CHAPTER 15

Appropriate and Inappropriate Technology

'HARD' AND 'SOFT' TECHNOLOGIES

Appropriate technology is a fashionable way to say "doing things in low-cost, effective ways that local people can manage and control."

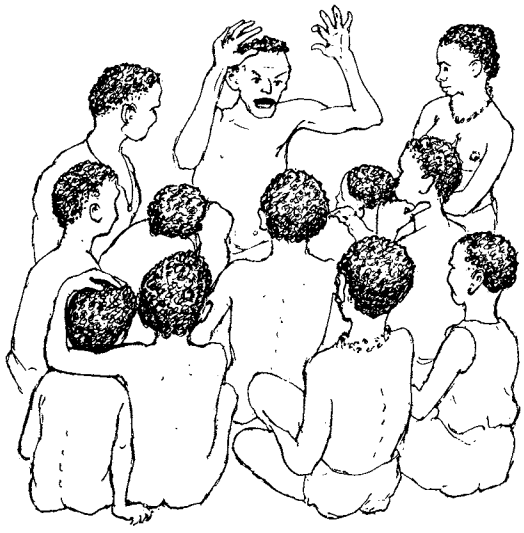
Development workers often use the term *appropriate technology* to refer to practical, simple THINGS—such as tools, instruments, or machines—that people can make, use, and repair themselves using local resources.

But appropriate technology also refers to METHODS—ways of doing, learning, and problem solving that are adapted to people's needs, customs, and abilities.

The technology of THINGS is called 'hard'; technology of METHODS is called 'soft'. Ideas are more flexible than bricks (if both are appropriate).

TWO KINDS OF APPROPRIATE TECHNOLOGY

METHODS



Story telling—an appropriate way of teaching, especially where people have little formal education and story telling is a tradition.

THINGS

Mud stoves that use less firewood—appropriate where trees and wood are scarce, but only if people will make and use them.

Unfortunately, some of the technologies commonly introduced by health programs turn out to be less appropriate than they seem. In this chapter, we will look at the strengths and weaknesses of some of the advice, methods, and things that are often assumed to be appropriate.

Chapter 16, which follows, also deals with appropriate technology. In it, we will look at some basic tools and pieces of equipment that health workers can make themselves.

HOW APPROPRIATE IS A SPECIFIC TECHNOLOGY?

To determine whether a certain **thing** or **method** is appropriate for your area, you can ask yourself the following questions:

Photo from Peru by Douglas Botting, from *Questioning Development* by Glyn Roberts.

- Is it acceptable to the local people?
- Do they (or will they) use it effectively?
- Will it help to improve the well-being of those in greatest need?
- Is it low-cost and efficient?
- Does it make full use of local resources, traditions, and abilities?
- Does it take into consideration any local factors such as geography, climate, and traditions, that may affect its usefulness?
- Does it keep a natural balance with the environment?
- Is it something that local people can easily understand, afford, and repair by themselves?
- To what extent were local people involved or consulted in its planning, design, selection, or adaptation?
- Does it provide more local employment? Or does it take jobs away?
- Does it build people's confidence to find their own answers and make their own decisions?
- Will it help close the gap between the rich and the poor? Or widen it?
- Does it help the weak to gain greater control and become more self-reliant?

RE-EXAMINING SOME COMMON ASSUMPTIONS

All aspects of a health worker training program—methods, materials, and content—should be continually re-examined. Questions like those on the previous page need to be asked again and again. **It is important that health workers take an active part in this questioning process.**

Much of the standard advice taught to health workers and villagers comes from faraway lands where conditions are very different. Some of it may apply to your own situation. Some may not. And some may even do more harm than good. Often recommendations from outside need to be adapted or completely changed. When planning a course or class, or providing any sort of information to student health workers, it is important to ask yourself:

- How is this information or advice likely to be accepted and used in the particular situation where the health workers will work?
- How is it likely to affect people's well-being—in terms not only of their immediate health needs, but of their long-range environmental, economic, and social needs?

Before giving people standard health advice, consider the reality of their lives.

To follow are 5 examples of standard health recommendations that need to be re-examined: (1) boiling of drinking water, (2) use of hybrid grains, (3) use of 'flow charts', (4) official inspection of food and marketplace, and (5) use of packaged rehydration salts.

