The Case for Sustainability Education

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Humanity faces sustainability challenges both for today and the future, and it is difficult to address those challenges without society being educated about those issues. To address the need for sustainability education, in December 2002 the United Nations General Assembly declared 2005-2014 as a decade of Education for Sustainable Development (DESD). This leads us to three questions: what is sustainable development, why do we need to educate for it, and how do we as math educators contribute?

In the United Nations Educational, Scientific and Cultural Organization's DESD at a Glance they state, ``Sustainable development, a constantly evolving concept, is thus the will to improve everyone's quality of life, including that of future generations, by reconciling economic growth, social development and environmental protection." In other words, the goal is to continually improve humanity for both today and tomorrow.

Unfortunately, there is much work to be done. For example, according the United Nations Millennium Development Goals in 2005 1.4 billion people in developing regions were living on less than the equivalent of $1.25 per day, in 2008 only one in three rural women and two of three urban women In developing regions receive the recommended care during pregnancy, and in 2008 there were 8.8 million deaths of children under the age of five. To be fair, all of these statistics represent an improvement over the previous decade. Our challenges related to poverty are part of a larger issue of income inequality in the world as measured by the Gini index (guess where the U.S. ranks).

Despite not meeting the current needs of much of the world's population we are already sacrificing future generations. For example, Millennium Ecosystem Assessment, which involved the work of well over 1000 experts worldwide, produced five technical volumes and six synthesis reports. It concludes that

> Human activity is putting such strain on the natural functions of Earth that the ability of the planet's ecosystems to sustain future generations can no longer be taken for granted. The provision of food, fresh water, energy, and materials to a growing population has come at considerable cost to the complex systems of plants, animals, and biological processes that make the planet habitable. Nearly two thirds of the services provided by nature to humankind are found to be in decline worldwide. In effect, the benefits reaped from our engineering of the planet have been achieved by running down natural capital assets. In many cases, it is literally a matter of living on borrowed time.

As a discipline, mathematics is in a unique position to address sustainability education due to the numbers of students at both the K-12 and college level that are required to take mathematics. In fact, quantitative skills are an important tool in making decisions to improve the quality of life for people today without sacrificing the future. To support the efforts of math educators at all levels to engage their students in issues of math and sustainability, the Math Awareness Month 2013: Mathematics of Sustainability resources page has links to relevant and appropriate math and sustainability themed curriculum materials. These resources show that mathematics classes can provide sustainability-oriented content and real-life examples to address sustainability education while still meeting our mathematical content goals. Many students need to see a link between math and the real world for successful learning, so incorporating sustainability themed examples, such as those related to income inequality, climate change, energy issues, and social justice, may increase student engagement in our courses and lead to better learning outcomes.