



EDUCATION AND THE SDGs

Occasional Paper #2

Educate A Child
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Foreword

This is the second Educate A Child (EAC) Occasional Paper. The purpose of our occasional papers series is to recognize and bring topics pertinent to out of school children (OOSC) to the fore for discussion and further elaboration.

As the global community embarks on the ambitious Sustainable Development Goals (SDGs) that it has committed to reach by 2030, it is incumbent upon all of us to consider how we will attain them. A first step in education is to determine where there are relationships, how strong they are, and in what direction they flow. This paper is EAC's start on better understanding the role of education in relation to the other 16 SDGs. It comprehensively summarizes a key selection of recent publications from high-profile organizations, with a goal of better understanding what we currently know and what we still need to know about education.

EAC believes that education has a transformational role to play in addressing the development challenges that the world faces today and over the next 15 years. Its primary contribution will focus on the most disadvantaged when it comes to the right to quality basic education. Nevertheless, an understanding of how to contribute to meaningful change in the education sector requires a solid understanding of education's role more generally.

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Acronym list

CBD	Convention on Biological Diversity
CSO	Civil Society Organization
DRC	Democratic Republic of Congo
GDP	Gross Domestic Product
GMR	Global Monitoring Report
ICPP	Intergovernmental Panel on Climate Change
ICT	Information and Communication Technology
MDG	Millennium Development Goal
NGO	Non-governmental Organization
ODI	Overseas Development Institute
OECD	Organization for Economic Cooperation and Development
OOSC	Out of School Children
PPP	Purchasing Power Parity
SCP	Sustainable Climate Practice
SDG	Sustainable Development Goal
SSA	Sub-Saharan Africa
UN DESA	United Nations Department of Economic and Social Affairs
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
UPE	Universal Primary Education

Introduction

Education plays a foundational role in the newly-launched Sustainable Development Goals (SDGs). With a particular focus on improving life opportunities and outcomes for the most marginalized in society, the SDGs were formed to build on the successes of the Millennium Development Goals (MDGs). In addition to serving as the focus for SDG 4 (“ensure inclusive and equitable quality education and promote lifelong learning opportunities for all”), education directly contributes to the goals addressing poverty reduction and reduced inequalities, health and nutrition, economic growth and labor market opportunities, as well as peacebuilding and the promotion of democratic institutions. Primary education, in particular, is recognized as a catalyst to meeting many of the most important development challenges that exist today. As governments and the international community increasingly focus on meeting the needs of citizens in middle income countries, it is crucial to continue to focus on the needs of the most marginalized and disadvantaged. It is equally critical that education programming benefit from the most rigorous research available; this document can guide practitioners toward the areas of most promise. Education has a transformational role to play in addressing all development challenges in the post-2015 era.

Overview and Summary

This document presents a summary of the literature on the impact that education (SDG 4) has on each of the other SDGs. It draws on a number of publications that perform a similar exercise, although it expands upon the scope of research and evidence that is presented (see Table 1). Publications were identified through internet searches, as well as searches of specific organizational websites. Once a list was compiled it was approved by EAC. Of the publications listed, *UNESCO (2014) Sustainable development begins with education*, *UN DESA (2015) How well are the links between education...*, and *UNICEF (2015) The investment case for education and equity* were most useful for the task. These publications compiled a wealth of information on the relationship between education and the SDGs. Additional publications were used to fill in gaps where possible, and to add more recent research findings. In this way, the present document should not be seen as a systematic review of evidence; instead, it comprehensively summarizes what some recent high profile organizational publications have compiled on the topic. In particular, the UN DESA publication summarizes 37 UN agency flagship reports as well as the World Bank, so this document can in turn be considered a review of those publications.

The publications were imported into NVivo 11 software and the documents were searched and mapped to each SDG. Some sources were careful to distinguish the impact of education on a particular SDG from that SDG’s impact on education, so where these differences were explicitly made in the publications, they are also made here as a separate section under the corresponding SDG. While the links between education and SDGs are outlined, a particular focus on investments and/or support for primary-aged out of school children and children in marginalized groups is made where applicable. Investments in education for primary-aged children from marginalized groups, including out of school children, were likely to be strongest in SDGs 3 (health); 5 (gender equality); 8 (economic development); 10 (inequality); and 16 (peace and justice and a reduction in conflict). Overall, education had the strongest links, in addition to the goals mentioned above, with goals 1 (poverty reduction) and 2 (nutrition), primarily through impact on the educational levels of parents. There are a number of SDGs where the evidence or arguments made for an association with education was weak. These include SDGs 12–15 (unless the focus is on changes to education curricula, which can help facilitate knowledge and awareness about

specific environmental problems), and to a lesser extent SDGs 6 (clean water and sanitation); 7 (affordable and clean energy); and 11 (sustainable cities and communities).

