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Teachers Matter:

Teachers Supply as a Constraint on the Global Education Transition

By Annababette Wils and Raymond O'Connor

WP-01

In 2011, FHI acquired the programs, assets, and expertise of AED.

Looking Below the Surface: Reaching the Out-of-school Children

Collaborative Working Paper WP-03

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February 2006

A revised version of this paper has been accepted for publication by the Journal for Education and International Development. Publication is expected in 2006.

Abstract

The goal of universal primary school access and completion will not be reached by 2015 if present trends continue. Yet this goal is critical to the elimination of poverty and to enable all people to live in dignity. It is important to focus efforts on how to reach the more than 100 million school-age children still not in primary school. Earlier studies have shown that these out-of-school children are disproportionately girls that they are from rural areas, and from poor households[1]. This EQUIP2/EPDC study examines two new significant aspects of this population:

- What is the sub-national distribution of education inequality?
- Does the overall development context within sub-national regions affect attendance levels?

The study includes a limited number of countries, but the results are suggestive. In countries with low national attendance rates, there is great regional disparity – some areas with high and some areas with very low attendance rates. To attain universal education, the national education policy must focus on these underserved sub-national regions. Second, in most cases, within the sub-national regions, low attendance rates correlate with low overall development. However, there are a few important exceptions, most notably Bangladesh, where most children are in school in all regions of the country, even in the least developed regions. Bangladesh, where there is high education everywhere even in the regions with the lowest development, should be studied as a model for good practice.

Recommended Citation

Wils, Annababette, Zhao, Yijie, and Hartwell, Ash, 2006. *Looking Below the Surface: Reaching the Out-of-School Children.* Collaborative Working Paper CWP-02-01. Education Policy and Data Center, Washington, DC (FHI 360).

EPDC

The Education Policy and Data Center (EPDC) was launched in 2004 by FHI 360, with funding from the U.S. Agency for International Development, as an associate award under the Education Quality Improvement Program 2: Policy, Systems, Management (EQUIP2), to increase the breadth and depth of information easily accessible to researchers and practitioners in international education.

[1] UNESCO (2002, 2004, 2005), UN Millennium Project (2005), Filmer (2000, 2001) and Filmer and Pritchett (1998, 1999, 2001), and Wils, Carrol and Barrow (2005).

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Looking Below the Surface:
Reaching the Out-of-school Children[2]

By 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling.

MDG Development Goal # 2

1. INTRODUCTION

The motivation for this study comes from the notion that there are geographical pockets within countries where children are more likely to be out of school, and that these pockets are typically in remoter regions of countries, where the context is simultaneously one of under-development. If such pockets exist, and out-of-school children are collected in them, then this can give focus to education policy and programs striving to reach these children.

Earlier research (Filmer and Pritchett[3] being the foremost authors of this branch) has shown that poor children are much more likely to be out of school than their wealthier compatriots. The question then arises, but where are these poor children and 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.

We also study 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 speculation. Interestingly however, there are some exceptions, where most children are in school in sub-national regions with low development. The paper proposes some factors which may have created these exceptions.

The study covers 30 countries for the sub-national differentials and nine for the sub-national differentials with development context. The empirical evidence for the

[2] The authors would like to acknowledge help from the colleagues who contributed to this paper. Hui Zhao from the University of Massachusetts assisted with the data extraction. John Gillies, Audrey Moore, George Ingram, Bidemi Carrol and an anonymous reviewer gave essential comments. Any errors of judgement or fact remain the authors'.

[3] The results are best presented in D. Filmer and L. Pritchett "The Effect of Household Wealth on Educational Attainment Evidence from 35 Countries" 1999. *Population and Development Review* 25(1). Graphs of education attainment by income for an ever-extending number of countries can be found at http://www.worldbank.org/research/projects/edattain/edattain.htm

study is from DHS surveys[4]. These surveys focus primarily on health, but 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.

Section 1 of the paper provides a description of data available on school attendance, in particular noting which sources provide internationally comparable data at the sub-national level. Section 2 follows with an analysis of school participation, noting the role of gender, urban-rural and sub-national/regional variations. We then move, in section 3, to examine the characteristics of these sub-national areas in a sample of nine countries. This discussion utilizes a development index (described further in that section) to define the degree to which areas are underserved in terms of access to health services, clean water, communications, and female literacy rates. We then show 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.

2. SCOPE AND DATA

Indicators that track the progress towards EFA goals are largely reported using countries as the unit of analysis. Annually, the UNESCO Institute for Statistics (UIS) as well as the World Bank provide 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 data presentation has, over the past fifteen years, focused on the gender gap, intended to support strategies for closing the gap between boys and girls, in part because of equity considerations, but also 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 gap in data 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 of these national agencies publish sub-national education information on a timely and regular basis on their websites and in reports, but most do not. 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

[4] Demographic and Health Surveys, sponsored by USAID. These 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, so school attendance is the measure used throughout this study.

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). 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 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 so that a detailed sub-national analysis is possible. These characteristics make household surveys a good data source for this study.

3. 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 dis-aggregation is between males and females and, to a lesser extent, between urban and rural areas.

Figure 1A shows the male-female attendance differentials, expressed as percentage point differences, for 55 countries (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).

