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**Learning, literacy and sustainable development:  
Inclusion, vulnerability, and the SDGs**

**Daniel A. Wagner**

Pope Francis has called on the world community to address sustainable development, stating that “no renewal of our relationship with nature [can be achieved] without a renewal of humanity itself.” This chapter reviews the ways in which literacy and education address the challenges of the new 2030 United Nations Sustainable Development Goals (SDGs). A number of key issues are discussed. *First*, international and national development commitments to literacy and basic education are reviewed and progress is noted. *Second*, we consider the impact of globalization that is already putting demographic, migration, technological and other pressures on our planet. *Third*, we look at how climate and environmental changes intersect with and carry their own impending consequences for sustainable development. *Fourth*, we review how literacy and schooling can foster both awareness and complex thinking skills concerning the complexities of sustainability challenges, and how to prepare the next generation of children and youth. *Fifth*, the vulnerability of poor and marginalized populations is delineated, along with new ways for multi-sectoral partnerships in agriculture and health. *Sixth*, implications are drawn with respect to the breadth of the SDGs, and their interaction with literacy education. *Overall*, we argue that greater investments in content awareness and critical thinking skills are needed to help people learn about and manage sustainability, and that special consideration must be given to the impact of sustainability on poor and marginalized groups.

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## Learning, literacy and sustainable development

We are not faced with two separate crises, one environmental and the other social, but rather one complex crisis which is both social and environmental. ... There can be no renewal of our relationship with nature without a renewal of humanity itself. ... What kind of world do we want to leave to those who come after us, to children who are now growing up? The question not only concerns the environment in isolation; the issue cannot be approached piecemeal.

– Pope Francis, *Laudato Si Encyclical* (2015)

Education either functions as an instrument which is used to facilitate integration of the younger generation into the logic of the present system and bring about conformity or it becomes the practice of freedom, the means by which men and women deal critically and creatively with reality and discover how to participate in the transformation of their world.

— Paulo Freire, *Pedagogy of the oppressed* (1972).

Few have said it as succinctly as Pope Francis: our planet is at risk. Much of what we do in our everyday lives, and in our seeking out of economic prosperity, must be rethought in an era where sustainability and planetary health must take precedence.<sup>1</sup> Development can no longer be understood as a single immutable concept, such as income growth per capita. Development should be defined according to the problems addressed, context, population and so forth. However defined, it must be seen in relation to the costs associated with more pressure on the available resources in a single sphere called Earth. This has not been and will not be easy. Nation building – indeed much of human well-being – has been dependent to no small degree on resources taken from the planet for the benefit of people – land, water, air, animals, agriculture, and much more. Should these resources continue to be depleted at current rates, development itself will need to be rethought. This is, of course, a primary reason for the word ‘sustainable’ in the new 2030 United Nations Sustainable Development Goals (SDGs). As we shall see, this perspective is also very much in line with the life work of Paulo Freire.

In this paper, we consider the ways in which education can be linked to sustainable development. These linkages may take a number of forms, as discussed each in turn. First, there is already a long history of international and national development commitments to

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<sup>1</sup> On the notion of planetary health, see:

[http://assets.rockefellerfoundation.org/app/uploads/20150625163005/Planetary-Health-Special-Report\\_06.25.14.pdf](http://assets.rockefellerfoundation.org/app/uploads/20150625163005/Planetary-Health-Special-Report_06.25.14.pdf) Accessed June 1, 2016.

education (including learning and literacy<sup>2</sup>). Second, we must consider the impact of globalization that is already putting demographic and other pressures on our planet. Third, climate and environmental changes need to be understood as they intersect with, and carry their own impending consequences for, sustainability. Fourth, schooling is a fundamental locus of where learning about sustainability, climate change and environmental conservation must take place in order to prepare the next sustainable generation of children and youth. Fifth, vulnerability and sustainability are inextricably linked, and this is nowhere more evident than in how education and other sectors – such agriculture and health – might work more closely together. Sixth, a number of implications are drawn with respect to the new era of the SDGs. Finally, we conclude with a set of recommendations as to how educators may play an even more effective role in promoting sustainable development.

## **I. Commitments to education and development**

*Background.* The World Conference on Education for All in Jomtien (Thailand) was a watershed moment in international education and development. Held in 1990, the conference embraced two key challenges: first, to significantly increase access to education for children in poor countries; and second, to promote the quality of learning in education.<sup>3</sup> A decade later, at the World Education Forum (WEF) in Dakar in 2000, these same two challenges were enlarged in a more detailed list of six Education for All (EFA) targets, including a 50 per cent improvement in levels of adult literacy, especially women.<sup>4</sup> Later in 2000, the international community adopted the United Nations Millennium Development Goals (MDGs) for 2015, which had a narrower focus in education, mainly through the second of eight major goals on universal primary education and the third one on gender equality and empowerment of women (UN 2000).<sup>5</sup> Later this month, the UN will ratify a new set of Sustainable Development Goals (SDGs) that will include: “By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy.” These global efforts have been linked not only to substantive increases in international development assistance to education, but also to greater attention in the broader public arena regarding the importance of literacy on a global scale.

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<sup>2</sup> Education is used here as a gloss for human learning as well as its most common basic cognitive goal – literacy. At various points these terms are used in specific ways, mainly due to the research that supports varied scientific approaches.