Table 1 – Summary of publications used for education & SDG mapping

Organization	Year	Title
Copenhagen Consensus	2015	Costs and benefits of education targets
EAC/R4D	2013	Exclusion from education: The economic cost of out of school children in 20 countries
EAC/R4D	2015	The price of exclusion: Social and economic costs of out of school children in Colombia
FHI 360	2016	The effects of armed conflict on educational attainment and inequality (forthcoming study; produced in conjunction with UNICEF's Learning for Peace programme)
FHI 360	2016	The economic costs of educational inequality in developing countries
Harvard Int'l Review	2015	Investing in all children; Towards equitable, inclusive, and sustainable development
ODI	2016	Who is being left behind in sub-Saharan Africa?
ODI	2016	Who is being left behind in Asia?
UNDESA	2014	Shaping the future we want—UN decade of education for sustainable development
UN DESA	2015	How well are the links between education and other sustainable development goals covered in UN flagship reports?
UNESCO	2014	Sustainable development begins with education: How education can contribute to the proposed post-2015 goals
UNESCO	2015	EFA GMR Policy Paper—Pricing the right to education: The cost of reaching new targets by 2030
UNESCO	2015	Investing in teachers is investing in learning: A prerequisite for the transformative power of education
UNESCO	2015	Education 2030: Equity and quality with a lifelong learning perspective
UNICEF	2013	Sustainable development starts with safe, healthy and well-educated children
UNICEF	2015	The investment case for education and equity
UNICEF	2015	Global goals for every child: Healthy, safe, educated and empowered children and young people are key to a peaceful, prosperous and sustainable world

This paper draws readers' attention to the areas where there are significant evidence gaps in terms of the relationships between education and several of the SDGs. Mostly, these gaps are in topics not covered by the MDGs, which calls for an accelerated effort in filling these gaps. This is discussed in more detail in this paper under SDG 12.

SDG 1: End poverty in all its forms everywhere

Education -> poverty reduction

- **Higher levels of education are associated with lower poverty rates**—The Global Monitoring Report (GMR) calculated there would be 171 million fewer people living in poverty (\$1.25 a day) if all students in low income countries learned basic reading skills. There was a strong correlation between mean years of schooling for ages 25–34 and poverty, when poverty was measured at less than \$2.00 per day. Poverty rates were nine percent lower for each year of schooling (UNICEF 2015 Investment Case for Education). Children with parents that had some formal education and inherited property were “more likely to find off-farm employment and so escape poverty... sons of educated mothers in rural areas were 27 percent more likely to find off-farm employment” (UNESCO 2014).
- **Education breaking inter-generational cycle of poverty**—Rural households in Ethiopia where the household head completed primary school were 16 percent less likely to be chronically poor, between 1994–2009. Household heads in rural Vietnam with greater than primary schooling were 24 percent more likely not to be poor four years later than households with no schooling (UNESCO 2014). For 16 countries in Sub-Saharan Africa (2003), 68 percent of children of uneducated mothers attended school, 87.7 percent of children of mothers with six years of education attended school, and 95.5 percent of children of mothers with 12 years of education attended school (UNICEF 2015 Investment Case for Education). Among lower income households in 12 Sub-Saharan African countries, the chance of being poor is 28 percent for households headed by adults with primary schooling (compared to 50 percent with no education) (UNICEF 2015 Investment Case for Education).
- **Impact of education on income and assets**—Owners of home businesses in Uganda with complete primary education earned 36 percent more than those with no education. More highly educated households in Thailand were more likely to invest profits; returns from household assets increased by seven percent for each year of education (UNESCO 2014).
- **Literacy and poverty**—In Vietnam, ethnic minorities’ inability to speak the national language was identified as a barrier to economic integration and accessing justice under land laws and other policies. Rural ethnic minority households with poor Vietnamese language ability were 1.9 times more likely to be poor than other minority households, and 7.9 times more likely to be poor than majority ethnic groups living in rural areas (ODI Asia).

Poverty reduction -> education

- Women faced “time poverty,” meaning they had less time for things like education (UN DESA).
- Children from worse off groups, including indigenous parents, were “more likely to have less education and less access to basic services” (UN DESA).
- In Benin in 2012, the rate of “education poverty” (defined as having four or fewer years of education) for the highest wealth quintile was 62 percent lower than the rate for the lowest quintile, and the difference was the same as in 2006 (ODI Africa).

How investments in primary OOSCs impact poverty reduction

- Investments in education for primary-aged OOSCs were most likely to have an effect on breaking the intergenerational transmission of poverty. The evidence indicating that higher educated parents were more likely to have higher educated, more productive, and higher earning children tended to be correlational in nature but was observed across most countries and contexts. The effect was particularly strong for disadvantaged children (from rural areas, ethnic/linguistic minority groups, etc.) but in these cases it is likely education would play a facilitating role along with other investments.

Evidence gaps

- It was difficult to distinguish research on the impact of education on economic development and how quality work gained from education impact poverty. There is a need for an explicit poverty focus but the implications were often the same.