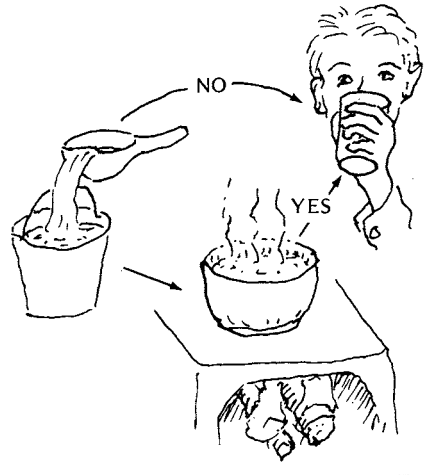
Example 1: Drinking water—to boil or not to boil?

Boil all drinking water is standard advice in many health programs. But is it good advice?

Often it is not! In fact, **advising families to boil drinking water may do more harm than good.**

Boiling does kill germs. But there are many other ways that the same germs can reach a child's mouth.

Water piped into homes, even if it is not 'pure', usually proves to be far more helpful in preventing infection. This is because it allows families to keep their homes and their children cleaner. For keeping a family healthy, quantity and availability of water are usually more important than its purity.



IS THIS APPROPRIATE ADVICE? Perhaps we should think again about this recommendation in *Where There Is No Doctor.* Health advice needs to be adapted to local conditions.

Before telling people to boil water, be sure to consider the cost to them. Families may be poor and resources limited. To boil water costs firewood (or cow dung), time, energy, and often money. If a poor family has to spend part of its limited food money on firewood, then boiling the water may actually harm their children's health!

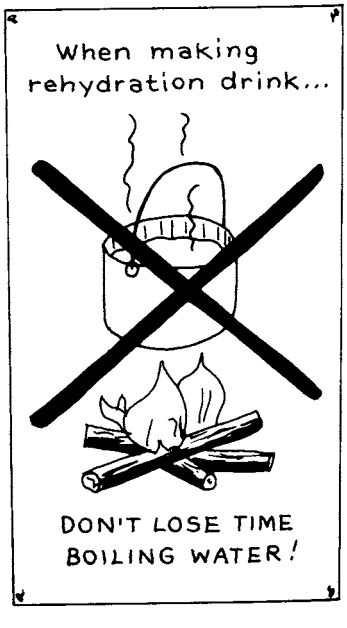
Good nutrition does far more to prevent infection than does boiling of drinking water.

Also consider people's need to live in balance with nature. In many areas, the gathering of firewood is turning forests into deserts. Where forests are destroyed, there is less rainfall, causing drought and crop failure. In these areas, advice on ways to cook with less firewood (such as by using special mud stoves) may be most important to long-term health. Advice to "boil your water" could be a slow death sentence, to both the land and the people.

Fortunately, in such circumstances, villagers tend to be more realistic than health advisers. They simply do not follow the advice. Unfortunately, the villagers are often scolded or made to feel backward for not doing so.

Boiling water for Rehydration Drink: Most dangerous of all is to instruct people to boil water when preparing Rehydration Drink for children with diarrhea (see Special Drink, p. **24**-20). **Telling mothers to boil the water for Rehydration Drink may actually cause more infant deaths.** The reasons are these:

- **Boiling water means extra work and extra cost.**
- Some mothers will simply not make the Special Drink if told they must boil the water for it.
- **Boiling takes time.** Cooling takes still more time. But a baby with diarrhea needs liquid immediately! The delay caused by boiling increases the danger of dehydration. This increased risk outweighs the germ-killing benefits. In any case, the baby with diarrhea probably already has the infection that the unboiled water might give him.

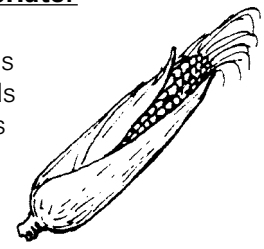


Instead of telling people to boil the water when preparing Special Drink, it is better to advise them, "Prepare it fast! Use the cleanest water you have. If you have water that has already been boiled, that is best. But DON'T LOSE TIME BOILING WATER WHEN YOUR BABY HAS DIARRHEA!"

Because preparing Rehydration Drink takes time, it is also wise to advise mothers of children with diarrhea to give plain water at once, and until the drink is prepared.

Note: This advice about boiling, like all advice, needs to be adapted to local conditions. In places where people get their water from open sewers, for example, boiling water may be an essential, even life-saving measure. Where firewood is scarce, you can put water (or Rehydration Drink) in small, tightly sealed plastic bags or clear plastic or glass bottles. Leave these in the sun all day. This will kill all or most of the germs.