<sup>3</sup> The subtitle of the Jomtien conference was “Framework for action to meet basic learning needs.”

<sup>4</sup> The six goals of the *Dakar Framework for Action*, to be met by 2015, were the following: (1) expansion and improvement of early childhood care; (2) compulsory and free good quality primary education; (3) equitable access for all to appropriate learning programs; (4) a 50 per cent improvement in levels of adult literacy, especially women; (5) elimination of gender disparities and achievement of gender equality; and (6) improved quality of measurement of learning outcomes (UNESCO 2000, pp. 15–17).

<sup>5</sup> While a focus on universal primary education (UPE) is no doubt the major contributor to achieving adult literacy in the long run, the MDG emphasis on UPE also tended to draw attention away from direct work on adult literacy programming.

Consequently, over the past two and half decades since the Jomtien Conference, major progress in educational development has been made in low-income countries (LICs). In sub-Saharan Africa, for example, primary school enrolment climbed from under 60 per cent to nearly 80 per cent, putting millions of additional children in school; and adult literacy rates have climbed to about 61%, with modest gains in gender parity.<sup>6</sup> Still, when compared with the stricter standards of the wealthier OECD countries, the lower income countries lag far behind in adult literacy.<sup>7</sup>

Even before the Dakar WEF conference in 2000, it was clear that the quality of education was a serious concern in low-income countries. For example, a World Bank national household survey in rural Bangladesh found that three years of schooling had approximately zero value in terms of learning achievement.<sup>8</sup> In other words, the effort of getting children into school had little or no payoff with respect to educational gains. That was in 1999. Today, after more than 15 years of substantial investments in education development, new studies are appearing with the same basic result: in many countries, children cannot read a single word even after attending school for several years (in other words, schooling does not guarantee literacy).

*Learning and literacy.* Over time, various rationales have been put forward to justify investments in learning and literacy: economics (higher skills lead to economic growth); social development (women's empowerment); political science (growth of democracy, national identity), education (literate parents foster literate children), and now, with the new SDGs, a sustainable planet. Even so, literacy is not only a United Nations goal – it is also a key outcome of schooling in every nation in the world. Further, the science of literacy acquisition demonstrates the important and reinforcing linkages in literacy from childhood to adulthood – as part of lifespan human development.<sup>9</sup>

To have a realistic policy goal of increasing learning and literacy, we need to have a clearer understanding of socio-cultural contexts. Much of the research on literacy in Western-type school settings has been only partially relevant to those interested in the promotion of literacy around the world.<sup>10</sup> The picture began to change at the turn of the 21st century, as research on global reading began to grow. European and American research studies have made the case for teaching early reading using the phonics (decoding) approach to acquisition, along with an important input of reading support by parents and teachers inside and outside of school. This Western approach to reading achievement has already contributed to research in low-income countries, but nevertheless languages and scripts vary in important ways around

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<sup>6</sup> These numbers for adult literacy are, nonetheless, well below the target levels of the EFA goals.

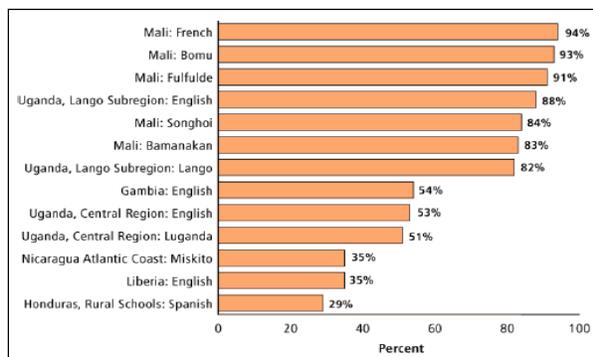
<sup>7</sup> OECD (2013).

<sup>8</sup> Greaney, et al. (1999).

<sup>9</sup> This also builds on the notion of “lifespan” literacy development (Wagner, 2010).

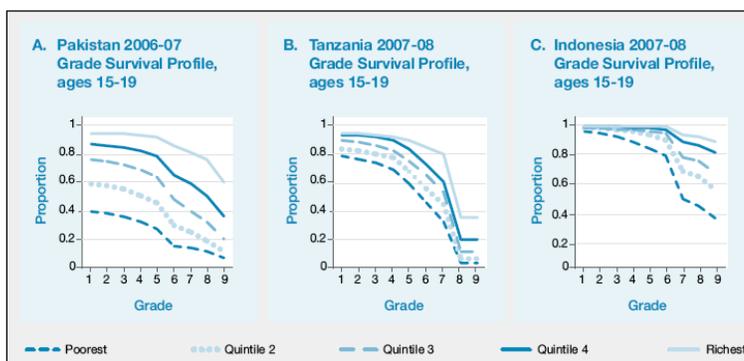
<sup>10</sup> Wagner (2015)

the world. We can be less sure of experimental interventions or statistical analyses when contexts vary so dramatically. For example, in non-alphabetic scripts, such as Chinese, a strict decoding approach will be of little value.<sup>11</sup> When letters have multiple forms (such as in Telugu and Kannada in South India), the emphasis on early letter discrimination may be of relatively greater importance.<sup>12</sup> Finally, although the use of new technologies in education is expanding rapidly, we are only now beginning to have more evidence on its effectiveness in the low-income countries, and some promising new developments (see below).<sup>13</sup>



**Figure 1. Percentage of children who cannot read a single word after two years of school, 2008–2009.**  
Source: adapted from Gove and Cvelich 2010, p. 10).