SDG 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Education -> Hunger/nutrition

- **Stunting**—In low income countries, the number of children who experience stunting would be 1.7 million less if all women completed primary education, rising to 12.2 million if all women completed secondary schooling. In India, during the first year of life, children whose mothers reached lower secondary education were 48 percent less likely to suffer from stunting, compared to children of mothers with no education. The same figure for Peru was 60 percent (UNESCO 2014).
- **Vitamins and supplements**—In Indonesia, 95 percent and 61 percent of households where mothers completed lower secondary education used iodized salt and vitamin A supplements for their children (respectively), compared to 51 percent and 41 percent with no education (respectively). “Evidence from Australia, Canada, the Republic of Korea and the United Kingdom shows that education contributes to lower obesity levels” (UNESCO 2014).
- **Sustainable agriculture**—Agricultural education and training raises agricultural productivity by developing producers’ capacities, fostering the development of people’s skills and competencies for innovation and generating human capital for research and advisory service. There is a need to attain more advanced levels of education to make use of new ICT-based information sources and technical advice and to respond to new market opportunities and environmental change (UN DESA citing FAO 2014).

Hunger/nutrition -> Education

- Research showed harmful impacts of undernutrition on education outcomes (UN DESA).
- Social protection programs such as cash transfers and school feeding programs led to higher enrollment, fewer dropouts and less child labor (UN DESA citing ILO 2015).

How investments in primary OOSCs impact hunger/nutrition

- The impact of investments in primary out of school children on nutrition, food security and promoting sustainable agriculture is likely minimal, although the reverse relationship is known to be effective (deworming and school feeding on keeping children in school, boosting test scores and other positive outcomes).

Evidence gaps

- The UN DESA paper mentioned the lack of an explicit connection regarding the beneficial effects of health on education. This included a relatively rich body of evidence that pointed to the beneficial impacts of school feeding programs on education and other outcomes for children.

SDG 3: Ensure healthy lives and promote well-being for all at all ages

Education -> Health

- **Child health and mortality**—A Lancet review of child mortality using more than 900 censuses and surveys “found that around half of the under-five mortality reduction from 1970–2009 can be traced to increases in the average years of education of women of reproductive age” (UNICEF 2015 Investment Case for Education). Based on data from 10 African countries, the rate of women who completed primary education who saw a health-care professional for prenatal care was significantly higher than unschooled women, in most cases. Women with primary education had on average 0.7 fewer live births than women with no education (UNICEF 2015 Investment Case for Education). A literate mother was 23 percent more likely to have a skilled attendant at birth. Controlling for household and community factors, the probability of a child receiving immunizations for diphtheria, tetanus and whooping cough would increase by 43 percent if all women in low and middle income countries completed secondary education (UNICEF 2014). If all women had completed primary education, maternal mortality “would have fallen from 210 to 71 deaths per 100,000 births (66 percent)” (UNESCO 2014). In Colombia it was estimated that achieving UPE would reduce the infant mortality rate from 15 to 11 per 1,000 (EAC/R4D Colombia).
- **Malaria**—In the Democratic Republic of Congo (DRC), odds of bed net use were about 75 percent higher if the household head completed primary education level, controlling for other factors. Across 11 Sub-Saharan Africa (SSA) countries and in areas with a high rate of malaria transmission, the odds of malaria presence in children were 22 percent lower when mothers completed primary education (UNESCO 2014).
- **Older adults**—Conclusive research in developed countries showed “consistent decline in mortality levels with education that has been linked to behavioural, psychological and contextual differences among education groups.” Separate studies in Bangladesh and Vietnam found significantly higher mortality among uneducated older adults compared to higher educated comparison groups. In developing countries outside of Africa the mortality rates for women with at least primary education were “36 percent lower than for women with less than primary education,” and in Africa this figure was 14 percent less (UNICEF 2015 Investment Case for Education). “Educated people are better informed about diseases, take preventative measures, recognize signs of illness early and tend to use health care services more often” (UN DESA).
- **HIV/AIDS**—While early in the AIDS epidemic the disease was more prevalent among higher educated groups, those with higher education are now less likely than those with no education to have the disease (UNICEF 2015 Investment Case for Education). Other studies showed that young people with higher education were more likely to have tolerant views of those with AIDS (UNICEF 2015 Investment Case for Education).
- **Adolescent health**—“Education is considered a way to protect people from engaging in risky behaviors... school-based reproductive health education programs can be effective in increasing knowledge and the adoption of safe sexual behavior” (UN DESA).

Health -> Education

- The explicit connection or causal link between health and its impact on education was not often made. Similar to SDG 2, there were rigorous studies on the impact that deworming, school feeding and early childhood nutrition have more generally on later education outcomes.

