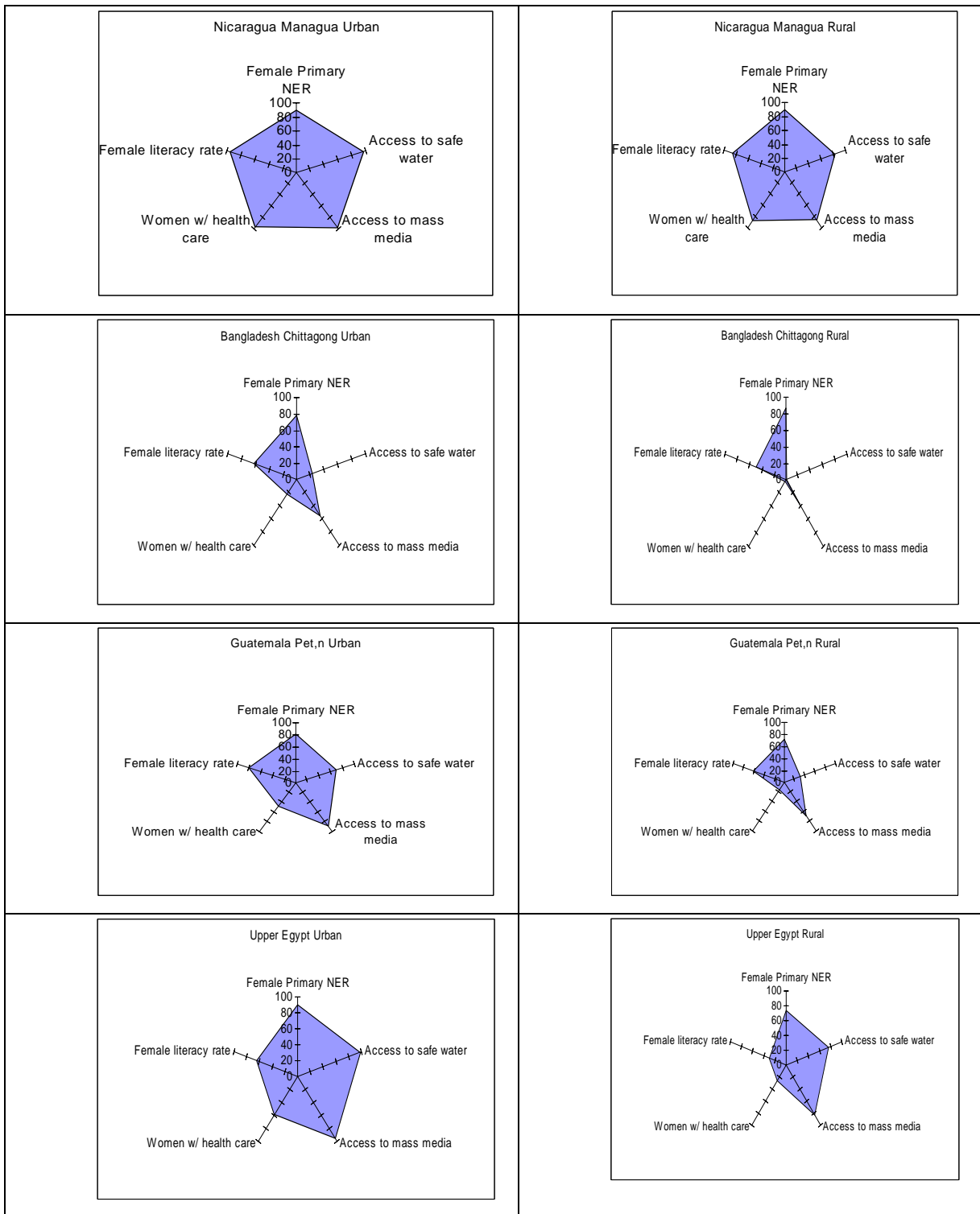
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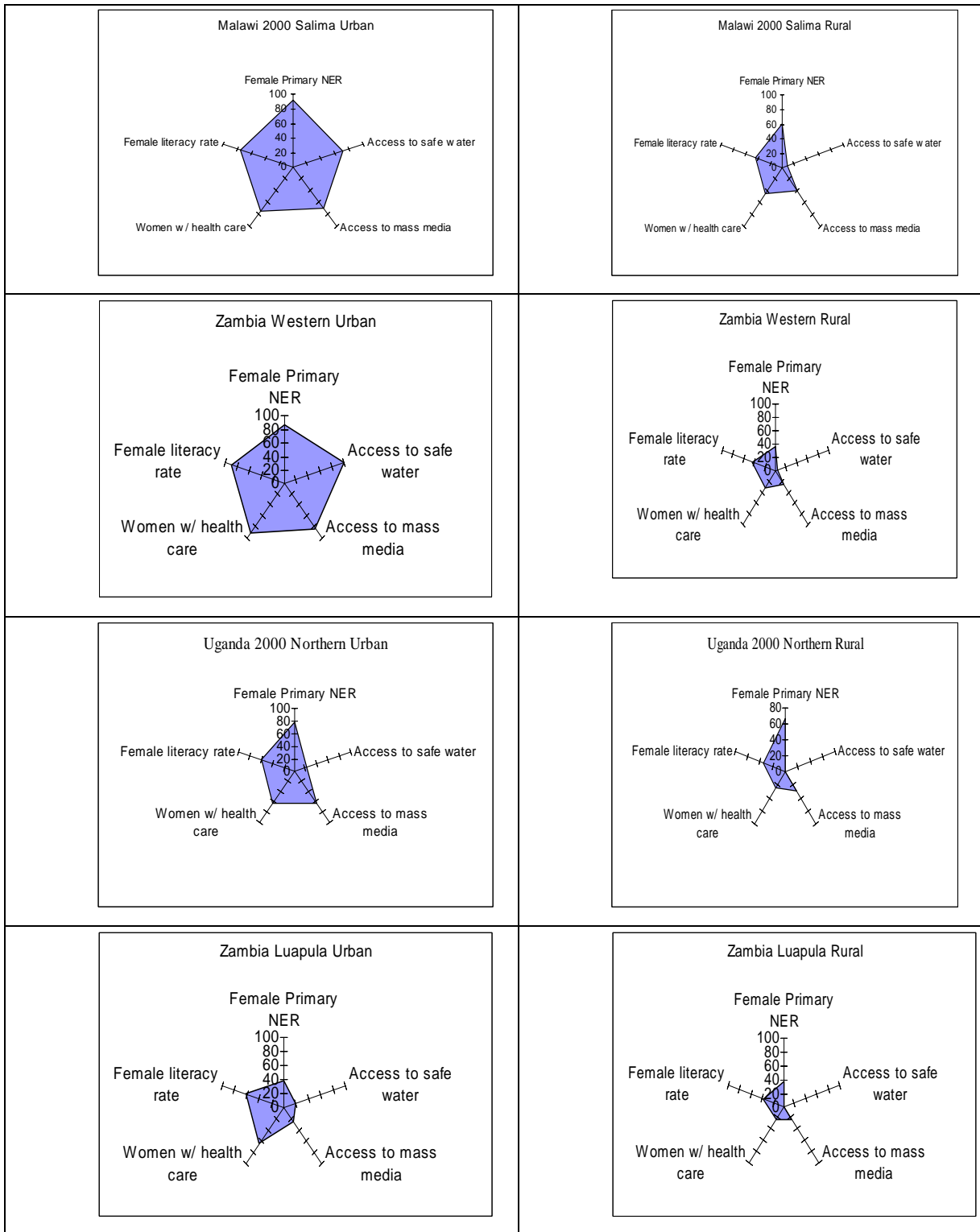