In the research policy arena, it is crucial to understand the pros and cons of language of instruction (LOI) in schools as a key determinant of literacy achievement. Often the decision on national or official language(s) is based on such factors as major or dominant linguistic groups, colonial or postcolonial history, and the importance of a given language to the interests of economic development. Official languages are typically those most commonly used in primary and secondary school, although there may be differences between languages used in beginning schooling and those used later on. One result of the continuing policy debate on LOI is that reading proficiency in any language remains quite low in many low-income countries.<sup>14</sup> **Figure 1** shows reading levels at end of



**Figure 2. Comparison of youth aged 15–19 years who have completed a given Grade, by Income Quintile, various Years.**  
Source: adapted from World Bank 2011, p. 18.

second grade or later in selected languages and countries. The use of mother-tongue instruction in primary education remains a topic of continuing debate.<sup>15</sup> Of course, one of the key barriers is the extent to which youth drop out of school, as shown by the youth educational survival rates in **Figure 2**.

<sup>11</sup> Taylor, 1999.

<sup>12</sup> Daswani, 2001.

<sup>13</sup> See Wagner et al., 2010 for a study in India; Wagner (2014) for a review of mobiles for improving reading; also, Wagner (2009) on pro-poor ICT solutions, see: <http://bit.ly/INFQMDh>, accessed June 1, 2016.

<sup>14</sup> Gove and Cvelich, 2010.

<sup>15</sup> Alidou et al., 2006; Wagner, et al. (1989).

Societies today are changing rapidly, along with a global economy that requires ever more skills and more learning in a competitive marketplace. To understand, predict and cope with these transformations, and to be better prepared for a sustainable future, we need to understand the ways for societies to cope with changing demands on human skill and human development.

## II. Globalization

*Historical background.* In 2005, Thomas Friedman published a highly influential book entitled *The world is flat*.<sup>16</sup> In it, he described the kinds of changes that the Internet and other communications technologies, global trade and cultural transfer were going to happen in the coming decades. Part of his argument was that this process – termed by some the advent of public awareness of globalization – would flatten (or reduce) many differences in the world, differences that had been maintained by the distances of time and space between cultures around the world. Cultural differences (and insularity) would begin to fade away, leading to a world where competition would necessarily grow between nations, cultures, and corporations. Friedman further posited that the market would help drive competition between the skills (and education) of workers, thereby increasing global productivity and connectivity – thought (by some, but not all) to be a positive outcome.

Of course, globalization (and flatness) did not begin in 2005. If we think historically, globalization began with the first international travelers, such as Marco Polo and Ibn Khaldun, who brought back facts, objects and wondrous tales from their explorations of previously unknown cultures. Some centuries later, imperial colonizers and missionaries traveled the world to spread their power, their languages and their gospel in ways that would forever change the peoples with whom they had contact. Indeed, it has been noted that “[t]he processes that are usually meant when we speak of globalization ... have existed for some 500 years.”<sup>17</sup> In today’s terms, however, globalization has been defined as “a set of processes by which the world is rapidly being integrated into one economic space via increased international trade, ... production and financial markets, ... a commodity culture promoted by an increasingly networked global telecommunications system.”<sup>18</sup>

Globalization has also had a major impact on the field of education. The ways that we think about education, literacy and even childhood itself have been directly affected by the globalization of knowledge, attitudes and values. What is a “good” education or a “happy” child? Many points of view are possible. Even so, it is clear that a near worldwide consensus

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<sup>16</sup> Friedman (2005).

<sup>17</sup> Wallerstein (2000, p. 250), cited in Breidlid (2013).

<sup>18</sup> Gibson-Graham (2006), cited in Stromquist and Monkman (2014, p. 1).

has been achieved that views education as a gateway to social mobility, positive economic outcomes and global citizenship. This consensus has been driven by many factors, not the least of which is the perception by families and communities the world over, and among the poor as much as in wealthier classes, who see the demonstrable consequences of education on the lives of their children and those of their neighbors.

*Demographic change.* Over the last quarter century, the world's population has increased by about 50% – from 5 to nearly 7.5 billion people today, with most of this growth happening in developing countries.<sup>19</sup> In many countries, and especially in developing countries, the rate of change across age groups has been dramatic particularly for youth and young adults. Low-income countries have a clear 'youth bubble' that is creating a serious problem for both educational and economic planners.<sup>20</sup> The pressure or 'stress' of this bubble, when linked to the school leaving issues, makes it exceedingly difficult to assume that educational achievement or higher numbers of high school or university diplomas will necessarily lead to employment or to increased GNP, as there are just too many young people entering the workforce for the number of jobs available. In other words, particular regions and sub-regions of the world have still not taken sufficient control over population growth, even as some parts of the world done so (e.g., Europe, China, Central Asia).