Example 2: Native grains or hybrids—which are more appropriate?



In farming and nutrition, as in other areas, development programs sometimes introduce new technologies that do not meet the needs of the poor as well as the old ways (see Chapter 7 and Hesperian's *A Community Guide to Environmental Health*). People need to carefully evaluate any new methods that agricultural extension workers or other outsiders try to introduce. As with medicines, **possible benefits must be weighed against possible harm.**

Consider hybrid grains. Hybrids are varieties produced by crossing two closely related types, in order to increase the amount of harvest. Under the best conditions, they often give a higher yield (more harvest per hectare). But they sometimes require costly fertilizers and insecticides—which may upset the natural balance of plants and animals in the area.

An even bigger problem is that **a new kind of plant disease could suddenly appear and in one season destroy all the hybrid grain planted in the entire region.** The result could be economic ruin and widespread starvation. The crops can be destroyed easily because hybrids lack the natural variation needed to resist disease. Native grains, on the other hand, have enough variation so that only a part of the crop is likely to be ruined by such an epidemic.

Nevertheless, banks, agriculture experts, and governments in some parts of the world have given a great deal of support to the growing and marketing of hybrid grains and even worse, Genetically Modified grains (GMOs). As a result, some native grains are in danger of being lost or weakened through crossbreeding with hybrids or GMOs. This could lead to disaster in the future because when an epidemic destroys a hybrid crop, the native grain—if it still exists—must provide the reserve from which a more disease-resistant hybrid can be developed.

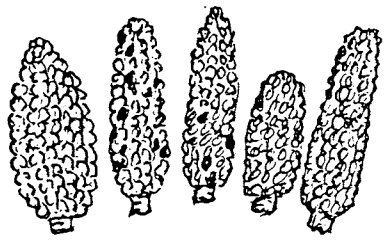
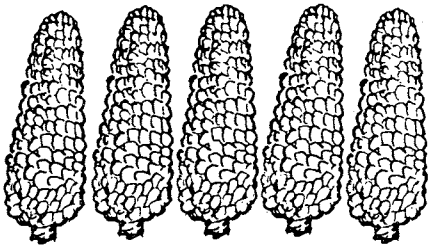
In the case of maize (corn) grown in Mexico, this danger is near. There the government pays a higher price for hybrid 'white maize', and it is now grown on almost all the large irrigated landholdings. Today, the main reserve of the traditional *criollo* maize lies in the small independent plantings of poor farmers. Although this yellow maize has been the main food in the native people's diet for hundreds of years, many small farmers are now switching to the white hybrids, tempted by the promise of a greater yield and a higher market price.

But **the disadvantages and risks of growing the hybrids and GMOs are felt especially by the poor farmer.** The white maize and GMOs require expensive fertilizers and often insecticides for good harvests. They are less resistant to disease. And they mature more slowly than the native grain—so if the rainy season is short, the crop fails. All this does not matter much to the large landholder with irrigated fields. But it is of great importance to the small farmer.

The nutritional difference is also a concern. *Criollo* maize is higher in protein and vitamin A than the new varieties. For families that can afford to eat meat and cheese, this difference is not very important. But for poor families, that often lack even beans, the additional protein in *criollo* maize can make the difference between health and malnutrition.

Unfortunately, the training of many agricultural advisers has been designed to meet the needs of large landholders and decision makers who can afford meat and cheese. As a result, village health and development programs are often advised to grow high-yield hybrids instead of native grains. In areas where hybrid crops are being introduced, it is important that program leaders study these questions carefully. They can then help health workers gain enough understanding of the issues to be able to give people sound advice.

A COMPARISON BETWEEN NATIVE AND HYBRID MAIZE

MORE APPROPRIATE	LESS APPROPRIATE
	
Native yellow or *criollo* maize has great variation, so it resists epidemic disease. It also matures faster, resists drought more easily, and is more nutritious than white hybrid maize. Although it often produces less grain, it is more sure to yield a harvest under difficult and variable conditions. For small farmers who lack irrigation and eat mostly maize, growing traditional yellow or ***criollo*** maize is a safeguard to health . . . now and in the future.	**White hybrid maize** has very little variation. All plants and ears are similar. So a crop of this maize can be destroyed completely by sudden epidemic disease. It matures slowly, and requires irrigation, fertilizers, and pesticides for good harvests. It also has less protein and vitamins than the native yellow maize. Because of its higher yield, the hybrid is attractive to large landholders. Its white flour appeals to commercial mills and sellers. But in the long run, if it replaces native maize completely, its destruction from sudden disease may cause widespread starvation.