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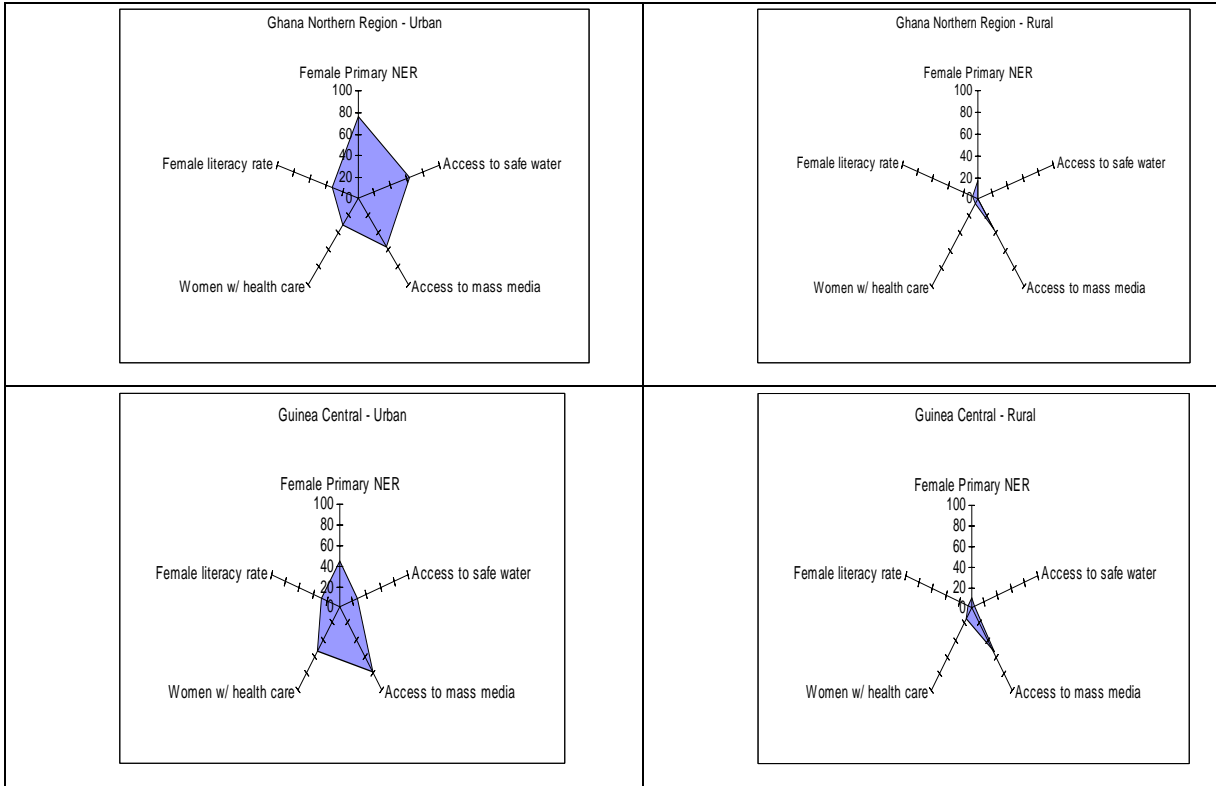
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**Appendix A. Selected Summary Spider Graphs of Development and School Attendance Indicators.**