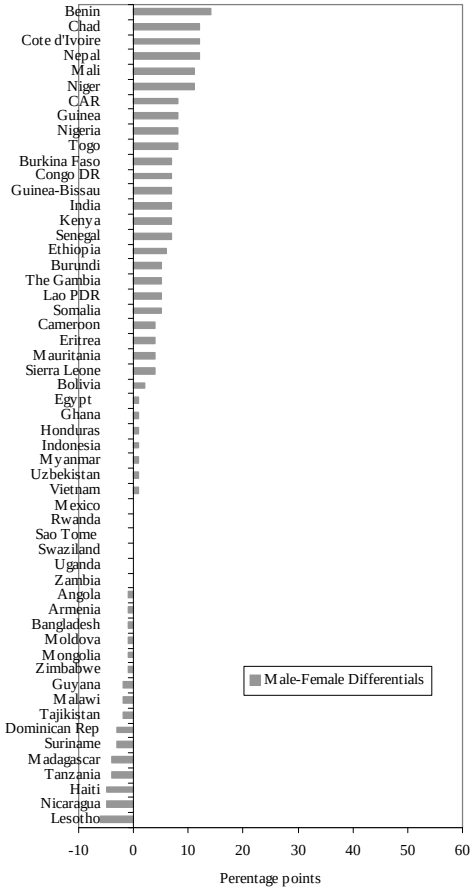
Figure 1B shows the percentage differential between urban and rural areas, using the same order of countries as in Figure 1A, and also showing the male-female differentials. In all but two of the countries, the attendance inequality between urban and rural residents is larger than that between boys and 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 gender, one should consider a few points. First, girls education has social and economic benefits in particular, as

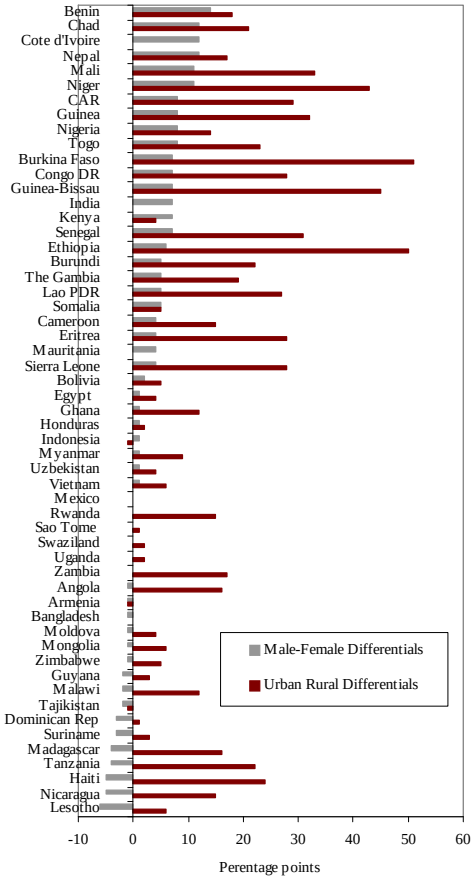
mentioned above, with regards to the health of the next generation, additional income, and employment. The evidence is lacking to know whether the same is true of rural children. On the other hand, one could argue that as the bulk of most countries' poverty and illiteracy tends to be concentrated in the rural areas, these areas are most in need of basic, especially primary education, to develop (more educated farmers are more productive).

Figure1: Gender and urban-rural net attendance gaps (data from household surveys and population censuses). Source: Wils, Carrol and Barrow (2005).

A. Gender differentials



B. Gender and urban/rural



As it turns out, even *larger* differences appear when the data is disaggregated by regions (provinces or states) within countries and urban-rural residence. Figure 2 shows the data arranged by sub-national region for 30 countries that had a DHS survey 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. This figure 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. That means that in countries with high

national attendance rates, *all regions* have high attendance rates; 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 is the country with the largest differentials between the lowest and the highest attendance rates (91 in 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.