Problems similar to those with hybrid maize in Latin America have occurred in many parts of the world. In **Zambia,** a mold called ***fusarium*** destroyed hybrid maize on big farms, while small farms with traditional maize were not affected. In the **Philippines,** epidemics have destroyed huge crops of hybrid rice. In **Indonesia,** 200,000 hectares of hybrid rice were lost in 1974 and 1975 because of a new virus disease spread by insects. Now the Indonesian government is trying to improve the old local varieties of rice, instead of using hybrids from outside the area.

Note: We are not suggesting that all hybrid grains are bad and should not be used. As long as care is taken to maintain a reserve of native grain, certain hybrids can be of considerable benefit. In a just political climate, they may even help to improve the well-being of the poor. Also, some hybrids—such as ***Opaque 2*** maize—are more nutritious than the native grains, although there have been major problems with rot, fungus, etc. The point we are trying to make is this:

Health workers should not simply accept hybrids—or anything else introduced by outsiders—without first checking to see if they will really meet the needs of the local people.

Raising social awareness using the example of *criollo* and hybrid maize:

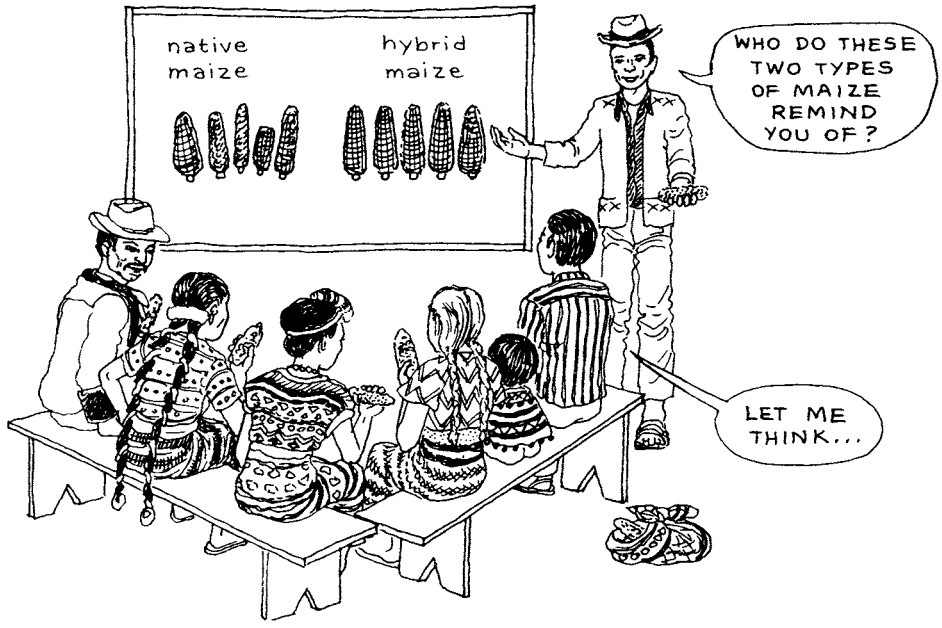
When you stop to think about it, the differences between ***criollo*** and hybrid maize have a kind of symbolic meaning.

After health workers have discussed the advantages and disadvantages of each type of maize, have the group imagine that these represent two kinds of people. Hand around samples of each kind of maize and have everyone think quietly for a few moments. Ask them to consider how the two kinds look, whose needs they serve, and their present and possible future effects on people's health. Then ask them to relate their ideas to different approaches to education, health care, and government.

You might start by asking questions like these:

- Who do these two different types of maize remind you of? Why?
- How do the different types (of maize and people) relate to the needs of the poor?
- What type do our schools try to produce? What type does the army try to produce? Why?
- How do these different types of maize compare with the kinds of health workers different programs try to train?

The group can carry on with their own questions and answers. It will be interesting to see where the discussion leads!