*Migration.* An important consequence of demographic growth, high unemployment and climate change is human migration. In the period from 1990 to 2010, the number of international immigrants increased by nearly 60 million people worldwide, with over 200 million people living outside their country of origin by 2010.<sup>21</sup> Internal migration within countries is about the same as the documented international migration rates with both showing important increases in the global South over recent decades. This seems to occur most notably as part of worldwide urbanization, as rural families search for labor opportunities in cities.<sup>22</sup> The broad trends of migration are massive and growing, with major consequences for education and social services. They are also highly sensitive to regional political instability, national conflict, and natural disasters, giving rise to a new subfield of education in fragile and conflict zones.<sup>23</sup>

Although migration research often focuses on changes in the labor market, the implications for literacy, and for educational systems more broadly, are sometimes overlooked. In each instance of translocation, children and youth confront the challenges of adapting to a new environment that may expose them to different languages, dialects and cultures – with major

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<sup>19</sup> [http://esa.un.org/unpd/wpp/Publications/Files/Key\\_Findings\\_WPP\\_2015.pdf](http://esa.un.org/unpd/wpp/Publications/Files/Key_Findings_WPP_2015.pdf)

<sup>20</sup> UNESCO GMR 2015, p. 21.

<sup>21</sup> Department of Economic and Social Affairs, United Nations, official statistics, <http://esa.un.org/migration/p2k0data.asp>. Accessed June 1, 2016.

<sup>22</sup> UNDP (2009); International Organization for Migration (2010); Skeldon (2012).

<sup>23</sup> See, for example, UNESCO-GMR (2011); and Pigozzi et al. (2014)

consequences for the learning contexts of their everyday lives. In schools, student migrants must cope with contrasts in culture, lifestyle and language of instruction, and then will have to demonstrate skills and achievement that may vary dramatically from their culture of origin.<sup>24</sup> Curricula that assume cultural and linguistic common denominators among students and teachers are often insufficiently aligned with these new trends in the diversification of student populations. Often, there is too little support for teachers as they try to meet the needs of students whose cultural and linguistic backgrounds are significantly different from their own.

Closely tied to both globalization and migration are the massive changes in urbanization. An average of only about 30% of the world's population lived in urban areas worldwide, while this number has jumped to about 54% in 2014.<sup>25</sup> Today, nearly 90% of the remaining rural populations in the world live in Africa or Asia (especially influenced by the large populations in India and China). Perhaps less well-known is the fact that half of the world's urban residents live in relatively small cities of less than 500,000 inhabitants, while only around one in eight live in the largest 28 mega-cities with more than 10 million inhabitants.<sup>26</sup> These large population transfers have many causes, but most seem related to the perception, among rural communities, that life and livelihoods are better in the city. Aspects of this presumption may be both accurate and inaccurate – and is certainly quite variable across individuals and groups – depending on the values that are placed on urban settings (e.g., proximity to better employment, health services, sanitation, schools, and so forth).

### **III. Climate and environmental change**

*Background.* As the well-known cognitive scientist Steven Pinker famously put it, “The goal of education is to make up for the shortcomings in our instinctive ways of thinking about the physical and social world.”<sup>27</sup> Few would doubt that climate and environmental changes run counter to what our human instinctive ways of existence, even if most of the world is now fully aware of catastrophic fluctuations that are currently taking place. Only in recent years have we become able to call climate change a global crisis.

Yet, over two decades ago, Robert Kaplan, in a highly publicized and very prescient article in the *Atlantic Monthly*, predicted – what he called a “premonition” – that the next few decades in West Africa were likely to bring “[d]isease, overpopulation, unprovoked crime, scarcity of resources, refugee migrations, the increasing erosion of nation-states and international borders, and the empowerment of private armies, security firms, and international drug

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<sup>24</sup> Yoshikawa and Kalil (2011); Suárez-Orozco, Rhodes and Milburn (2009).

<sup>25</sup> United Nations (2014, p. 8)

<sup>26</sup> United Nations (2014).

<sup>27</sup> Cited in Williams (2011), from Pinker (2007, p. 439)

cartels.”<sup>28</sup> One may reflect on recent years – of Ebola, massive out-migration, civil conflict, rising income inequality – to see how close he was to seeing the future. And, this is not only in one region of Africa, but increasingly in the Mideast, parts of South Asia, the Balkans, and other unstable parts of the world. More recently, the well-known climatologist, James Hansen, and colleagues have stated that our whole civilization is now at serious risk.<sup>29</sup>

*Climate prognosis.* Climatologists and others have been forewarning problems of changing environment for more than a century, with ever more greenhouse gases (especially CO<sub>2</sub>) being emitted by industry into the atmosphere, the rising temperatures in the oceans, and the measurable changes in weather patterns.<sup>30</sup> During this same time, concern has grown about the depletion of forests that absorb CO<sub>2</sub> (such as in the Amazon basin), and the melting of glacial ice at the North and South poles. In addition, there is increasing concern about the declines in biodiversity (both flora and fauna) through which hope of better adaptation to such global environmental changes must reside. Fewer species of fish, insects, and diversity of land resources will necessarily limit the ability of the earth’s complex ecosystems to survive as climate warming, and related consequences, challenge our planet’s ability to adapt.<sup>31</sup> In sum, it is clear that the earth’s changing ecological ‘footprint’ is no longer sustainable.