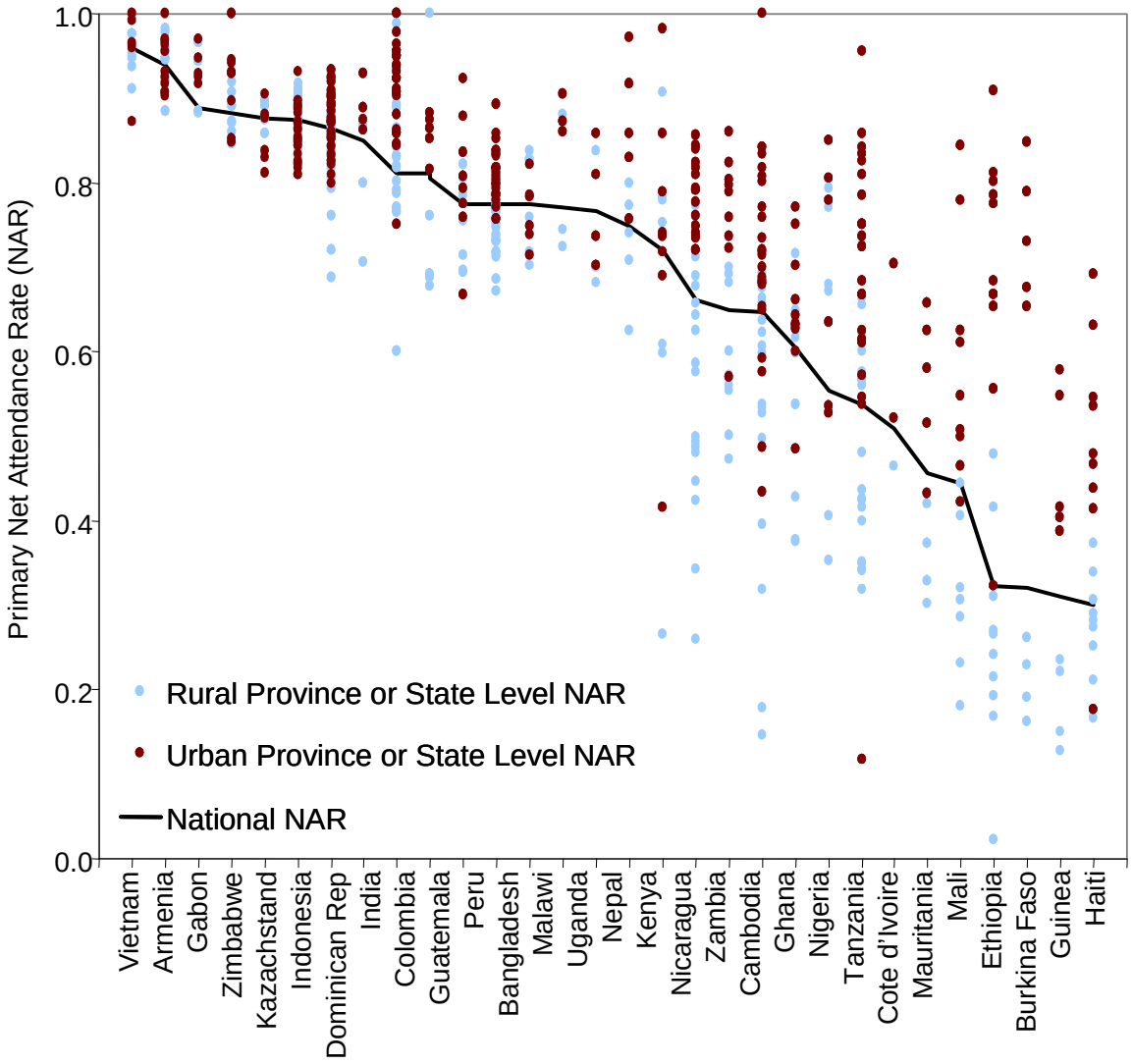
Secondly, the figure shows that in almost all countries, including those with the lowest attendance levels, at least some regions have high net attendance rates. Those sub-national regions with high net attendance are generally large urban areas. Examples of areas with high urban attendance rates within 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 citizens have access to primary education; therefore the challenge is to reach the underserved areas, rather than the entire country.

The extent of the regional disparities is not correlated to education disparities by income. For example, there are some countries, such as Bangladesh, where there is very little regional disparity, but where the education disparities by income are large. There are other countries where the reverse is true (smaller education disparities by income and larger by sub-national variation), for example, Ethiopia, Mali, and Burkina Faso. In an ongoing, unfinished 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[5]. 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 also may be the result of variations in the supply or quality of schools.

These regional disparities have received too little attention in the international education discussion on EFA. They call attention to the need to formulate policies and programs aimed at sub-national areas with sizeable underserved populations. This need is all the greater if it also turns out that poverty it disproportionately concentrated in particular regions. To make effective policies and programs requires understanding the characteristics of the underserved populations. What is causing children in one part of the country to stay out of school in greater numbers than those 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 three sections address these questions.

[5] 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.

Figure 2: Net attendance rates by region and urban-rural residence in 30 countries. Source: Wils, Carrol and Barrow (2005).



4. CHARACTERISTICS OF UNDERSERVED AREAS

Our first hypothesis is that, generally, areas that have 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 literature (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, p129). 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 on 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 less 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 have reduced ability to 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 – and this correlation would apply at the sub-national as well as at the national level.

To measure this relationship, we construct an index of development for the measures for wealth, health and empowerment, to correlate with school attendance. It would also have been possible to run a regression model with wealth, health, and empowerment separately, but it was outside the scope of the time available for this study, and it may be done in a follow-on analysis. The index for development used in this study is built from two of the UNDP's (2004) indices for well-being. The first is the well-known Human Development Index (HDI). 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 second is the Human Poverty Index (HPI-1), which includes the same concepts, but is measured differently. In this index, 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 here differs somewhat from the UNDP indices, because not all the needed data were 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[6] was utilized to select four indicators which provided the greatest discrimination from a larger set of candidate indicators. The four

[6] See Tabachnick & Fidell (2001) for a description of the factor analysis utilized through SPSS, Version 12.

indicators 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 an unavoidable element of arbitrary selection remains in this choice, calculations with a larger set of indicators show that the findings presented here remain, 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 selected countries all have large household DHS surveys available. All nine countries are at risk for not achieving EFA goals.[7] Although this is a limited sample, we believe 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, and middle income countries, Egypt and Guatemala; and spans three continents.