How investments in primary OOSCs impact health

- The impact of education on SDG 3 is rich with empirical support, but much of the effect is mediated by the educational level of the parents (most often the mother). Investments in out of school children were likely to produce outcomes in terms of reducing risky behaviors during adolescence and improving general health and the adoption of safe practices later in life. Some evidence suggested youth were more likely to be tolerant towards those with diseases such as AIDS. They were also more likely to adopt healthy practices around malaria and other diseases.

Evidence gaps

- “Another surprising gap is the absence of reference in our sample of reports on the links from health to education. The evidence on such links seems strong, and indeed they are routinely presented as one of the social co-benefits of providing access to drinking water and sanitation. It could well be that these links are considered so obvious and already incorporated in development practices that further emphasis on them is not needed” (UN DESA).

SDG 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Targets:

4.1

By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes

4.2

By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education

4.3

By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university

4.4

By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship

4.5

By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations

4.6

By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy

4.7

By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development

SDG 5: Achieve gender equality and empower all women and girls

Education -> Gender equality

- **Demographic and labor market trends**—Trends indicated that higher education for girls was associated with delayed marriage, fertility and childbirth. It was projected that if all girls had secondary education attainment in sub-Saharan Africa and South/West Asia, child marriage would fall from 2.9 million to one million (64 percent) (UNESCO 2014), while early births would fall from 3.4 to 1.4 million (59 percent) (UNESCO 2014). In Brazil it was estimated that 70 percent of the decline in fertility rates from 1960–1980 were explained by education improvements (UNESCO 2014).
- **Attitudes and decision-making**—A host of country-level studies indicated that investments in education for women resulted in attitudes and decision-making that were consistent with gender equality. In Sierra Leone, “an additional year of schooling reduced women’s tolerance of domestic violence from 36 percent to 26 percent”. In Pakistan 30 percent of women with no education believed they had a say over how many children to have, while 52 percent with primary education did. Similarly, in India, young females were 30 percent more likely to have a choice regarding their spousal partner compared to women with no education (UNESCO 2014). In Mauritania, 79 percent of women with no education viewed female genital cutting favorably, compared to 41 percent with lower secondary education (UNICEF 2015 Investment Case for Education).
- **Employment**—Investments in education were associated with an increase in women’s income and an increase in the range of occupations for which they were employed (SDGs and Children; UN DESA).
- **Literacy**—The lack of majority Vietnamese language skills was found to impact ethnic minorities, in particular women, in terms of accessing employment, government services, engaging in markets and receiving social transfers (ODI Asia).

Gender equality -> Education

- **Early marriage and pregnancy**—These factors limited not only women’s possibilities for education, but also the inter-generational transmission of opportunity in the form of their children’s schooling and labor market outcomes (UN DESA).
- **Household income**—An increase in the share of household income contributed by women resulted in improvements in their children’s educational attainment (UN DESA).
- **Targeted pro-equity policies**—Bangladesh had success (in some respects) in promoting gender equality for girls and young women. The country achieved gender parity in education (primary and secondary) through specific public interventions for female students, such as stipends and exemption of tuition fees for girls in rural areas, and a stipend scheme for girls at the secondary level (ODI Asia).

How investments in primary OOSCs impact gender equality

- As indicated above, investments in education for primary-aged out of school children, particularly girls, were likely to have an impact on a number of factors related to gender equality. These include early marriage and childbirth, for which women were more likely to have

their livelihoods impacted, and a range of practices consistent with a lack of gender equality. Educational investments in out of school children would also boost subsequent income and employment prospects.

Evidence gaps

- As noted in the UN DESA publication (2015), this was the SDG that was most consistently linked to education across UN and World Bank flagship reports. A number of empirical studies at the micro level document evidence for the impact of education on factors associated with gender equality, particularly related to the attitudes, decision-making and general household bargaining power of women. A host of studies also looked at cross-national or large-scale trends to emphasize education's correlation or association with aspects of gender equality, with the implicit assumption that education may be associated with a range of positive factors related to human development, that also may influence gender equality.

SDG 6: Ensure availability and sustainable management of water and sanitation for all

Education -> Clean water and sanitation

- Sources showed that in China, educated farmers were more likely to use “rainwater harvesting and supplementary irrigation technology” in times of drought (UNESCO 2014).
- In urban India, when the adult household head completed primary schooling, the probability of water purification through filtering or boiling increased by nine percent, relative to no schooling. The increase was 22 percent when the household head completed secondary schooling (UNESCO 2014).

SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all

Education -> Affordable and clean energy

- Across OECD countries, research showed that those with higher education levels were more likely to employ sustainable household practices related to energy. For example, in the Netherlands higher educated people used less energy, and across 10 countries those with more education were more likely to save water (UNESCO 2014).

How investments in primary OOSCs impact affordable/clean energy

- “The Global Energy Assessment sees education as part of a package in order to achieve this effort, along with feedback, information, and advice. It emphasizes the importance of targeting youth to provide the knowledge and skills about energy use that will allow them to make informed choices as energy users” (UN DESA).