*Types and timing of sustainability.* Embedded within the public discourse concerning sustainability is a major debate about what more precisely needs to be sustained. Amidst the growing research on this topic, three major types of sustainability have been described.<sup>32</sup> First, there is social sustainability, maintaining the local and regional communities that could be torn asunder by the effects of environmental change. Second, economic sustainability refers to the need to maintain a balance between the natural resources and human consumption that can generate goods and services without degradation of the balance between the two, and without increasing global economic inequities. Third, environmental sustainability focuses on the limitations within the biophysical environment – protecting the planet. Each type of sustainability has its proponents, possibilities and challenges. It has been said that the “world will in the end become sustainable, one way or another.”<sup>33</sup> Policymakers can choose the timing, types and levels of the transition, or natural depletion and pollution will dictate the terms in a less planned and abrupt manner.

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<sup>28</sup> Kaplan (1994, p. 3).

<sup>29</sup> Hansen, et al. (2015); <http://www.atmos-chem-phys-discuss.net/15/20059/2015/acpd-15-20059-2015.pdf>

<sup>30</sup> Arrhenius (1896), a Nobel Prize winning chemist, first wrote about carbon dioxide concentrations as having a deleterious affect on the atmosphere.

<sup>31</sup> Quotation from Louv (2015) is at: Interview: <http://news.nationalgeographic.com/news/2013/06/130628-richard-louv-nature-deficit-disorder-health-environment/>. Accessed June 1, 2016. Also, see useful discussion on nature and sustainability in the context of social change in McMichael (2011, pps. 9-11.)

<sup>32</sup> This section draws on the seminal paper by Goodland (1996). See an update by Morelli (2013).

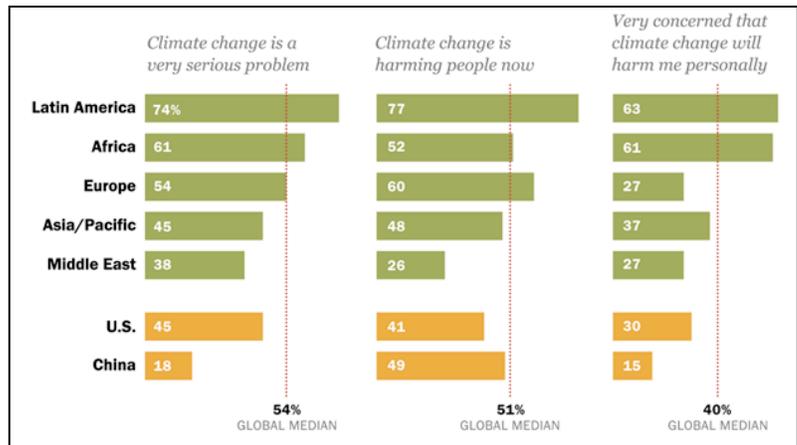
<sup>33</sup> Goodland (1996, p. 14).

#### IV. Literacy, schooling and sustainability

Literacy and environmental literacy. How should the field of education react to climate and environmental threats to sustainability? First, there needs to be a much broader recognition of the environmental problems we face. Clearly, the way people (and especially the next generation of children and youth) think and act about environmental change will be central. For this reason, the UN and its specialized agencies have tried during the recent UN Decade of Education for Sustainable Development<sup>34</sup> (2005-2014) to raise awareness, in part through inputs into the curricula of schools. While environmental literacy<sup>35</sup> (or awareness) has

increased, there remains large variation across the globe (see **Figure 3**).<sup>36</sup> Awareness of climate change is typically higher in better-educated populations.<sup>37</sup>

Nonetheless, it does not necessarily follow that those most aware are those who act most in concert with environmental goals. This conclusion comes from studies that have shown that there are entrenched beliefs about climate change that are difficult to counter.<sup>38</sup> On the other hand, without basic education, our ability to foster sustainability awareness in present and future generations will be severely limited. Clearly, much must be done to improve learning and literacy.<sup>39</sup>



**Figure 3. Global public awareness of climate change (as of 2015).**  
 Source: Pew Research Center (2015). Note: Regional medians; Russia and Ukraine not included in Europe median; Asia-Pacific median includes China.

<sup>34</sup> <http://www.desd.org>

<sup>35</sup> The term environmental literacy largely refers to work done in raising awareness about sustainability, such as through “through the skills and knowledge that its graduates learn and put into practice, its research and exchange of knowledge through business, community and public policy engagement.” Cited in Kopina (2015, p. 988). See also “sustainability literacy”:

[http://www.sustainabilityexchange.ac.uk/news/the\\_sustainability\\_literacy\\_test\\_the\\_first\\_world](http://www.sustainabilityexchange.ac.uk/news/the_sustainability_literacy_test_the_first_world) . Accessed June 1, 2016.

<sup>36</sup> See recent poll by Pew Research Center, <http://www.pewglobal.org/2015/11/05/global-concern-about-climate-change-broad-support-for-limiting-emissions/>. Accessed June 1, 2016.

<sup>37</sup> The one exception in education related awareness of the impact of climate change is in the U.S., where the median is lower than any other OECD country.

<sup>38</sup> See for example, the problematic finding that those who are more ‘scientifically literacy’ in the U.S. tend to be more opposed to policies that are more environmentally friendly (Kahan, et al., 2012). Naturally, this finding, based on models of cognitive risk and awareness, may or may not be replicable in other countries.