**Appendix B. Correlation Matrices for 9 Countries and All Countries Together.**

\*\* - correlation significant at the 0.01 level (2-tailed); \* - correlation significant at the 0.05 level (2-tailed).

**All Countries**

|             | safe Water | Mass Media | Health Care | Female Literacy |
|-------------|------------|------------|-------------|-----------------|
| Female NAR  | .47**      | .41**      | .74**       | .50**           |
| Safe Water  |            | .77**      | .62**       | .69**           |
| Mass Media  |            |            | .62**       | .58**           |
| Health Care |            |            |             | .70**           |

**Ghana**

|             | Safe Water | Mass Media | Health Care | Female Literacy |
|-------------|------------|------------|-------------|-----------------|
| Female NAR  | .56*       | .48*       | .61**       | .87**           |
| Safe Water  |            | .73**      | .80**       | .65**           |
| Mass Media  |            |            | .80**       | .60**           |
| Health Care |            |            |             | .82**           |

**Bangladesh**

|             | Safe Water | Mass Media | Health Care | Female Literacy |
|-------------|------------|------------|-------------|-----------------|
| Female NAR  | -.15       | -.13       | -.01        | .46             |
| Safe Water  |            | .80**      | .75**       | .59*            |
| Mass Media  |            |            | .97**       | .78**           |
| Health Care |            |            |             | .74**           |

**Guatemala**

|             | Safe Water | Mass Media | Health Care | Female Literacy |
|-------------|------------|------------|-------------|-----------------|
| Female NAR  | .34        | .57*       | .52*        | .58*            |
| Safe Water  |            | .33        | .27         | .25             |
| Mass Media  |            |            | .91**       | .91**           |
| Health Care |            |            |             | .86**           |

**Egypt**

|             | Safe Water | Mass Media | Health Care | Female Literacy |
|-------------|------------|------------|-------------|-----------------|
| Female NAR  | .93**      | .98**      | .79*        | .80*            |
| Safe Water  |            | .94**      | .87*        | .89**           |
| Mass Media  |            |            | .87*        | .81*            |
| Health Care |            |            |             | .90**           |

**Guinea**

|             | Safe Water | Mass Media | Health Care | Female Literacy |
|-------------|------------|------------|-------------|-----------------|
| Female NAR  | .75*       | .78*       | .88**       | .90**           |
| Safe Water  |            | .79*       | .89**       | .90**           |
| Mass Media  |            |            | .91**       | .91**           |
| Health Care |            |            |             | .95**           |

**Malawi**

|             | Safe Water | Mass Media | Health Care | Female Literacy |
|-------------|------------|------------|-------------|-----------------|
| Female NAR  | .57**      | .61**      | .63**       | .85**           |
| Safe Water  |            | .88**      | .84**       | .71**           |
| Mass Media  |            |            | .85**       | .72**           |
| Health Care |            |            |             | .76**           |

**Nicaragua**

|             | Safe Water | Mass Media | Health Care | Female Literacy |
|-------------|------------|------------|-------------|-----------------|
| Female NAR  | .78**      | .66**      | .90**       | .93**           |
| Safe Water  |            | .73**      | .84**       | .84**           |
| Mass Media  |            |            | .74**       | .75**           |
| Health Care |            |            |             | .96**           |

**Uganda**

|             | Safe Water | Mass Media | Health Care | Female Literacy |
|-------------|------------|------------|-------------|-----------------|
| Female NAR  | .70        | .85**      | .73*        | .87**           |
| Safe Water  |            | .83*       | .78*        | .77*            |
| Mass Media  |            |            | .86**       | .96**           |
| Health Care |            |            |             | .76*            |

**Zambia**

|             | Safe Water | Mass Media | Health Care | Female Literacy |
|-------------|------------|------------|-------------|-----------------|
| Female NAR  | .78**      | .75**      | .79**       | .82**           |
| Safe Water  |            | .92**      | .90**       | .89**           |
| Mass Media  |            |            | .83**       | .84**           |
| Health Care |            |            |             | .89**           |

### Appendix C. Calculation of the Development Index

Performance in each dimension is expressed as a value between 0 and 1 by applying the following general formula: Dimension Index = (actual value – minimum value)/(maximum value – minimum value). Since there is only one indicator for each development dimension, the dimension index is the same as the indicator value.

The weight of each indicator (see the following table) is obtained by using unweighted least-squares factor analysis and varimax method for rotation through SPSS Version 12 (Tabachnick & Fidell 2001).

|   | Factor |
|---|--------|
|   | 1      |
| Access to safe water                    | .871   |
| Access to mass media                    | .807   |
| Female literacy rate                    | .780   |
| Women's access to healthcare facilities | .799   |

The Development Index is then calculated as an average of the weighted indicator values. It is expressed as a value between 0 and 0.8 which is the average of the weights.

Take rural Managua of Nicaragua as an example.

Access to safe water = 0.82

Access to mass media = 0.84

Female literacy = 0.86

Women's access to healthcare facilities = 0.87

Development Index =  $(0.82 \cdot 0.871 + 0.84 \cdot 0.807 + 0.86 \cdot 0.78 + 0.87 \cdot 0.799) / 4 = 0.69$