WARNING: In leading a discussion like this one, you will need to be careful that people do not conclude that they, the 'natives'—because they appear darker, more irregular, and 'less perfectly formed'—are less worthy than the more uniform 'white' variety. Help them understand that, in spite of appearances or what they have been told, they have a hardiness, strength, and ability to survive under difficult conditions, that the more demanding, artificially developed, more uniform variety often lacks. If the discussion is led well, people will end up with a new appreciation and respect for both their native crops and themselves.

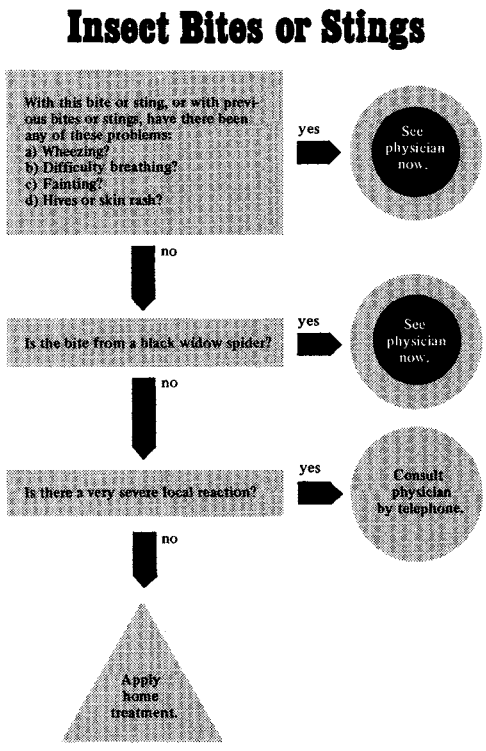
Example 3: Flow charts

Some health programs make extensive use of flow charts, or ***algorithms.*** These are charts designed to help health workers diagnose illnesses by guiding them through a series of yes-or-no questions.

A few studies done under ideal conditions have shown that health workers make more accurate diagnoses with flow charts than when using more conventional methods. However, some programs have had disappointing results with flow charts. They have found that the charts often make for a less personal relationship between the health worker and the sick person. Also, some health workers with limited formal education find flow charts difficult or confusing.

Our biggest objection to flow charts has to do with the question of who has control. **Flow charts provide a means of keeping control over diagnosis and treatment in the hands of the professionals** who design the charts. Little decision making or clinical judgement is expected of the health worker. The hidden message in most flow charts seems to be, "We don't trust you. Your role is to follow instructions. Not to think. Not to lead!"

This lack of trust is also reflected in the fact that the most frequent final command of many flow charts is "Refer to doctor at once." Often no other information or advice is provided, even though early emergency treatment by a community health worker might save the person's life.



A TYPICAL FLOW CHART—from *Take Care of Yourself,* by Donald M. Vickery, M.D. and James F. Fries, M.D., Addison-Wesley, 1976.

In spite of the fact that they are sometimes used to limit the health worker's diagnostic role to one of mechanically following instructions, **flow charts can be a helpful learning tool.** Some programs have successfully used flow charts to help health workers learn to ask appropriate questions and approach diagnosis in a logical, step-by-step way. But many have found that once those skills are learned, their health workers work just as accurately with, and greatly prefer, simple lists of signs (as in *Where There Is No Doctor).*

As with any other health technology, the appropriateness of flow charts must be judged on social as well as medical grounds. A key question to ask is, **"Does the use of this technology encourage or discourage initiative, critical thinking, and problem-solving skills?"**

As we have seen, flow charts can be used to help health workers develop independent mastery of the problem-solving process. Or they can be used to keep the health worker dependent on the decisions of professionals. Which way they are used will depend largely on the program's trust and respect for health workers and whether they want them to be followers or leaders.

Example 4: Inspection of food and market place—top-down or bottom-up?

A public market where farmers and vendors sell food can be a place where disease is spread through spoilage, dirt, flies, and careless handling.

A variety of approaches have been taken to 'clean up the market place'. In some cases, the authorities take steps that throw small, independent sellers out of the market. Or public health inspectors sometimes fine the vendors or close down stalls that do not meet standards of cleanliness.

Unfortunately, attempts by health authorities and officials to clean up market places have resulted in many abuses and hard feelings. The small farmers selling their produce are often hurt most. This leads to more 'middle men' and higher prices, which means that poor customers also suffer.