Evidence gaps

- “If education for sustainable energy is really an important component of energy transitions, and in turn energy transitions are identified as a critical element of future paths to sustainable development, then these issues should be covered in more reports than is the case” (UN DESA).

SDG 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Education -> Economic growth and employment

- **Education's impact on Gross Domestic Product (GDP) growth**—A rich range of literature explained the impact of education on macroeconomic growth. While estimates vary, 14 recent studies determined that each additional year of schooling was associated with a median 13 percent increase in GDP (UNICEF 2015 Investment Case for Education). Controlling for macroeconomic factors, an increase of one year would be expected to increase per capita income by 26 percent over the working lifespan (UNESCO 2014). Another stream of literature sought to account for initial education levels in GDP growth. For example, differences in initial education levels explain half of the difference in growth rates over a 45-year period between East Asia and sub-Saharan Africa, as well as two-thirds of the within-region growth in Latin America and the Caribbean between 2005 and 2010 (UNESCO 2014). Comparing Vietnam and Pakistan, in 2005 the average number of years adults spent in school was similar but distributed very differently; in Pakistan half the population had no education while only eight percent had no education in Vietnam. This difference accounted for 60 percent of the difference in per capita growth between 2005 and 2010 (UNESCO Investing in teachers). A 2014 study found significant benefits to country economies when investing in education for out of school children. The costs of out of school children across 28 low and middle income countries ranged from one percent of GDP in Thailand to 10 percent in the Gambia. For all countries, the estimated cost of enrolling out of school children was less than the expected benefit to the country, providing evidence for macro-level benefits to investments in out of school children (R4D/EAC). In Colombia, achieving universal primary education was estimated to increase Colombia's GDP by 2.1 percent per year, which is equivalent to half its 2013 growth rate (R4D/EAC Colombia).
- **Education's impact on private returns**—Additional literature sought to estimate the rates of private (individual wages/income) return to education. One recent study found that an additional year of school led to a 10 percent increase in income across 139 countries. Returns were estimated to be higher for low and middle income countries and for women (UNICEF 2015 Investment Case for Education). The Copenhagen Consensus published the benefits and costs of education targets for the post-2015 development agenda. It included increasing pre-school enrollment in Sub-Saharan Africa from present 18–59 percent; for every dollar spent the benefit was 33 dollars. Increasing primary enrollment from 75 to 100 percent yielded a seven-dollar return on each dollar spent, and improving school quality by increasing student test scores by one standard deviation yielded benefits worth four times the cost (Copenhagen Consensus). The R4D/EAC study supplements its macroeconomic focus with the costs based on foregone labor market wage returns to schooling (R4D/EAC).
- **Productive employment**—Demographic trends indicate that as disadvantaged groups such as women and rural populations gained access to education, they shifted from a choice between agricultural or household-oriented work to an increased supply of labor choices (UN DESA). Higher levels of schooling for mothers in Guatemala resulted in higher education for their children, and each grade completed for their children led to an increase of wages of 10 percent,

“while an increase in the reading comprehension test score from 14 points to the mean of 36 points raised their wages by 35 percent” (UNESCO 2014).

- **Education inequality and wage/employment returns**—Forthcoming research estimated the impact of closing education gaps between marginalized groups on the productive capacity of a workforce. For example, in Nigeria the gender gap in education attainment cost the Nigerian economy \$538 dollars (Purchasing Power Parity) per working age female, which translated to \$17 billion dollars in foregone earnings for the country. In South Africa, disparities between racial groups amounted to \$5,768 dollars per working age non-White individual (FHI 360 EPDC).

Economic growth and employment -> Education

- **Shift from agricultural to industrial/technological industries**—This was often cited as a causal reason for the increases in educational levels seen across regions.
- **Child labor**—This may also be seen during economic growth and would impede access to education.
- **Employment-education connection**—The types and diversity of jobs may influence content of the education system. Some UN reports maintained that especially in high income countries, where technological or “green” jobs were plentiful, education curricula were tailored to the skills required.

How investments in primary OOSCs impact economic growth and employment

- The impact of investments in primary-aged OOSCs on economic growth were most likely to be seen in the private rates of return studies mentioned earlier, as well as in impacts on GDP growth. While early on it was thought that primary schooling had the highest rates of return to educational investments, recent studies suggested returns were greater at the secondary and tertiary levels. Of course, this would suggest individuals having attained primary education in the first place.

SDG 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Education -> Industry, innovation and infrastructure

- Special emphasis was made on the role of education as influencing innovation capacity and providing the foundation for technology absorption processes and diversification. Specialized knowledge and experience in science and engineering may matter more than general managerial capabilities and intermediate-level technical skills in explaining innovation excellence by high-tech firms. It was noted that the development of wireless telecommunications and wireless education enabled countries lagging behind others to leapfrog over the expensive investment in infrastructure that mobilized the finances of developed countries in the twentieth century (UN DESA).

