

## **When Low Technology is the Right Technology**

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Assignment 3, Paper 2

### **INTRODUCTION**

“Although the Pampanga River runs through Marlita, the rice paddies were parched and fallow. Carlos said it had been a dry winter, too dry for a second rice crop. ‘What about irrigation?’ I asked.

He shrugged. ‘The irrigation pump is broken.’

We drove by it, a little gasoline job the size of a rider-mower engine. They were killing each other over nickel-and-dime corruption in these villages, while the wealth of the entire community could be doubled with one high-school shop-class water-pump fix-it project.

Understand that and you can understand the whole Third World.”<sup>1</sup>

P. J. O'Rourke's observation of a struggling village in the Philippines should give one pause when considering solutions for issues facing developing countries. The use of high technology may not always be the best use of resources for solving these issues. High-tech solutions can be expensive and awkward to implement, difficult to maintain, and will fail at some time. The best solutions are based on technologies that users can implement and maintain themselves.

In the above example, the villagers of Marlita needed a lawnmower mechanic and a few spare parts to double their economic output; computers, Internet connectivity, cellular telephones, and other high-tech equipment would not have the necessary impact. It is important to consider the issues and pursue the appropriate technologies for them.

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<sup>1</sup> P. J. O'Rourke, *Holidays in Hell*, The Post-Marcos Philippines—Life in the Archipelago After One Year of Justice, Democracy and Things Like That, Vintage Books, New York, 1988, pp.108.

## WHAT ARE “LOW TECH” SOLUTIONS?

“Low tech solutions” are answers to problems that require little in the way of education or cost to implement and maintain. The goal of low-tech solutions is to make the best use of money and resources while moving the population of the developing nations from survival through self-sufficiency to a standard of living well beyond subsistence. As Barbara Crossette stated in her article "Low-Tech Solutions Often Key To Third World Problems:"

“At the local level in many developing countries, effective if low-tech equipment is what people say they need most immediately from foreign assistance. A bag of cement and a glazed ceramic toilet seat, worth no more than about \$10 for both, can change the life of a Third World family and improve the health of a village. A concrete floor and solid roof to prevent village markets from turning into seas of mud in rainy seasons is also health-enhancing — not to mention a psychological boost to stallholders and shoppers.<sup>2</sup>”

Low-tech solutions lack the prestige, attention, and money that sophisticated, high-profile project attract. They also lack the impact on the local population and environment and ensuing controversy that comes with it. , For example the World Bank and other organizations have funded dam building for years. These construction projects not only leave many nations under a burden of debt they can not repay, but as G. Pascal Zachary observed in a March 19, 1998 *Wall Street Journal* article:

“Even the World Bank concedes that poorly designed dams, many it helped fund, have done environmental harm and uprooted millions of villagers in developing countries.<sup>3</sup>”

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<sup>2</sup> Barbara Crossette, *U.N. Wire*, Low-Tech Solutions Often Key To Third World Problems, June 1, 2004, [http://www.unwire.org/Features/Columns/522\\_24242.asp](http://www.unwire.org/Features/Columns/522_24242.asp).

<sup>3</sup> G. Pascal Zachary, *The Wall Street Journal*, World Dam Commission Seeks to Bridge Opposing Interests, March 19, 1998.

## WHAT ARE THE NEEDS OF DEVELOPING NATIONS?

The basic needs of the developing world are *immunizations, health care, clean water, food, and sanitation*.<sup>4</sup> Indeed these are the most basic building blocks, the very foundation of civilizations. Without water and food, there is no survival. Without a reasonable expectation of health, it is very difficult to plan a future. When an individual spends every waking hour eking out a living, there is no time or energy for education or technological progress. For example, a village of one hundred subsistence farmers would need a one percent surplus to support full-time teacher. If these farmers were not able to grow enough crops for their families, they will certainly not support the teacher.

The primary goal of aid to developing nations must be the provision of a stable foundation that the rest of their society can be built upon. Abraham Maslow (1908 - 1970) illustrated this process in his paper *A Theory of Human Motivation* (1943). He formulated a hierarchy of human needs, and his theory contends that as the basic needs are met, humans desire the fulfillment of higher needs.<sup>5</sup> This has become known as *Maslow's Hierarchy of Needs* (Figure 1). An article from the AllPsych Online website explains why the most basic needs of people must be met first (emphasis mine):

Maslow's most well known contribution is the Hierarchy of Needs...The basic premise behind this hierarchy is that we are born with certain needs. *Without meeting these initial needs, we will not be able to continue our life* and move upward on hierarchy. This first level consists of our physiological needs, or our basic needs for survival. *Without food, water, sleep, and oxygen, nothing else in life matters.*

Once these needs are met, we can move to the next level, which consists of our need for *safety and security*. At this level we look seek out safety through other people and strive to find a world that will protect us and keep us free from harm. *Without these goals being met,*

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<sup>4</sup> Michael Fors, UN Chronicle Online, What the United Nations Can Do: Closing the Digital Divide, December 2003, <http://www.un.org/Pubs/chronicle/2003/issue4/0403p31.asp>.

<sup>5</sup> CampusProgram.com, Copyright 1996-2004, [http://www.campusprogram.com/reference/en/wikipedia/m/ma/maslow\\_s\\_hierarchy\\_of\\_needs.html](http://www.campusprogram.com/reference/en/wikipedia/m/ma/maslow_s_hierarchy_of_needs.html).