A selection of summary graphs, showing the distribution of the four development measures and female school attendance values, are presented in Appendix A. 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, namely, that one can speak of a "basket" of social development indicators that interact to form an index.

4.1 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 the 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.

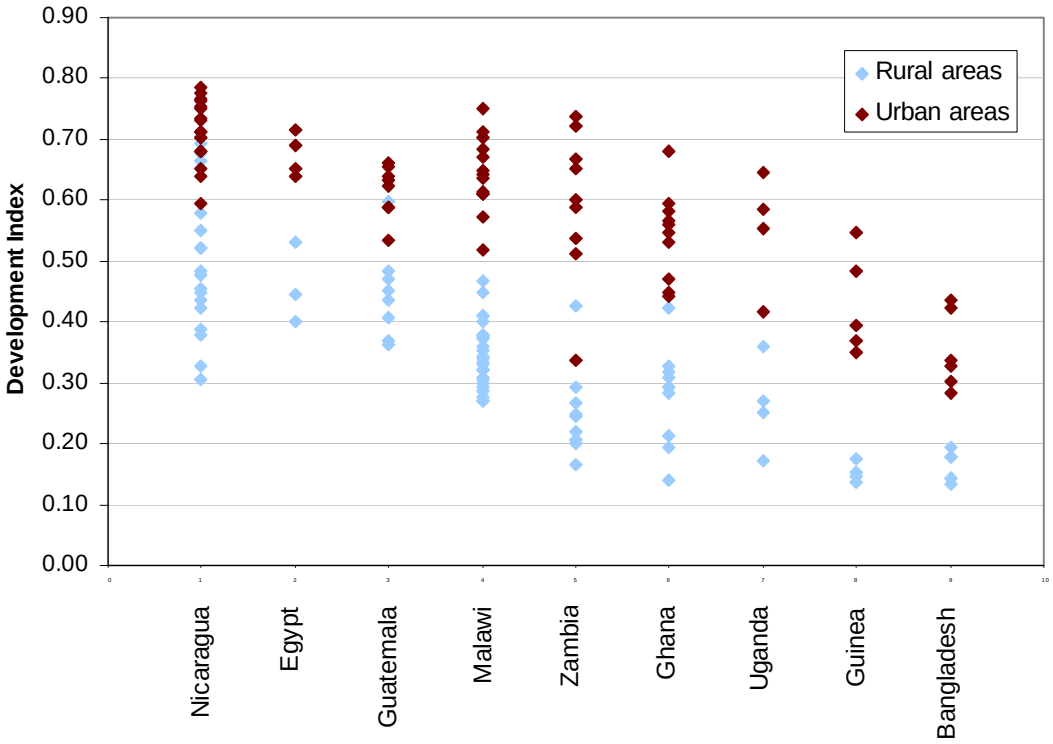
[7] www.uis.unesco.org/TEMPLATE/pdf/**efa**/**efa**suivi_en.pdf

Table 1: Development indices: urban and rural.

	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) up over countries' provinces or states. At this more disaggregated level, even larger sub-national differences emerge. The largest development index range is in Zambia, with values spanning 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, arranged by country. Source of data: own calculations based on DHS survey datasets.

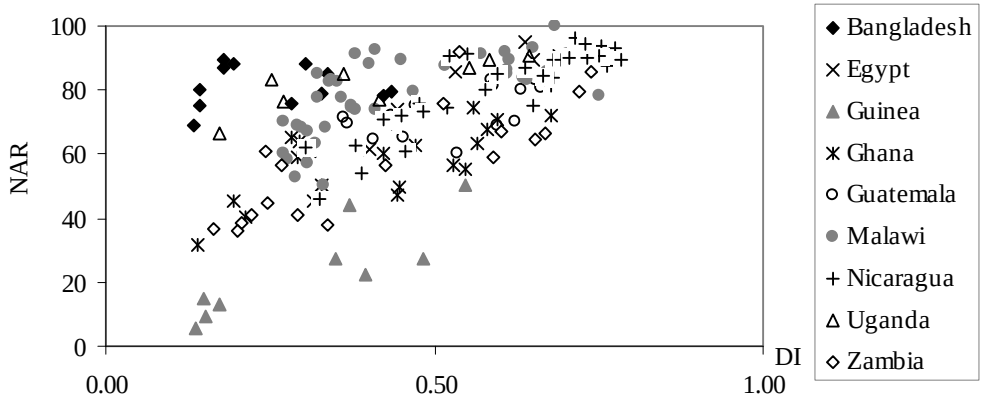


The lowest values for the development index are found in Ghana (in rural Northern, Upper East, and Upper West regions), Zambia (rural Luapula), Uganda (rural Northern), Guinea (all rural regions), and Bangladesh (all rural regions). Those familiar with these countries and regions will note that the underserved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