SDG 10: Reduce inequality within and among countries

Education -> Inequality

- **Income inequality**—Across 114 countries for the period 1985–2005, an extra year of average education was associated with a reduction of the income Gini coefficient (a measure of inequality between individuals) by 1.4 percent (UNICEF 2015 Investment Case for Education citing Patrinos and Psacharopoulos, 2013). In France, Malaysia and Brazil, the Gini coefficient decreased by roughly seven percent over two decades as the share of the population with secondary education grew (UNICEF 2015 Investment Case for Education).
- **Government education investments**—On average, in low-income countries, 46 percent of public education resources were allocated to educate the 10 percent of students who were most educated. In lower middle income countries, the percentage was 26 and in upper middle and high income countries, the percentage was 13 (UNICEF 2015 Investment Case for Education).

Inequality -> Education

- **Household wealth inequalities**—Cross country analysis indicated that children from the poorest 20 percent of households were four times as likely to be out of school as those from the wealthiest (40 percent compared to 10 percent) (UNICEF 2015 Investment Case for Education citing UIS).
- **“Never entry”**—This concept refers to children who never enter the school system. Never entry rates were almost non-existent for children from the wealthiest 20 percent of households, except for a few very low income countries. Meanwhile, the countries with the highest rates of non-entry for children from the poorest household wealth quintile were highest in West Africa. In Guinea, for example, 62 percent of children from the poorest households will never enter school, which is nine times the rate from the wealthiest households. “Countries with the lowest average rates of never entry tend to have lower inequality levels than countries with high average rates of never entry” (UNICEF 2015 Investment Case for Education).
- **School survival**—Across 28 countries, the average percentage of the poorest quintile who reach the end of primary was 53 percent. The highest rates were in Indonesia and Peru, which have more equitable completion rates for disadvantaged groups relative to advantaged groups (UNICEF 2015 Investment Case for Education).
- **Literacy and educational attainment**—In Bangladesh, the literacy rate for people in households where at least one member had a moderate disability was at least as high as among households where no members suffered from any disability; however, this trend was reversed in the case of severe disabilities (ODI Asia). In case studies of Benin and Nigeria, the Overseas Development Institute (ODI) found that education inequalities by urban/rural area and ethnicity were wide and are increasing. For example, in Benin those ethnicities and regions with the highest rates of “education poverty (four or more years of schooling) improved the least, such that the gap between these and other groups grew” (ODI Africa).

How investments in primary OOSCs impact reduced inequality

- The most direct way to improve inequality in education and subsequent employment and wage inequalities is to provide schooling for disadvantaged children. As demonstrated, access was

highly associated with different measures of inequality, and the most disadvantaged groups were the most likely to be out of school. These were often the groups most likely to suffer from a range of other problems.

- Nomadic and herder communities such as the Karamajong, Peulh or Touareg drop out the most. According to the most recent data available, from 1989, there were an estimated 30–40 million nomadic people in the world, with average enrollment rates much lower than the global average. A rough estimate of 2–3 million children were not in school due to factors related to their nomadic cultures (GPE 2012). Approximately three to five percent of the out-of-school population was from nomadic cultures, meaning that nomadic children were eight times more likely to be out of school than the average (UNICEF 2015 Investment Case for Education).
- Balescut and Elkindh (2006) estimated that 90 percent of children with disabilities in Africa were out of school. In addition, children with disabilities, including learning, speech, physical, cognitive, sensory disabilities or emotional difficulties, who were enrolled were likely to drop out (UNICEF 2015 Investment Case for Education).

Evidence gaps

- For some SDG areas, there is a relative simplicity to the messages and the links that were put forward, to the point that it at times difficult to separate advocacy from evidence-based messages. Taking SDG 10 as an example, the messages regarding the links between education and inequality emphasized in the reports analyzed here reflect contradictory messages and an imperfect understanding of the way in which these links operate. Going forward, it is important to understand whether this lack of clarity reflects the state of scientific knowledge, or inadequate synthesis of that knowledge in UN flagship reports (UN DESA).

SDG 11: Make cities and human settlements inclusive, safe, resilient and sustainable

Education -> Sustainable cities and communities

- In the U.S., a one percent increase in the proportion of tertiary education graduates living in a city was associated with a 0.5 percent increase in output (UNESCO 2014).
- Negative findings included the fact that higher educated individuals in the fastest growing cities were more likely to possess a private vehicle and less likely to give up use despite traffic congestion and air pollution problems (UNESCO 2014).
- Higher levels of education were associated with strengthened understanding of warnings and disaster preparedness plans (UN DESA).
- “Some have even estimated that investments in female education could be a more cost-effective carbon emissions abatement strategy than more direct strategies, due to the strong impact education has to lower fertility rates and population” (UNICEF SDGs and Children).