Some sort of cleanliness inspection for the market place may be appropriate. But **health workers need to find ways for checks and control to come from the local people rather than from outside authorities.**

A good example comes from Togo, Africa, where school children have become the local 'health inspectors'. Once a week the children go to the market and observe the cleanliness and condition of all the stalls. They check to see if the vendors' hands are clean, the floors swept, and the food fresh and protected from flies. To each stall that passes their inspection, they award a red ribbon. The people who come to buy have learned to look for these ribbons and prefer to buy where they are displayed. So vendors try to keep their stalls clean in order to pass the children's test.

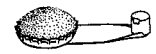
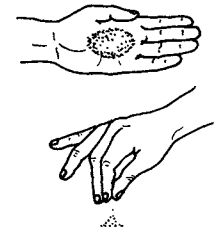
Teaching suggestions:

Discuss this example from Togo with the learning group and see how many beneficial features they can point out. Here are some:

- It is an example of true community participation. A group that usually has little power (the children) is able to take a leading role in dealing with a problem affecting their health.
- In taking this responsibility, the children not only learn about hygiene and sanitation, but put their knowledge into action.
- The children take part eagerly because they are doing something that matters and because **they are in charge.** It builds their confidence and awareness.
- Rather than focusing attention on those who fail the inspection, the child-inspectors reward those who do best.
- The example shows everyone involved—children, sellers, and buyers—the possibilities of a friendly, community-based approach to solving problems in which the weak gain strength through popular support.

Example 5: Oral rehydration—which method is most appropriate?



Diarrhea is one of the main causes of death in small children. However, most of these children actually die from ***dehydration***—the loss of too much water. It is generally agreed that the most important way to manage diarrhea is to replace the liquid that the child is losing. But there is less agreement about how to do this.

A few years ago, most doctors treated even mild dehydration by giving intravenous (I.V.) solution. But this was expensive, and many children died in diarrhea epidemics because there was not enough I.V. solution, or not enough skilled workers to give it.

Today, most health planners recognize that ***oral rehydration***—or giving liquid by mouth—is the best way to manage most cases of diarrhea and dehydration. **Even in clinics where I.V. solution is available, it usually makes more sense to replace liquids by mouth.** This way parents learn how to prepare and give liquids so they can begin treatment early, at home, the next time a child gets diarrhea.

A Special Drink or Rehydration Drink can be made from water mixed with small amounts of sugar and salt. It is even better if the drink contains a little ***baking soda*** (bicarbonate of soda) and a mineral called ***potassium***—found in orange juice, coconut water, banana, and other foods.

- The **salt** in the Special Drink replaces the salt lost through diarrhea, and helps the child's body to keep liquid.
- The **sugar** provides energy and also helps the body absorb liquid more quickly.
- The **baking soda** prevents 'acid blood', a condition that causes fast, heavy breathing and shock.
- The **potassium** helps keep the child alert and willing to drink and eat.

The amounts of sugar and salt in the Special Drink do not have to be very exact. In fact, there is great variation in the amounts recommended by different experts. However, too little sugar or salt does less good, and too much salt can be dangerous.

TOO MUCH SALT IN REHYDRATION DRINK USUALLY MAKES CHILDREN VOMIT.

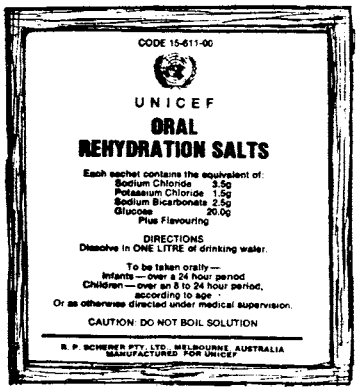
TOO MUCH SALT IS DANGEROUS!

There is much debate among health planners about how a rehydration drink should be prepared. The main disagreements center around 3 issues:

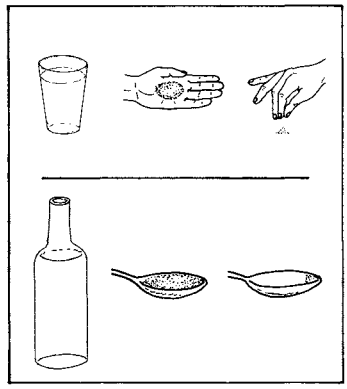
- Whether to use mass-produced 'packets' or homemade rehydration mixes.
- What amount of salt to use.
- Whether methods should be standardized or locally adapted.

Instructors of health workers should be familiar with the different points of view so that they can prepare health workers to make appropriate decisions and advise people well.

1. 'Packets' or homemade mix?