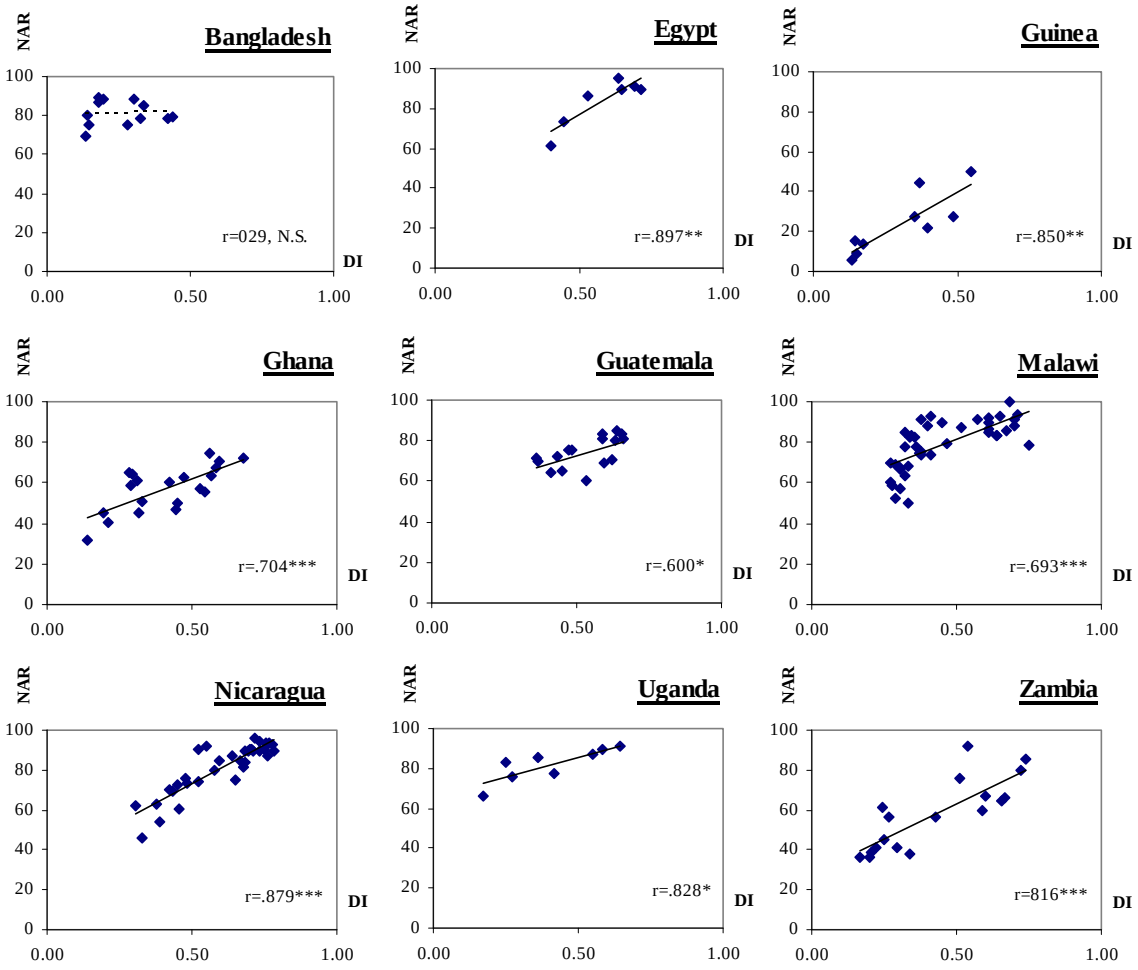
4.2 Development and school attendance

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 8 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 within nine countries, shown together and by country. Linear regression lines, correlation values and level of statistical significance shown. Data from DHS surveys.



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



Bangladesh is a true outlier in this group. It contains regions which rate among the lowest with regards to adult female literacy, health, clean water, and information, yet have among the highest school attendance rates found in the study. This country has been able to overcome the obstacles of underdevelopment 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. Another exception - not visible from the figures - is Northern Ghana, where attendance rates doubled from 1998-2003 in the absence of radical change in other aspects of development[8]. 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.

4.3 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 girl net attendance 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. Two outstanding features of Bangladesh are: the presence of a very large number of non-government and NGO schools, most notably Bangladesh Rural Advancement Committee (BRAC); and a stipend program for poor children. BRAC's education efforts, initially targeted to the rural areas, have, over the past twenty years, been able to reach an increasing number and proportion of girls in rural areas. 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 percent are girls. BRAC teachers are chosen from among the most educated women in each village. Teachers must

[8] Longitudinal results for 1998 and 2003 not shown here but available from the authors.

have at least nine years of schooling. Presently, 97 percent of all teachers are women. Each year, almost 90 per cent 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.

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 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, as well as 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's development index. Its development index is exceptionally low (among the lowest of the 165 regions). Between 1998 and 2003 (years of two DHS surveys), however, girls' net attendance rates almost doubled from 17% to 32%. This is an increase of approximately 26-30,000 female students[9]. 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, there were 9,000 children enrolled, half of them girls[10] implying that about one-fifth of the enrollment growth in this area is due to Schools for Life.

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.

[9] The estimate is based on the following. In the 2000 population census there were 1.805 million people counted 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 thousand pupils. Another way to estimate this: in 2002 there were 100 thousand female pupils, and an estimated GER of 57. Combining pupils and GER gives us an estimated school age girl population of 175 thousand. Using this population as a base, the 15 percentage point increase would be 26 thousand.

