

# Basic Science Research and Education: A Priority for Training and Capacity Building in Developing Countries

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## KEYWORDS

- Basic science research • Basic science education
- Global health • Developing countries

Does science education in developing countries really count?<sup>1</sup> The overall goal of this article is to provide evidence that basic science education and research are key priorities for global health training, capacity building, and practice. While an increasing number of scholars attest to the need of building basic science capabilities into education in developing countries, this is still largely a neglected area. To paraphrase from a 1964 article by J. Ronald Gass “The notion that science education should be considered as an investment is somewhat unheard of in the economic planning of many countries”.<sup>2</sup> In this same article, he suggested “the great potentiality of science as a dynamic force in cultural change in the underdeveloped world.” Dr Gass then continued to show the major lack of teachers, facilities, and even interest in developing basic science education that existed in the 1950s and 1960s—a situation which

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continues to the present day and is still underappreciated and most often not addressed.

More recently, the International Council for Science (ICSU), in its report "Science Education and Capacity Building for Sustainable Development,"<sup>3</sup> stressed that "science capacity-building encompasses a multiplicity of resources, actors, and of organizational and institutional components (of which the education and training of scientists is only one central and necessary component) interacting in a long-term systemic process".<sup>3</sup>

While this report makes a number of recommendations towards strengthening science education and capacity building, with a few exceptions, basic science research and education appear as low priorities in many developing as compared to developed countries (ie, the global South as compared with the global North). Expanding basic science capabilities will not only enhance the capacity of institutions in the South to enhance teaching and learning environments, but will more rapidly bring these institutions and their students and faculty into equal relationships with the currently dominant North. Importantly, it could have major impact upon halting or diminishing the massive brain drain of scientific researchers from the developing areas.

Traditionally, research in public health aspects of infectious diseases has been the major focus in developing areas and subsequently has consumed a significant portion of the available human and financial resources.<sup>4</sup> In terms of capacity building at the local level in the South, infectious disease research has been a major building block in establishing basic science research in order to train individuals in the South to serve initiatives that combat human immunodeficiency virus (HIV), malaria, parasitic diseases, and other infections. However, with the increasing recognition that noncommunicable diseases such as type 2 diabetes,<sup>5</sup> cardiovascular disease,<sup>6,7</sup> and cancer<sup>8</sup> are rapidly emerging as a significant burden in developing countries, similar to what has occurred in the developed countries, there is a major need for building laboratories and training personnel who can help manage these emergent problems locally in the South. There is a need to produce a cohort of researchers who possess the requisite competencies to address the priority challenges of the South relating to improving health, nutrition, food security, and rural livelihoods. Improvement in research in basic science in universities of the South will help guarantee sustainable development by strengthening local physical and human resources.<sup>3</sup>

Too often, researchers in the South have looked upon the North for handling biochemical analyses required for local population studies rather than developing the requisite capabilities. This needs to be discouraged. In a recent example, in the study of micronutrient status of children in the West Bank of the Jordan, local laboratory facilities were strengthened, and quality assurance was ensured by receiving blinded samples from the US Centers for Disease Control. Results obtained will likely lead to changes in fortification policy in Palestinian populations (Massad S, Deckelbaum RJ, Khammash U, unpublished data). The ability of basic scientists and public health scientists to provide a scientific and mechanistic basis to recommendations and policy will greatly enhance their ability to influence policy makers.<sup>9</sup>

#### **WHAT IS THE CURRENT STATUS OF BASIC SCIENCE TRAINING IN GLOBAL HEALTH?**

Even in North America and Europe, review of university curricula offered in global health tracks reveals that little emphasis is placed on basic science training. As an example, in an ad-hoc review by the authors of over 50 courses offered by two north-eastern US universities for global health concentrations, only a single course with any

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