Sustainable Technology

World Vision

We are surrounded by technology - from simple tools like knives and forks to complex machinery like computers or cars; from the medicines we take when we are sick, to the processes that bring us our food and water. Technology is anything that humans invent to save time or energy, to make life safer or easier.

Technology in the Third World

- Is a computer useful if there is no reliable electricity supply to run it?
- How useful is a water pump which runs on fuel which is too expensive for a community to buy?
- What can you do if replacement parts for farming machinery can't be found or are too expensive?
- How can someone build a better stove that saves wood without costing a fortune?

More than a billion of the world's people live in absolute poverty. They lack nourishing food or clean water, they suffer from malnutrition and sickness. They may not have access to things like health care, education, secure employment or electricity. In their countries, agriculture and industry are often poorly-equipped or unproductive for a variety of reasons.

There is a great demand in the Third World for new technology: agricultural, industrial, medical, communications equipment, household appliances, bridges, roads, electricity, water or sewerage systems, and so on.

What is 'sustainable technology'?

Communities need to use technology which they can afford to maintain, replace and run, both financially and environmentally. Sustainable development can only happen when the tools and processes of development are suited to the climate, circumstances and finances of the community it's meant to help.

Technology can relieve hard-working people of their burdens, improve crops so there is more food for the hungry, help struggling industries, bring clean water, communications, and save people's lives. But not everyone necessarily benefits from the same kind of technology.

Technology must be appropriate for the people who use it, and for their situation. It should be introduced only if it will really meet their needs, is affordable and able to be maintained.

Saving lives with a filtered tube

Guinea worm is a major health risk in much of Africa.

The worms lay their eggs in water that is often the only water source for locals. When people drink the contaminated water, the eggs get into their bodies. When they hatch, the worms make their way out through the skin, whatever way they can. It's excruciatingly painful and doubly distressing when the victims are children.

There are several ways of tackling the problem. The best way is to provide communities with clean, safe drinking water. This, however, takes time. As an interim measure, one way to prevent guinea worm infestation is to give filters to everyone using the water.

The filter is made with a pipe and a square of cloth, carried around the neck on a piece of string. By using the pipe as a straw, the cloth filters out the eggs while drinking. Although other water-borne diseases, like cholera, may remain a threat, this simple straw can at least protect families from this deadly parasite.

Important questions about technology

Technological change often brings other changes to people's lives - some positive, some not so good. In order to analyse the benefits and problems of changes, some questions need to be asked.

1. Is it simple to make, use and repair?

Simple devices can be just as effective as the latest hi-tech ones. If people can easily understand and use new technology, and especially if they can make or repair it themselves - they will be more likely to feel that it belongs to them

2. Does it need to be imported, or could a local product be used?

Imported technology may be helpful, but if it breaks down, parts and repairs might be difficult to obtain. It is worth checking whether there is a local product that could do the job just as well.

"Many tractors and tools are lying disused throughout the Third World. Although they brought wonderful advances to farming, the capital or skills to repair them are not available, and they have just become a burden to the owners. After a short "romance" with tractors, many farmers are turning back to draught animals." - *AT Reader/Heifer Project Exchange No.39 (1987*)

3. Will it use resources wisely and respect the environment?

Traditional farming methods, transport and ways of life may be slower, but may avoid some of the harmful side effects of modern technology: exhaust fumes, non-recyclable waste, harmful chemicals and rapid depletion of our natural resources.

There are alternative energies such as biogas (produced from animal manure) and solar power, which are easily renewable, do less harm to the environment and can be used effectively by poor people throughout the Third World.

Clay stoves – a simple solution

Deforestation is a major problem in some countries. One way to combat this is to build more fuel-efficient stoves.

In Uganda, villagers are learning how to build *rollena* stoves out of clay. The stoves use less wood, cook faster and produce less smoke. They are also portable.

This woman has made several stoves for herself and others, and has trained 20 more people how to make them for themselves. At a cost of around US$3.50 per stove, they are economical, easy to build, environmentally sustainable and healthier than traditional stoves.

4 How will it affect cultural and social traditions?

When new technology is adopted, it may bring major changes to the way people live and relate to each other. Sometimes, the same technology will have different effects in different communities.

The introduction of a fuel-driven mill in one Balinese community changed the way women interacted. Instead of working together to mill their rice by hand, the work was done by the mechanical mills which were operated by men. It reduced women's workloads, but also impacted on a significant social opportunity.

However, at a different project , the opposite effect was noted. Women who had ground rice at home, in isolation, are now meeting at the mill. Freed of this physically demanding task, they have time to meet and talk.

Sometimes, sustainable technology is also a matter of appropriate management.

5. Is the new product better quality?

Advertising and the appeal of Western affluence encourage people to adopt new ways - for example, some highly-processed foods - that are not always better than the old ways. People have the right to be educated about things like health and nutrition: then they can make better decisions about what is good for them.