[10] See Hartwell, Ash (2005) School for Life Case Study. EQUIP2.

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.

5. CONCLUDING OBSERVATIONS

The report addresses two main issues: What is the sub-national distribution of education inequality? Does the overall development context within sub-national regions affect attendance levels? The analysis is based on sub-national data extracted from DHS and MICS household surveys.

Regarding the first question, the report demonstrates that there are large, sub-national differences in school attendance in many countries. The 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 in these countries it will be necessary to target the under-served regions – to 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, it is critical to bridge sub-national differentials and the conditions of underserved areas.

In addition to sub-national educational disparities, there are other important vectors of inequality. For example, while gender differentials have declined at the national level, *within* regions girls may still be very much disadvantaged (in particular, in regions with low overall enrollment).

Filmer and his colleagues at the World Bank have shown that 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.

With regards to the second question of whether low overall development within sub-national regions is correlated to low attendance levels, the study analyzed 165 sub-national regions in nine countries. The analysis confirms that, in general, there is a positive and strong relationship between school attendance and overall development (proxied by a development index). Bangladesh is an exceptional case: there is no relationship between school attendance rates and a region's development level; in Uganda, the relationship is also rather flat.

It appears that within those countries 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.

And, the research also demonstrates that, as evidenced by Bangladesh, Uganda, and North Ghana, the common mold with rural, underserved areas of a country suffering low school enrollment rates, is not immutable. 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 study finds that one distinguishing characteristic of that country is the presence of a large number of NGO schools, including BRAC schools. In Uganda, the strong government commitment to universal primary education, which led to the removal of school fees in 1996, may be a critical factor. A 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. It may be that the alternative Schools for Life played a role in this case.

We would like to suggest that these cases (and perhaps others to be identified in an expanded version of this analysis) be studied by policy makers to learn how to formulate focused strategies that bring underserved children into school.

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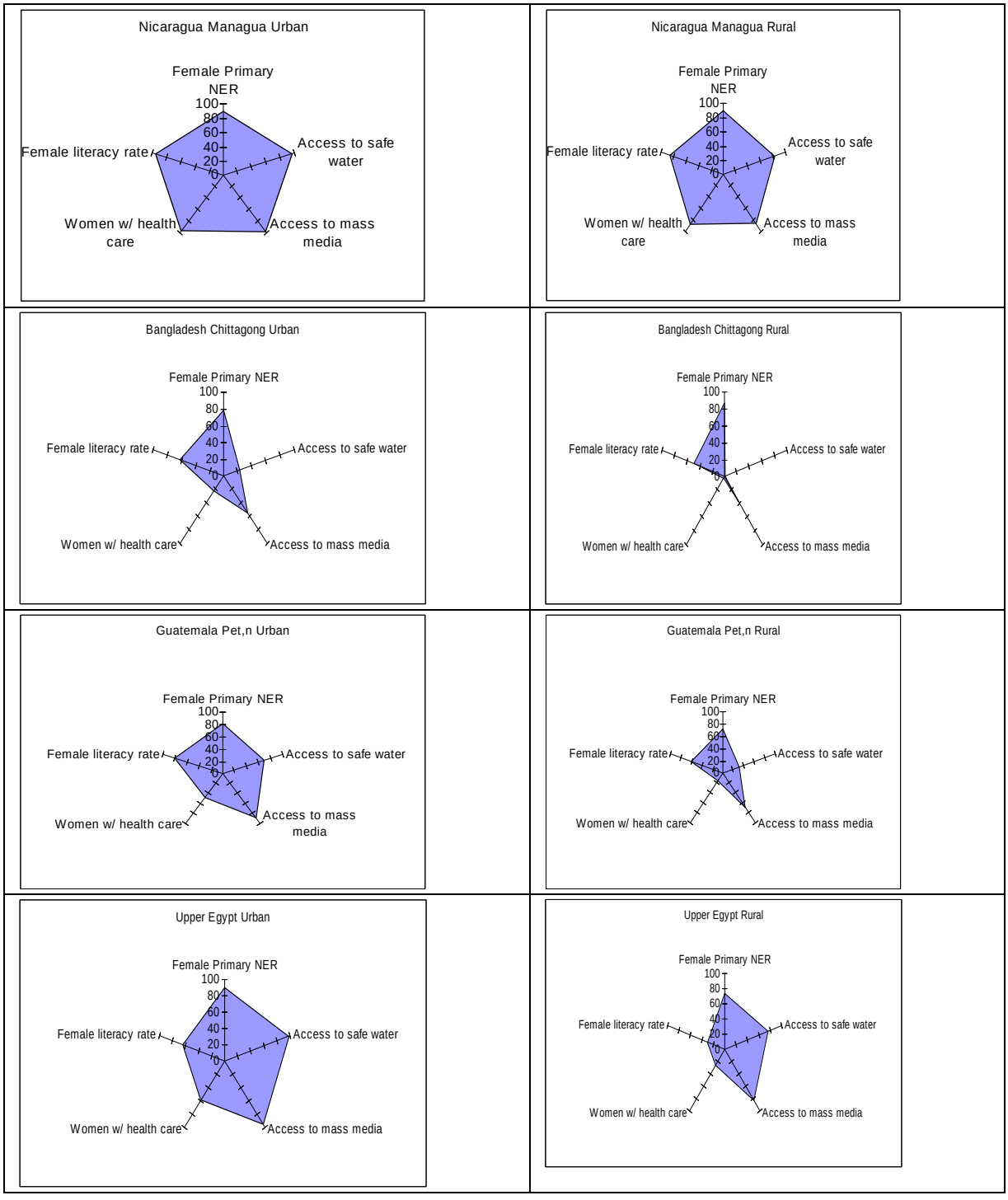
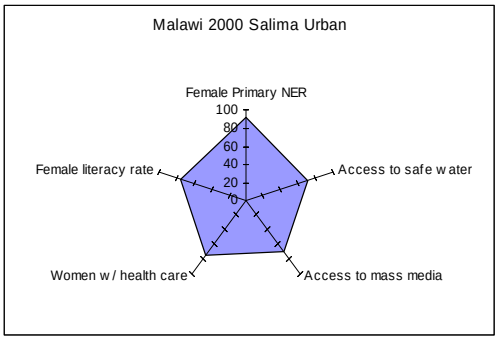
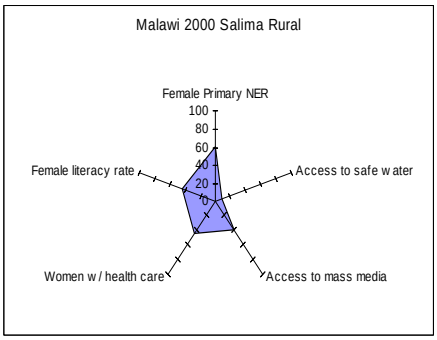
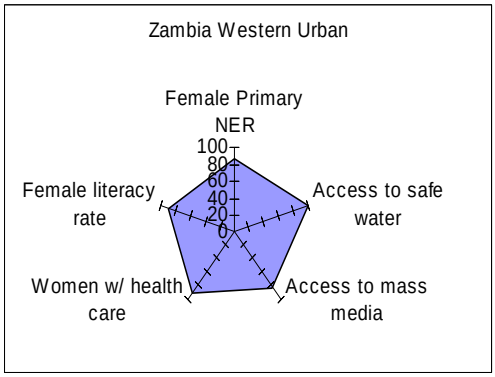
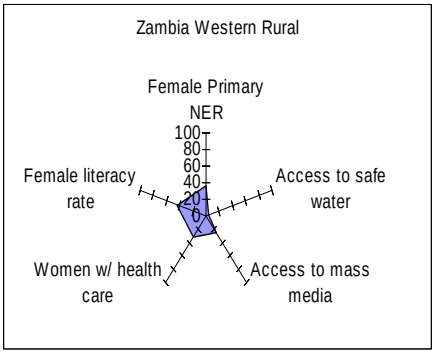
APPENDIX A. SELECTED SUMMARY SPIDER GRAPHS OF DEVELOPMENT AND SCHOOL ATTENDANCE INDICATORS.