*it is extremely difficult to think about higher level needs and therefore we can not continue to grow.*

When we feel safe and secure in our world then we begin to seek out...Maslow's third level, the need for belonging and love...and to feel like we have a *place in the world*. Getting these needs met propels us...into the fourth level, called esteem needs. At this level we focus our energy ...feeling that we have made accomplishments on our life. We strive to move upward in careers, to *gain knowledge about the world*, and to work toward *a sense of high self-worth*.

The final level in the hierarchy is called the need for self-actualization...<sup>6</sup>

As the above quote points out, without the most basic needs being met, it is difficult and pointless to emphasize meeting the higher needs.



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**Figure 1**

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<sup>6</sup> AllPsych and Heffner Media Group, Inc., 1999-2003, <http://allpsych.com/personalitysynopsis/maslow.html>  
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## WHY CONSIDER LOW TECH SOLUTIONS?

It is simple to make things complex; it is complex to make things simple – Meyer's Law

It is essential to implement solutions in developing nations that are cost-effective (cheap) and appropriate for their level of technology. What this means is creating answers that make every dollar count and allow the indigenous people to maintain the solutions that have been put in place.

For example, examine the lack of an adequate supply of potable water. The first thought could be to build a water treatment plant. But the Cedar River Treatment Facility in Seattle, Washington, which supplies water to almost 1 million people cost \$78 million to build and \$31 million to maintain for 25 years.<sup>7</sup> If this facility were built in a developing nation, most of the equipment to build and maintain it would be imported, many of the workers would be foreign contractors, and there would not be a tax base to support it.<sup>8</sup> Compare this to the SODIS (Solar Water Disinfection Process):

The Solar Water Disinfection (SODIS) process is a simple technology used to improve the microbiological quality of drinking water. SODIS uses solar radiation to destroy pathogenic microorganisms which cause water borne diseases.

SODIS is ideal to treat small quantities of water. Contaminated water is filled into transparent plastic bottles and exposed to full sunlight for six hours.

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<sup>7</sup> Phuong Cat Le, *Seattle Post-Intelligencer Reporter*, Cedar River Supply Will Taste Better for 1.3 Million People Around Seattle, June 6, 2002, [http://seattlepi.nwsourc.com/local/73486\\_water06.shtml](http://seattlepi.nwsourc.com/local/73486_water06.shtml).

<sup>8</sup> David Abler wrote:

"According to the World Bank, more than 1 billion people live below the international poverty line of ...\$1.50 per person per day in today's dollars. Another 2 billion are only a little better off."

If the above mentioned treatment plant were built in an area where the population lived below the international poverty line, it would take sixty-five years at a one hundred percent income-tax rate to pay for the project.

David Abler, *AG EC 450 - Economic Conditions in Developing Countries*, [http://450.aers.psu.edu/economic\\_conditions.cfm](http://450.aers.psu.edu/economic_conditions.cfm).

Sunlight is treating the contaminated water through two synergetic mechanisms: Radiation in the spectrum of UV-A (wavelength 320-400nm) and increased water temperature. If the water temperatures raises above 50°C, the disinfection process is three times faster.<sup>9</sup>

The SODIS utilizes clear plastic bottles (“trash” in the United States), which allows each user to be responsible for maintaining their supply of drinking water. The cost of the project is no more than producing clear plastic bottles (or recycling discarded bottles), the transportation of the bottles to a village or group of people, and instruction on how to use it. \$100 million would produce and transport many bottles as well as sponsor the “how-to clinics.

## **WILL LOW TECH SOLOUTIONS IMPEDE TECHNICAL PROGRESS?**

There is a concern that low-tech projects withhold tools from developing nations that would allow them to achieve the technical progress enjoyed by the western nations. As demonstrated by the American wars in Viet Nam, Somalia, and Iraq, technically inferior foes effectively fought the American military. In the case of the Soviet war in Afghanistan, the Mujahideen learned and embraced cutting edge technology, with lethal consequences.<sup>10</sup>

There is no reason to think the population of the developing world would be unwilling or unable to learn and use the technology that is available today.

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<sup>9</sup> SANDEC (Water & Sanitation in Developing Countries), <http://www.sodis.ch/Text2002/T-Howdoesitwork.htm>.

<sup>10</sup> Brigadier (Ret.) Mohammad Yousaf observed how the Mujahideen, although mostly uneducated, mastered the FIM-92 Stinger MANPADS, at the time the most advanced antiaircraft weapon ever developed (emphasis mine):

*In practice all training was carried out on this simulator, with no live firing ever taking place before the teams fired Stingers for real in Afghanistan.*

*...the average hit rate by American troops trained on the Stinger was 60-65 per cent in a non-hostile situation. They regarded this as satisfactory. From statistics we compiled later during actual operations the Mujahideen's success rate was 70-75 per cent, while our Pakistani instructors reached 95 per cent.*

Brigadier (Ret.) Mohammad Yousaf, Bear Trap - Afghanistan's Untold Story, Jang Publishers, 13 - Sir Khan Road, Lahore, Pakistan, <http://www.sovietsdefeatinafghanistan.com/beartrap/english/15.htm>.

Not only are technologies welcome in these developing areas, the local populations innovate uses and applications appropriate to the local socio-economic structure (often in ways never imagined by the West). When people confident of their basic survival, they enjoy the freedom and ability to pursue and use the technology that is available.

## **CONCLUSION**

In this paper I have discussed the need to evaluate and pursue the proper technologies for issues facing the developing world. As the developing populations become self-sufficient, market forces will push the right technologies in the right direction. The West must use its resources to bring this about.