<sup>39</sup> Easton (2014).

*Complex thinking.* Environmental awareness as taught in schools – if only as facts – is not enough. Critical thinking is required to understand the complexities of climate variation, and the oft-occurring counterintuitive changes that occur (such as colder winters in Europe at the same time as glacial melting in the Alps). Research suggests that an issue like climate change can be very difficult to fully understand. Indeed, it constitutes what has been called a ‘perfect storm’ in moral and critical judgment,<sup>40</sup> since there are conflicting dimensions between individual and collective needs as well as between generations (since climate affects future generations more than current ones). These complexities reside further within a sense that the individual has little power over the collective nature of the problem, especially in a context where many of the specific scientific issues remain uncertain.<sup>41</sup> Even so, some striking examples of the costs associated with failure to take into account the total cost of industrial production and pollution may be seen in the now-famous example of the “\$200 hamburger” (see **Box 1**) Clearly, there is a central role for improving educational quality, both in terms of basic skills to absorb needed information, as well as in critical thinking, 21st century skills, and what will likely be a new subfield of sustainability thinking.<sup>42</sup>

**Box 1. The \$200 hamburger.**

...[T]he true cost of a McDonald’s hamburger should be \$200 if one includes the full spectrum of implied costs associated with its carbon footprint, water use, soil degradation, and the hidden health costs for treating diet related diabetes and heart disease from its consumption. Source: Ricciardi (2010), in a review of Patel (2009), who cited Dunne (1994).

*Risk reduction.* Another approach is to consider the consequences of environment for the education of those most at risk. On the one hand, these may be populations who reside in high-risk geographical zones – such as those at low sea levels, or tropical climates that are becoming even warmer, those that are undergoing major environmental destruction (such as the Amazon rain forests), and subject to instability that may be caused by environmental changes. In these zones, which are at serious risk, there are opportunities for direct action, such as the Sandwatch Initiative that brings communities into direct contact with the changes that will affect their lives.<sup>43</sup>

## V. Vulnerability and sustainability

<sup>40</sup> Gardiner (2006). Broader discussions on climate education are in Anderson (2010) and Mochizuki and Bryan (2015).

<sup>41</sup> In a review of psychological and social norms concerning climate change, the World Bank (2015, p. 171) found that there exist serious cognitive barriers, such that “Human beings are far more concerned with the present than with the future, whereas many of the worst impacts of climate change could take place many years from now.”

<sup>42</sup> OECD (2005) on 21<sup>st</sup> century skills. As part of a new effort to consider global citizenship skills, see Anderson (2012); Hoskins et al. (2012). These efforts have focus on the attitudes and participation of citizens in addressing issues of environmental sustainability. Kopnina (2015) provides a useful critique of what she terms “neoliberal education” where all views are considered equally valid, but where the environment continues to suffer. She argues for new ways to overcome this impasse.

<sup>43</sup> On the Sandwatch Initiative, see Anderson (2010, p. 10). Also see Kagawa and Selby (2012, p. 209), on disaster risk reduction; they state that: “Disaster risk increases when an exposed, vulnerable and ill-prepared population or community encounters a hazard event.”

*Vulnerability and the poor.* Vulnerability has many causes. Human beings across the world acquire different sets of skills and capabilities – such as language, literacy, problem-solving, content knowledge and much more. Learning and literacy are at the essential core of the human ability to respond to the economic, social and environmental changes.

Of course, not all populations are equally vulnerable. The world's poorest groups have been impacted by decisions to advance industrial agriculture or global business that force people off of their ancestral lands. They end up in urban slums where life is challenging in many ways, but where climate change (bringing tempests of ever-greater severity) will increase the health risks, and make quality schooling even more difficult to maintain. The risks for indigenous peoples are also well documented. According to the UN, they make up 5% of the world's population, but own 22% of the world's land on which 80% of the planet's biodiversity is located. Their ecosystems are especially vulnerable to shifts in climate, as they may reside in small island states, on coasts or at high altitudes or in arctic regions – areas that may threaten livelihoods of hunting, fishing and farming.<sup>44</sup> In other words, there is little doubt that creating a sustainable future for all will require an increased focus on the lives of the poor.

*Literacy, agriculture and sustainability.* According to the United Nations sustainable development vision: “We will strengthen the productive capacities of least-developed countries in all sectors.”<sup>45</sup> This strongly suggests that the education sector – including education policy makers, ministries of education, and educators – should see other ministries as collegial allies in addressing problems of sustainability. Let us take agriculture as a first example.

While less than 20% of the world's population is directly engaged in farming, the range is huge between countries. For example, only about 2% of the working population in the United States is involved in farming, while in India, the figure is more than 50%, and varies between 30-50% in many of the world's low-income countries. Can literacy help agriculture be more productive and efficient – in ways that make the earth more sustainable? This simple question seems only rarely discussed and studied in the education community.

Yet, research has accumulated in a variety of countries showing that rural farmers are better farmers if they have been to school.<sup>46</sup> A number of reasons have been put forward for this conclusion: (1) schooled farmers have better decision-making and management skills; (2) schooling and literacy allow the farmer greater access to information (particularly about

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<sup>44</sup> UNDP (2011, p. 54-56).