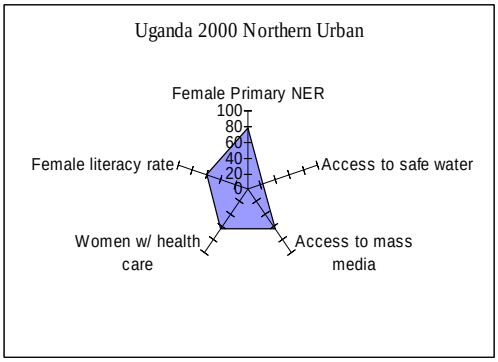


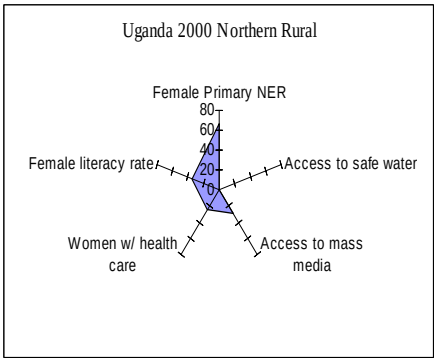

Malawi 2000 Salima Urban
Female Primary NER
100
80
60
40
20
0
Access to safe water
Access to mass media
Women w / health care
Female literacy rate

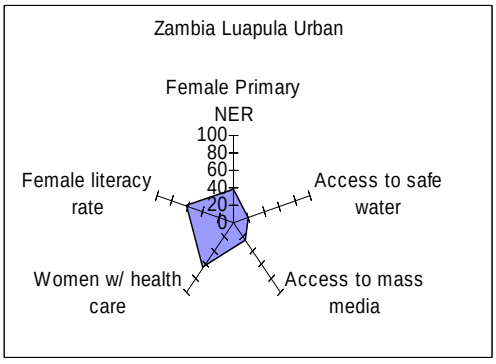

Malawi 2000 Salima Rural
Female Primary NER
100
80
60
40
20
0
Access to safe water
Access to mass media
Women w / health care
Female literacy rate

