

APPROPRIATE TECHNOLOGY IN AN AGE OF RENEWABLES

Martin A. Hubbe

In this editorial the author proposes that scientists and technologists can play essential roles in the selection of technological alternatives that are appropriate to people's long-term needs. Lessons learned in the 1970s and 80s, involving the design of simple and reliable mechanical systems for underdeveloped regions, can have relevance today in an increasingly interdependent, crowded, and polluted world. Specialists can help in two ways to promote technologies that make sense, providing for future well-being, and minimizing risks. First, we can exercise personal judgment in our work, as we pursue technological progress. We need to consider whether the likely products of our work are compatible with the world that we want to leave for our grandchildren. Second, we can provide guidance to our fellow citizens, as society grapples with the political and economic choices associated with progress.

Keywords: *Appropriate technology, Renewable resources, Sustainability, Industrialization*

Contact information: *Department of Forest Biomaterial Science and Engineering, College of Natural Resources, North Carolina State University, Campus Box 8005, Raleigh, NC 27695-8005;*
hubbe@ncsu.edu

A CONCEPT BORROWED FROM THE DEVELOPING WORLD

The words "appropriate technology" have most often been used in the context of aid to third-world countries. Equipment and processes to be used in different parts of the world need to be suited to the local conditions, including the availability of electricity, running water, *etc.* It doesn't make sense to send a lot of plug-in refrigerators to a region that lacks a power grid. Likewise, expensive farming equipment will become useless in a land where there are no spare parts or people able to do the repairs.

In this editorial I would like to propose that the concepts of appropriate technology also are needed most urgently in the developed world. The idea is not new. For instance, the authors of the book *Appropriate Technology in Industrialized Countries* (Riedijk, W., ed., Delft Univ. Press, 1989) point out ways in which modern societies can benefit from technologies that are inherently simpler, cheaper, safer, or less centralized than the current state of the art.

Let's suppose that you are attempting to design a system to deliver water to nomadic people. Your clients, over many years, have developed patterns of living and knowledge of their environment that have allowed them to subsist and to avoid disaster (see Dunn, P. D., *Appropriate Technology: Technology with a Human Face*, Schocken Books, 1979). The priority, then, is to minimize risk. Your desert clients may face a disaster if they come to rely on a water system that depends on transmission lines or the delivery of fuel. A simpler system, relying on local resources and manual labor, might be less risky, even if less impressive.

The situation just described has some parallels with modern life. We all tend to become more vulnerable to political and economic changes when the resources upon which we depend come from far away. The fruit on your American table in winter may come from Chile. Gas in your car may come from Arabia, or maybe somewhere else equally far away. Most of us do not live in deserts, but our present lifestyles are becoming vulnerable due to the pressures of population growth, climatic change, and depletion of resources.

What are the patterns of living that will sustain members of spaceship Earth in years ahead? In his book *Small is Beautiful* (Harper and Row, 1973) E. F. Schumacher urged increased reliance on things that are local, cheap, simple, small, and requiring the input of manual labor. To that list one also could add environmentally favorable, healthy, relying on renewable resources, and tending to promote harmony among peoples. Words like “increased personal wealth,” “personal freedom,” and “a better life for our children” are usually left out of lists such as this, but we need to be realistic about rising expectations of future generations.

OUR ROLE AS SCIENTISTS AND TECHNOLOGISTS

How does one apply ideas, such as those just mentioned, in cases related to the utilization of cellulose-based materials? Many readers of this magazine are engaged in research and technology related to renewable resources. Proponents of appropriate technology would applaud us on that account, but what about the other issues? Here are some questions that each of us can ask ourselves about possible implementations of scientific findings:

1. Does the technology on which I am working require long shipping distances, increased vulnerability to disease, or risk of unintended consequences?
2. Does the technology on which I am working minimize, or at least not increase, the release of carbon dioxide or consumption of fossil fuels?
3. If implemented, is the technology on which I am working likely to pose risks to current or future generations? Is there a reliable way to minimize environmental hazards associated with it?

“But I’m just a scientist,” someone may say. “I have no control over how and whether my results become implemented.” As pointed out by Willoughby in his book *Technology Choice: A Critique of the Appropriate Technology Movement* (Westview Press, Boulder, 1990), people need to actively *select and implement* appropriate technological solutions. Individual initiative, on the part of those familiar with the underlying science, is critically needed. If scientists among us don’t provide some guidance to our fellow citizens, relative to selection of what technologies to implement, then the inertia of scientific progress may take us in directions that we would not choose.