SDG 12: Ensure sustainable consumption and production patterns

Education -> Responsible consumption and production

- A survey of farmers in 10 African countries showed that each additional year of education reduced the probability of no adaptation practices (to climate change) by 1.6 percent (UNESCO 2014).
- Many governments, non-governmental organizations (NGOs), UN agencies and companies increasingly emphasize the importance of learning and capacity-building as they search for solutions to sustainability challenges, including climate change, disaster risk management, biodiversity loss and sustainable production and consumption (UNESCO, 2012). Civil society organizations (CSOs) promoted sustainable climate practices (SCP) through a wide variety of activities, including research, advocacy, training, awareness-raising, education, networking and catalyzing multi-stakeholder partnerships (UN DESA).

Evidence gaps

- “Another area of concern—and for improvement—is the low number of connections made between education and SDGs 12 to 15. These are areas that were not covered by the MDGs. Connections between SDG 12 (ensure sustainable consumption and production patterns) and education were most covered in reports by UNESCO (reports on education for sustainable development), UNEP and the World Bank. Connections between education and climate change were picked up by only a few organizations (UNESCO, UNEP, UNDP and the World Bank) and were missing in other reports. As mentioned in section two, an analysis of the Intergovernmental Panel on Climate Change (IPCC) Working Group II report from 2014 (IPCC, 2014) was also included. The report contained very few links to education. Hence, in this particular case, it cannot be said that the IPCC reports filled gaps not addressed by the UN system. The strongest messages in relation to links to SDG 15 on terrestrial ecosystems come from UNESCO, UNEP and CBD. In general, links between education and the “new” SDGs were only found in recent reports that specialized in sustainability-related topics (e.g., for SDG 12—UNEP report on sustainable consumption and production or UNESCO reports on education for sustainable development). Consideration of these links is yet to be integrated into a wider system perspective of education. Lack of any reference to education in relation to oceans and seas is also an area that deserves attention. While there is certainly a need to raise awareness about anthropogenic influence on oceans, for example, pollution that threatens marine biodiversity and overfishing, no report in our sample covered this topic. Connections between education and biodiversity loss or unsustainable consumption and production patterns made in various reports may have implicitly covered these issues to some extent. However, to date, there is no assessment that would address education in relation to policies to conserve and sustainably use oceans, seas and marine resources in a comprehensive manner; this is a major gap, which will need to be addressed in coming years. Weak coverage of SDGs 12 to 15 comes as a surprise given UN’s efforts to promote education for sustainable development. The United Nations Decade of Education for Sustainable Development (2005–14) aimed to integrate the values inherent in sustainable development into all aspects of learning in order to encourage changes in behavior that allow for a more sustainable and just society for all (UNEP, 2012, 2014;

UNESCO, 2009, 2012, 2014). Its scope covered a wide range of areas, including climate change, biodiversity, water, SCP and disaster risk reduction (UNESCO, 2014). Yet, while education for sustainable development is recognized and advocated as important in all these areas (UNESCO, 2012), so far this has not translated into systematic incorporation of lessons learned, challenges and policy recommendations from these efforts into UN flagship reports, including some from UNESCO. Efforts to bridge this gap and broadly share the lessons learned from these programs within the UN system could be an avenue for progress in coming years” (UN DESA).

SDG 13: Take urgent action to combat climate change and its impacts

Education -> Climate action

- In the 30 OECD countries that participated in the 2006 assessment, a one-unit increase in the awareness index (of complex environmental issues) was associated with an increase of 35 points on the environmental science performance index (UNESCO 2014).
- In 47 countries covered by the 2005–2008 World Values Survey, the higher a person's level of education, the more likely she was to express concern for the environment. Furthermore, in the 2010–2012 World Values Survey, when forced to choose between protecting the environment and boosting the economy, those respondents with secondary education favored the environment more than those with less than secondary education (UNESCO 2014).
- Data from the International Social Survey Programme on 29 mostly high income countries similarly showed that the share of those disagreeing with the idea that people worry too much about the environment rose from 25 percent of those with less than secondary education to 46 percent of people with tertiary education (UNESCO 2014).

How investments in primary OOSCs impact climate action

- Basic education provided the foundation of carbon-friendly technology absorption process, but a large enough pool of qualified engineers and researchers was also crucial (UN DESA).

SDG 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Education -> Life below water

- The documents reviewed showed no direct evidence for this goal, although it can be surmised that higher levels of education create more awareness about the importance of oceans and marine ecology for sustainable development. To understand this connection better requires additional research.

SDG 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Education -> Life on land

- In almost all countries participating in the 2010 International Social Survey Programme, respondents with more education were more likely to have signed a petition, given money or taken part in a protest or demonstration, in relation to the environment, over the past five years. In Germany, while 12 percent of respondents with less than secondary education took such political action, the share rose to 26 percent of those with secondary education and 46 percent of those with tertiary education (UNESCO 2014).

