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Editorial

Translational Environmental Science and Technology (TEST)

Translation is a versatile word found in wide-ranging disciplines including literature and biology where it refers, respectively to the conservation of meaning or intent associated with the expression of an original idea or genetic potential into alternate forms. Recently, the word *translational* has gained currency in medicine and public health, where discoveries in science laboratories are geared toward clinical applications and disease prevention at the population level (National Institutes of Health. 2009. NIH Roadmap for Medical Research. http://nihroadmap.nih.gov/clinicalresearch/overview-translational.asp.) Hence, translational science in health care emphasizes the recursive flow of ideas through the cycle of "laboratory bench -to- patient bedside -to- community." The rhetoric of the translational paradigm has not yet gained much traction in environmental science and technology, in part because "technology transfer" has been the traditional phrase used to describe some of the conceptual issues captured by translational science(Elizabeth M. Denholm and William J. Martin, II. 2008. Translational research in environmental health sciences, Translational Research, 151(2): 57–58.){William C. Clark. 2007. Sustainability Science: A room of its own. Proceedings of the National Academy of Science of the United States, 104: 1737}. However, there are some important differences that need to be pointed out, especially in the context of the relationship between scientific discoveries made in affluent countries and their translation into effective technologies in developing countries. This of course also applies to the reverse, in which resources and technologies emerging through creative activities in developing countries are translated into technical products and processes in affluent countries. Examples of the latter include the mining of special minerals such as tantalum that have boosted the electronic revolution, and new agricultural and pharmaceutical products associated with biodiversity. On a side note, the literal translation of "*African Journal of Environmental Science and Technology*" into hieroglyphics highlights the rich integration of biodiversity into African languages and texts (Figure 1).

In environmental science, the strategy that most closely resembles the translational science approach used in health care is associated with the concept of ecosystem health, where discoveries and observations made in laboratory microcosms are translated into practices and policies for environmental remediation or for preventing the deterioration of ecosystem integrity. Hence "translational environmental science and technology (TEST)" could be a formal representation of the new emphasis captured as "laboratory bench –to– ecosystem –to– sustainability." This is arguably a more robust conceptual framework than "technology transfer." The articulation of TEST as an operative framework for basic and applied research should encourage the generation of new hypotheses about the causal factors of resilience in ecosystems, and how the web of ecosystem interactions contributes to sustainable structures and functions. But this is not just for the science – the application of tools and other inventions based on fundamental discoveries to solve environmental problems and to reduce the burden of disease and disability is the *raison d'etre* for TEST.

Investing in education through training and career development is crucial for the success of the TEST framework. Few academic departments accommodate specialists in all the disciplines necessary to accomplish translational environmental science and technology. Even fewer scientists are willing to engage to build teams of investigators to design basic experiments in environmental science with the clear goal of contributing to the understanding of broad and sometimes vague concepts of ecosystem integrity and sustainability. And this is not necessarily "sustainability science", which typically emphasizes social studies of science and policy analysis. The U.S. National Science Foundation (NSF) began supporting some research programs that come close to the TEST framework through its *Environmental Sustainability* initiative(National Science Foundation. 2009. Environmental Sustainability.http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=501027). According to NSF, the goal of the initiative is to promote "sustainable engineered systems that support human well-being and that are also compatible with sustaining natural (environmental) systems." Ecological services which are vital for human survival are embedded in natural ecosystems, and the kinds of research that are supported typically includes long time horizons and are interdisciplinary with respect to the inclusion of social and management sciences, economics and ethics. Technology development forms the cornerstone of TEST, and in concert with the focus of the NSF initiative, calls for the invigoration of translational research in developing countries in four broadly defined areas of research, namely industrial ecology, green engineering, ecological engineering, and earth systems engineering.

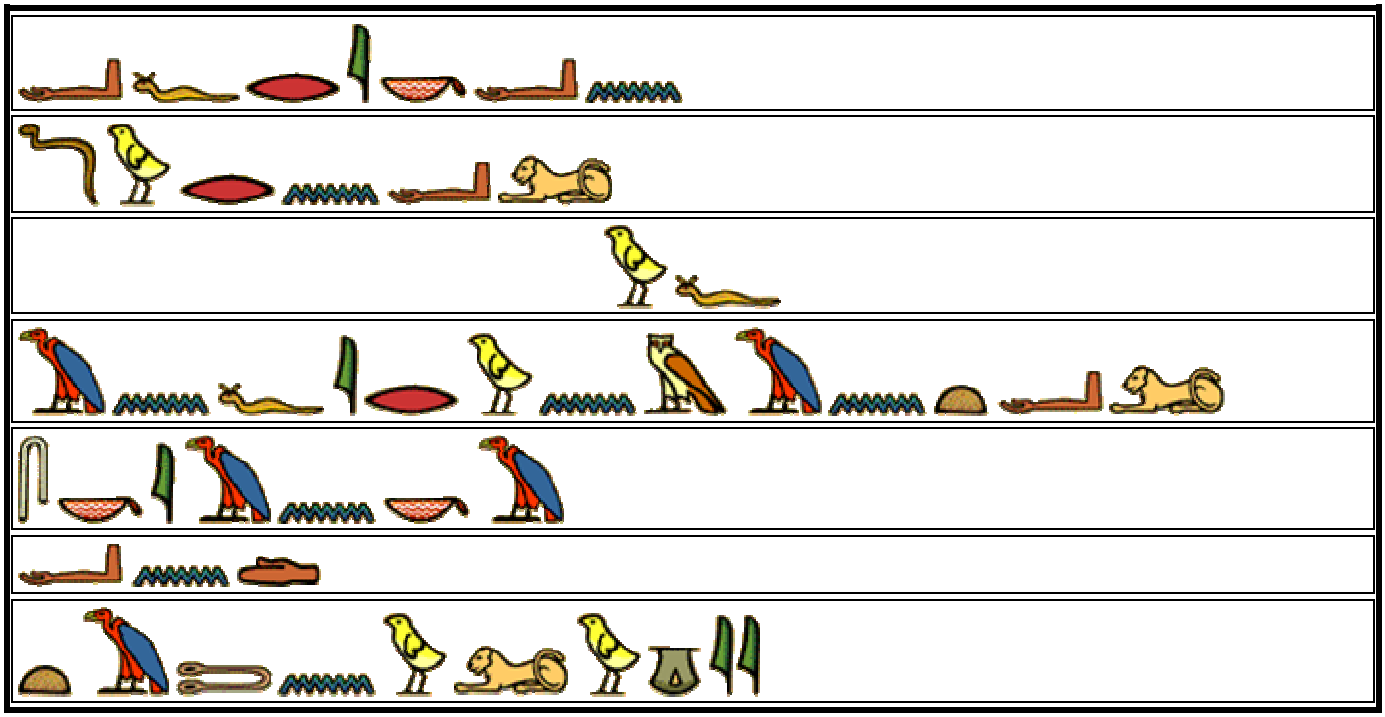

Figure 1. Hieroglyphic translation of "***African Journal of Environmental Science and Technology***" suggests the emphasis on biological diversity and ecosystem concepts in human communication– according to http://www.quizland.com/hiero.mv .

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