<sup>45</sup> United Nations (2015, p. 7).

<sup>46</sup> Asadullah and Rahman (2009); Jamison & Lau (1982); Asfaw and Admassie (2004).

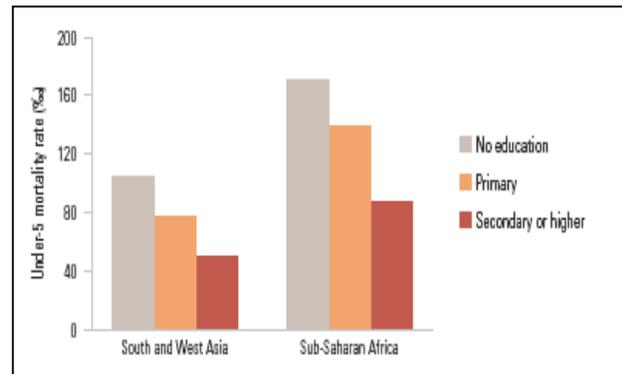
prices for both purchasing and selling); (3) educated farmers are more likely to adopt new technologies (such as the Internet) or enhanced water conservation methods; and (4) all of the above contribute to a generalized ability to evaluate opportunities and risks on investments (such as optimizing a mix of crops to reduce risk) leading to a per-annum increase in agricultural productivity of about 3.2%.<sup>47</sup> Based on this work, national governments should be making much greater investments in the schooling and literacy of farmers, especially with populations in countries with vulnerable populations.

*Literacy, health and sustainability.* A second example is literacy and health. The relationship between health and other development factors such as wealth and education have long been known. Whether in OECD or low-income countries, it is widely understood that GNP per capita is a strong predictor of lower rates of poor health, lower infant and maternal mortality, and access to better health services.<sup>48</sup> Within this general context, we might also ask the

question about the degree to which learning also might impact health. There is ample research on this topic as well. One of the most comprehensive systematic reviews –

looking at more than 3000 studies in the United States – found that low reading skills were directly related to adverse medical outcomes.<sup>49</sup> In India, it was found literacy can have significant effects on improved health outcomes independent of household income. More broadly, in developing regions considerable data has shown that there are significant consequences of years of maternal education on specific health consequences, such under-5 infant mortality rates (see **Figure 4**).

Nonetheless, one of the quandaries of the ‘education leads to better health’ claims is understanding the mechanisms by which this happens. What is it about the mother’s education, or literacy, that leads to better health outcomes? Explanatory rationales have included: increased monetary expenditures, women’s empowerment, improved knowledge, and adoption, of modern medicine. Literacy is sometimes evoked (as the above case in India), but actual measurement of literacy and its impacts have rarely been the focus of attention. Fortunately, a longterm four-country comparative study – in Mexico, Nepal,



**Figure 4. Under-5 mortality rate, regional weighted average, by mother’s education, 2004–2009.** Adapted from UNESCO (2011).

<sup>47</sup> This analysis is drawn from Reimers and Klasen (2014).

<sup>48</sup> See for example the widely-cited paper by Pritchett and Summers (1996).

<sup>49</sup> DeWalt, et al. (2005). One recent study in Mozambique found that HIV/AIDS knowledge was strongly related to both basic reading and basic mathematics (Ciampa, et al., 2012).

Venezuela and Zambia – addressed this question.<sup>50</sup> Employing both qualitative and quantitative methodological designs, the researchers were able to find clear evidence that maternal education led to particular oral language and literacy skills that were statistically related to their understanding of key health messages. Further, it was found that mothers acted as teachers in their interactions with children, a finding that was further substantiated by field-based behavioral observations.

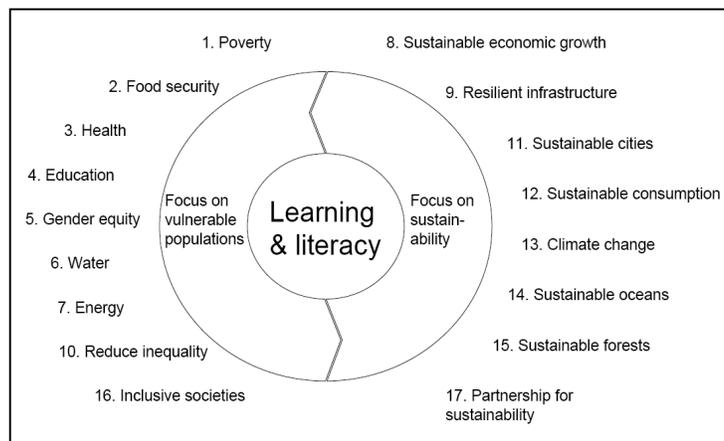
//Another way to think about the role of learning and health is to consider how small behavioral changes can influence how the individual utilizes the knowledge that he or she already possesses. One of the most promising new ways to achieve adherence to drug use – a major issue especially among the poor in many countries – is to provide reminders. Most people know the importance of taking a specific prescribed medication, for example, but it is not always /easy to remember to do so. Hence, the use of text message reminders, such as those used in rural Uganda for adherence to HIV/AIDS anti-retroviral therapy, has become popular. As expected, the level of literacy (defined here simply as the self-assessed ability to read a sentence) was a strong predictor of whether the patients could read a direct (or coded or pin-protected message) about the results of their medical testing. Similar results were found with those most literate returning to their health clinic as requested within a seven-day time period.<sup>51</sup> Over recent years, there has been increasing collaboration between health and education ministries, often based on the use of school infrastructure in support of health innovations.<sup>52</sup>