SDG 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

Education -> Peace, justice and strong institutions

- **Voting and participation in democratic systems**—Public opinion surveys across 36 low and middle income countries showed that there was a relationship between education and higher levels of voting, and that the relationship was stronger in countries with lower levels of education. In India, education also had a positive effect on the probability of campaigning, discussing electoral issues, attending rallies and establishing contacts with local government officials in the states of Madhya Pradesh and Rajasthan (UNESCO 2014). In India only about four percent of all candidates for state assembly elections were female, and the mean vote share of female candidates was about five percent. Halving the gender literacy gap would likely increase the share of female candidates by 21 percent and the share of votes obtained by women candidates by 17 percent (UNESCO 2014). In Brazil, 53 percent of voters said they would vote for a competent but corrupt politician, while 25 percent of respondents with at least some college education said they would do the same. In 31 countries, as part of the World Justice Project (2009–2011), those with secondary education were one-sixth more likely to complain about poor government services (UNESCO 2014). Across 18 Sub-Saharan African countries, voters with primary education were 1.5 times more likely to express support for democracy than those with no education (UNESCO 2014). In Colombia, it was estimated that if all out of school children completed primary school, they would be 1.5 times more likely to vote and their propensity to vote in the next presidential election would increase from 31 percent to 47 percent (EAC/R4D Colombia).
- **Intolerance**—The degree to which people express intolerance in values surveys decreased with increasing education levels. In Latin America, those with secondary education were 47 percent less likely to express intolerance of other racial groups, and in Arab States people with secondary education were 14 percent less likely to express intolerance towards other religions (both compared to primary) (UNESCO 2014). In Sub-Saharan Africa, those with secondary school completion were 23 percent less likely to express intolerance towards those with HIV and in Central/Eastern Europe those with secondary education were 16 percent less likely to express intolerance towards immigrant groups (UNESCO 2014).
- **War and Conflict**—A study of over 100 low and middle income countries from 1960–2010 showed that countries with high rates of education inequality were twice as likely to experience conflict in the following years. A subsequent study found that conflict exacerbated education inequalities by gender, wealth and other dimensions. For example, conflict worsened gender equality in educational attainment for females by 5.4 percent in fragile countries. The study found that the effects increased over time (FHI 360/EPDC 2014, 2015). If the male secondary school enrollment rate was 10 percent higher on average, the risk of war would decline “by a quarter... In a country with a high ratio of youth to adult population at 38 percent, doubling the percentage of youth with secondary education, from 30 to 60 percent, would halve the risk of conflict” (UNESCO 2014). In 55 low and middle income countries, a two-fold increase in

education inequality doubled (3.8 percent to 9.5 percent) the likelihood of conflict (UNESCO 2014). In 2010 children in conflict-affected countries were three times more likely to miss primary school than other children (UNICEF 2015 Investment Case for Education citing World Bank).

Peace, justice and strong institutions -> education

- “Juvenile crime is positively associated with local unemployment and poverty, and decreases with family income and education (World Bank, 2007)” (UN DESA).
- “Homicide and armed violence occur most frequently in poverty-stricken urban areas characterized by lack of employment, poor standards of housing, overcrowding and low standards of education and social amenities (UNDP, 2014). Studies show a greater prevalence of physical violence by parents toward children in countries with lower education, literacy, and income (World Bank, 2013)” (UN DESA).

How investments in primary OOSCs impact peace, justice and strong institutions

- It was estimated that directly investing in out of school children would increase voter turnout and participation in democratic processes (R4D/EAC Colombia study).

SDG 17: Strengthen the means of implementation and revitalize the global partnership for sustainable development

Education -> Partnerships for the goals

- The documents reviewed provided no direct evidence for this goal, although it can be surmised that higher levels of education can create better awareness about the importance of partnerships for sustainable development and for linking across the SDGs. More research is needed to build an evidence base for this goal.

Conclusion

It is clear from this review that education serves as a foundational component for all of the SDGs. While the links have yet to be articulated clearly for some of the more specific goals, the importance of education as a pillar for the achievement of human development challenges is both indisputable and comprehensively established. To reiterate, investments in education for primary-aged children from marginalized groups, including out of school children, were likely to be strongest in SDGs 3 (health); 5 (gender equality); 8 (economic development); 10 (inequality); and 16 (peace and justice and a reduction in conflict). Education overall had the strongest links, in addition to the goals mentioned above, with goals 1 (poverty reduction) and 2 (nutrition). On the other hand, evidence was not as well articulated for SDGs 12–15 (sustainable economies, climate action and ocean and land conservation), and to a lesser extent SDGs 6 (clean water and sanitation); 7 (affordable and clean energy); and 11 (sustainable cities and communities). Moving forward, it is crucial that investments in education for the most marginalized are made based upon solid research and evidence. This guide can be used to point practitioners toward the areas of most promise.