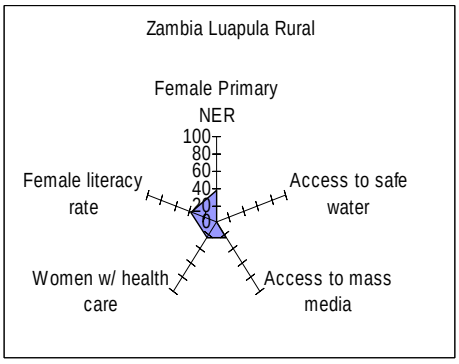

Zambia Western Urban
Female Primary NER
100
80
60
40
20
0
Access to safe water
Access to mass media
Women w/ health care
Female literacy rate

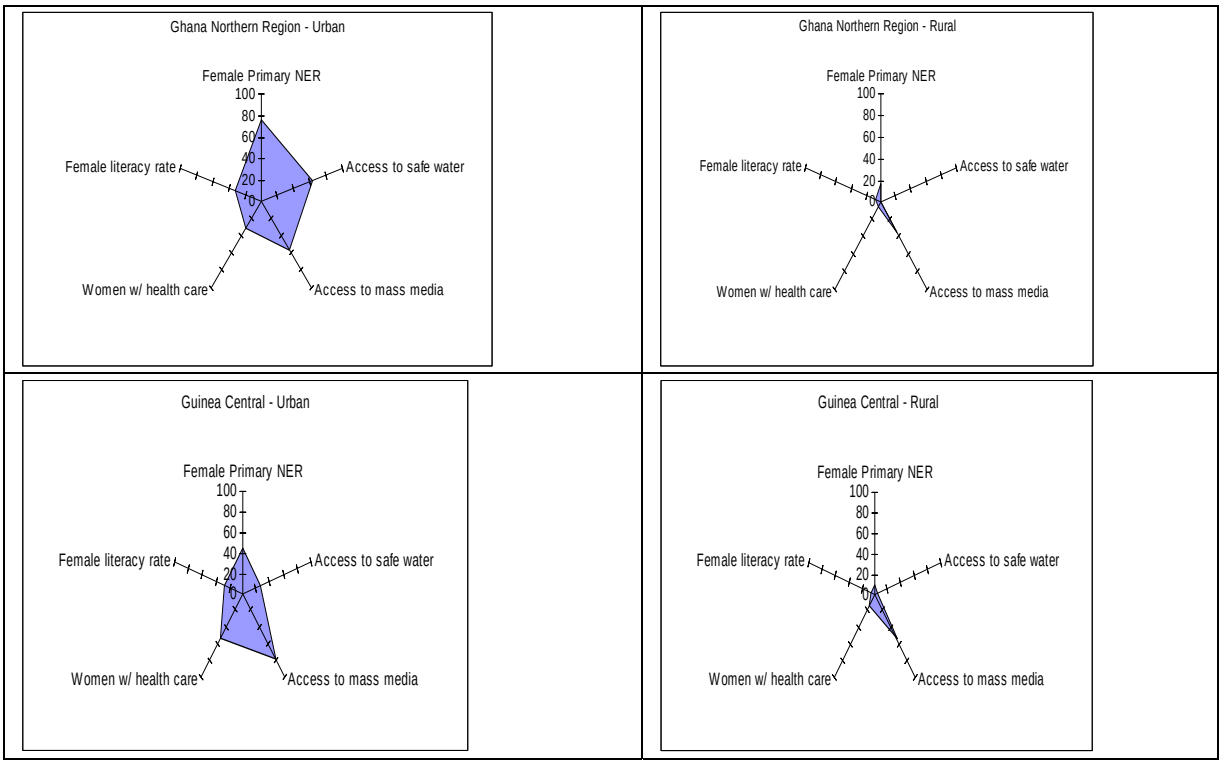

Zambia Western Rural
Female Primary NER
100
80
60
40
20
0
Access to safe water
Access to mass media
Women w/ health care
Female literacy rate


Uganda 2000 Northern Urban
Female Primary NER
100
80
60
40
20
0
Access to safe water
Access to mass media
Women w/ health care
Female literacy rate


Uganda 2000 Northern Rural
Female Primary NER
80
60
40
20
0
Access to safe water
Access to mass media
Women w/ health care
Female literacy rate


Zambia Luapula Urban
Female Primary NER
100
80
60
40
20
0
Access to safe water
Access to mass media
Women w/ health care
Female literacy rate


Zambia Luapula Rural
Female Primary NER
100
80
60
40
20
0
Access to safe water
Access to mass media
Women w/ health care
Female literacy rate


Ghana Northern Region - Urban
Female Primary NER
100
80
60
40
20
0
Female literacy rate
Access to safe water
Women w/ health care
Access to mass media
Ghana Northern Region - Rural
Female Primary NER
100
80
60
40
20
0
Female literacy rate
Access to safe water
Women w/ health care
Access to mass media
Guinea Central - Urban
Female Primary NER
100
80
60
40
20
0
Female literacy rate
Access to safe water
Women w/ health care
Access to mass media
Guinea Central - Rural
Female Primary NER
100
80
60
40
20
0
Female literacy rate
Access to safe water
Women w/ health care
Access to mass media

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**

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**

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**

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**

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**

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 Matrix

	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*0.871 + 0.84*0.807 + 0.86*0.78 + 0.87*0.799)/4 = 0.69