## VI. Implications for the SDG era

In September 2015, the United Nations

ratified a set of 17 Sustainable Development Goals (SDGs). As shown in **Figure 5**, these goals cover a wide variety of global efforts to assure a more sustainable and less consumption-

oriented future for the planet. Included at the *left side* of the list, as with the earlier set of MDGs, are goals focused on poverty reduction, food security and agriculture, health, education, and gender equality – the most vulnerable populations. On the *right side* is another



**Figure 5. The 17 UN Sustainable Development Goals.** These are divided into those that focus on vulnerable populations and those focused on sustainability. Learning and literacy are at the center of these sets of goals. Source: Author.

<sup>50</sup> LeVine, et al. (2012).

<sup>51</sup> Siedner et al. (2015).

<sup>52</sup> See, for example, Rwanda's school based HPV vaccination program that had the health, education and gender ministries collaborate in schools for a major and rapid increase in HPV vaccinations (Farmer et al., 2013).

set of goals that are focused mainly on sustainability. As discussed, literacy is a core component to achieving all the SDGs. Without improved learning and literacy, each of the SDGs will limit the ability of citizens to be sufficiently informed on key issues, and less empowered to take action.

At the same time, in order to achieve a more literate world, the education sector – largely responsible through its support of formal and non-formal programs – could benefit greatly from linkages that build on improvements in each of the SDGs. As described in the previous section, the sectors of education, agriculture and health, have natural affinities. By improving agriculture, we know that food security can be better achieved, and thus children will have time to go to school and be properly nourished. And, ministries of agriculture need to increase their demand for more literate farmers, knowing that these farmers will be more able to produce more efficient crops.

Similarly, improvements in health services contribute to increased student enrollments learning in school, thereby improving literacy. Above we also noted research showing that literate mothers are especially able support healthy behaviors in children. The list of multi-sectoral collaborations will no doubt grow, but surely could be enhanced under the new framework of the SDGs, and the call for more partnerships.<sup>53</sup>

## **VII. Conclusions and recommendations**

Nearly a half-century ago, Paulo Freire took a strong ideological stance (as shown in the opening quotation), arguing that: Education (learning and literacy) are key components in helping communities in the “transformation of their world.” It is probably no accident that Pope Francis and Paulo Freire both originate from South America (from Argentina and Brazil, respectively), and both were influenced by the liberation theology of that time. The common thread between these two intellectual and moral giants is that the world is ultimately in our hands, and if we cannot find ways to transform our own increasingly unsustainable needs and consumerism, the consequences will be ours to bear.

In this review, we have noted the escalating changes due to globalization. Some are threatening, such as climate and environmental changes that put at risk not only peoples in some parts of the world, but nearly everyone in all parts of the world. The complex spillover effects of these changes on education, social and political conflict, national and international migration, and employment may be catastrophic in the coming years and decades – if not attenuated soon. And yet, some changes are hopeful as well, such as an increasingly aware

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<sup>53</sup> See also: <http://www.project-syndicate.org/commentary/pope-francis-universal-literacy-by-daniel-a--wagner-2015-10>. Accessed June 1, 2016.

global citizenry, increased access to new technologies, and greater respect for the world's essential resource limitations.

Education – of which the core is both learning and literacy – is central to any set of sustainability solutions, and across all development sectors. We now need to make renewed and innovative advances to use education as a means for the formidable transformations in sustainability that are required over the next 15 years of the SDGs and beyond. It is not enough to inform the public about the challenges of globalization, climate change and sustainability. Our education goals must include new ways to address these challenges and overcome them.

With these perspectives in mind, several recommendations should be considered:

1. Education specialists will need to invest more in content awareness as well as critical thinking skills that can help people (especially children and youth) learn about, and address the challenges of, sustainability and its consequences – what we have termed here sustainability thinking. A broad focus on improving learning is the key to managing a very challenging future for this planet.
2. Educators (at all levels) will need to further develop and expand effective connections and partnerships with other sectors and broader stakeholders to address sustainability challenges as part of the new SDGs. New uses of pro-poor technologies can play a crucial role in sustainable solutions.
3. Finally, educators should be especially alert to the impact of sustainability on the most marginalized and vulnerable groups (especially children, women, indigenous and disabled populations) across the world, in an era when those groups are most likely to be disproportionately impacted by environmental change.

There is no doubt that we know more in 2015 about development than we did in the year 2000 when the first UN development goals were ratified, and considerable progress has been achieved. However, it is also true that the ground has literally changed under our global feet in the last decade and a half. We may be able to improve classroom learning, reach more children in conflict zones, and develop better methods of teaching training. All of these dimensions and more will no longer suffice to address the new era of the 2030 Sustainable Development Goals. These new global efforts, as the Pope aptly put it, will require a “renewal of humanity,” as well as new ways of learning, thinking and prioritizing our educational mission for all.

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