"Infant powdered milk formulas are being promoted and distributed among poor people in some developing countries. While some mothers benefit from being able to bottle-feed their babies, they may not know about the health risks.

Breast-feeding is free, nourishing and hygienic; it contains natural protection against some infant diseases. Powdered milk costs money. There is a risk that it may be over-diluted by a poor mother to make it last longer (resulting in malnutrition), or that the water or bottle she uses may not be clean. Bottle-fed infants get sick far more often and are up to 25 times more likely to die in childhood than those who are breast-fed for the first 6 months." – *UNICEF*

6. Is it economically sensible?

New kinds of seed, fertiliser, machinery or improved farming methods can enable poor people to grow a wider variety, and greater amounts, of food or other crops. Their health, as well as their income, can benefit from this.

But before the farmers invest precious time and money - perhaps even going into debt - to buy the new technology, they must be reasonably sure that the financial risk involved is not too great. Questions like these should be asked:

- Is there a market for the product?
- Will the producers be paid fair prices?
- What would happen if the crops failed?

Sustainable technology empowers rather than controls poor people

Mlolo
– a case study

While most farmers in Malawi are struggling to feed themselves because of drought, some are reaping bumper harvests. The reason is the introduction of treadle pumps by World Vision's Mlolo Area Development Program.

Each treadle pump, worth US$126 can irrigate 8,600 square metres of land and produce 8,400 kg fresh weight of potato for sale or consumption. A group of farmers can share the cost and pay off the pump within a couple of seasons.

A treadle pump is simply a water pump fixed on top of a borehole to draw water. But unlike similar pumps found in Africa, which are operated by hand, the treadle pump resembles a stepper machine in a gymnasium, and is worked by repeatedly pressing levers with one's feet.

The pumped water can then be fed through a series of plastic pipes to take it to every part of a farmer's fields to nourish thirsty plants.

They don't require fuel, they are easy to operate and easy to maintain. World Vision helps farmers to buy the pumps with low-interest loans, and the farmers repay the debt with the extra income they can make from bigger crop yields.

7. Who will the technology help?

Any technology is limited: it cannot help everybody. But we should be cautious with innovations that help some people while harming somebody else.

Genetically modified (GM) plants are a case in point. While plants that are disease- and drought-resistant could be of benefit , what are the costs associated with these products? Will farmers be able to harvest and sow seeds from the crop, or will they need to buy new seed stock each year from the sellers? Will the promised large harvests only arrive if the appropriate fertilisers or herbicides are purchased?

Medical solutions in rural Uganda

In Uganda, many women give birth in their homes, on the ground of a traditional mud hut. If there are complications help may be too far away. Yet building enough clinics to cover the needs of rural Uganda will be a costly and time-consuming job.

The answer lies in dealing directly with the communities. In the Soroti region, 70 Traditional Birth Attendants (TBAs) are working with World Vision to help save more lives in their community. TBAs have previously practiced traditional tribal techniques to assist in childbirth. Some of those techniques, like using grass to cut umbilical cords and soot to treat the wounds, were causing infections and other health problems.

Besides learning basic mother care, nutrition and home hygiene, the TBAs now have access to basic medical kits, containing soap, a stethoscope, disposable razor blades, disposable gloves, an apron, needle and thread and a sheet of polythene for the mother to lie on.

The community is encouraged to make small contributions towards the replacement of items as they are used. In this way, the birthing mothers are protected at an affordable cost to the community.

Training these volunteer women in basic health care, and providing them with simple, affordable and effective tools is making the world of difference to families in rural Uganda.

Until these and other important questions about GM foods (e.g. economics, health and safety, environmental risks and the risk to bio-diversity) are fully answered, their use as a sustainable technology is in doubt.

World Vision's policy on GM foods is to use them only for emergency relief when no other grains are available. World Vision recommends that GM grains are ground before delivery, so that seeds do not enter the local food chain. In the meantime, World Vision is having success in promoting appropriate organic farming methods and crop diversification, resulting in up to a four-fold increase in crop yields.

What can you do?

- Look at your own lifestyle. How much of what you do could continue if you no longer had electricity? How would you store and prepare food? Would it affect your study, work or play?

- Compare some technologies available in New Zealand and decide if they are sustainable (either economically or environmentally). This includes solar power vs coal power; cars (petrol) vs trains (electric).

- Find ways to contribute towards a sustainable world – in your home, your community, your country and globally.

Further reading

- http://www.livelihoods.org/
  Livelihoods Connect, based in the UK, presents the Department of International Development's resources for 'creating sustainable livelihoods to eliminate poverty'.

- http://www.itdg.org/
  Britain's Intermediate Technology Development Group specialises in helping people to use technology for Practical Answers to Poverty.

Originally created by Heather Elliott in June 1991, with funding from the Australian international Development Assistance Bureau. Updated in February 2003.

World Vision New Zealand Information Centre
Private Bag 92078
Auckland
New Zealand
Ph. 0800 800 776.
Email: infocentre@worldvision.org.nz