- Which can save more lives?
- Which is more reliable in terms of safety? In terms of being available when needed?
- Which puts more control and responsibility in the hands of the local people?



Many large organizations, including the World Health Organization, favor teaching people to use factory-produced 'rehydration salts'. Millions of standard packets have been produced by large drug companies and are now being distributed in many countries by UNICEF and other groups. Each UNICEF packet can be used to make 1 liter of Rehydration Drink.

Smaller, community-based programs often favor teaching families to make their own Special Drink, using water, sugar, and salt that they have in their homes or can buy at the local market.

Those in favor of the packets argue that these are safer and work better. "After all," they say, "the contents of each packet are accurately measured. Baking soda and potassium are included. And the special sugar ***(glucose)*** may, in some cases, be more easily absorbed by children with severe diarrhea." (However, studies indicate that ordinary sugar works as well.)

Those in favor of the homemade Special Drink argue that this approach allows more children with diarrhea to be treated, right away, and in their own homes. If packets are used, then for each case of diarrhea families will have to depend on a supply system that involves foreign manufacturers, international organizations, health ministries, transportation networks, and health posts. But in most parts of the world, the sugar and salt needed for home-made mix are common household items. Once they learn how, families can make and use the drink right away whenever it is needed—without having to depend on outsiders.

"But you must consider safety!" argue the packeteers. "If people make their own rehydration drink, they may put in too much salt! That can be dangerous!"

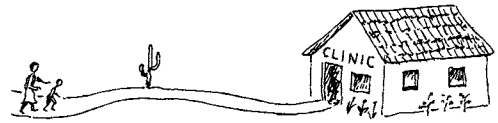
"True," say the home mixers. "But if people mix a standard packet with too little water, the result can be equally dangerous!" And it does happen. John Rohde and others conducted a study with two groups of mothers in Indonesia. One group made Rehydration Drink using packets. Another group mixed salt, sugar, and water, using plastic measuring spoons. **The study showed a slightly higher number of mothers prepared dangerously salty drinks when using the packets.**

Another argument often given by those favoring packets is that the packets seem more like medicines, and therefore people accept them more readily than homemade mixes. This may be true. But, surely, to promote a simple drink by giving it the magic of a medicine is shortsighted. It makes far more sense to help people understand oral rehydration and why it works. Many health workers feel it is important to **look at Rehydration Drink as a FOOD, not a MEDICINE!** Strict medical controls for this basic food supplement are an obstacle, not a help.

The underlying issue in the argument about packets and home mixes is political. Do health planners want to use technology that will make poor families more self-reliant and independent? Or do they want to use outside technologies that make people more dependent on institutions and central control?

We think that, in most circumstances, the arguments in favor of the homemade drink strongly outweigh those in favor of packets. An exception might be in remote areas where sugar or salt is sometimes scarce or unavailable.

What about packets for use in clinics?



Some health program planners suggest that Special Drink should be prepared by families in their homes, but that packets or more complex mixes might be more appropriate in health posts and clinics. We disagree. The health post or clinic should be a center for parent education. So it is important that, even in the clinic, the parents learn to prepare the Rehydration Drink and give it to their children themselves.

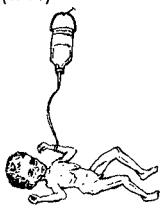
In the health post or clinic, use the same rehydration methods you want families to use in their homes.

On the following page is a diagram showing many different methods of rehydration. They range from those that are completely dependent on outside resources (I.V. solution) to those that permit the greatest self-reliance on the part of the family.

Discuss these choices with the health workers in your training course, and decide together which approach will best serve the needs of people in your area.

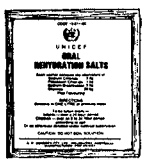
A RANGE OF REHYDRATION METHODS FOR CHILDREN WITH DIARRHEA

intravenous solution (I.V.)

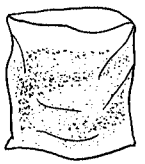


factory-prepared oral solution

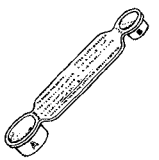
factory-prepared packets of 'rehydration salts' for mixing in water



bags with salts, prepared at the health center for mixing in water

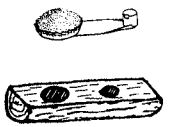


homemade drink made with plastic measuring spoons



homemade drink made with spoons found in the home

homemade drink made with homemade spoons



homemade drink with salt & sugar measured with the fingers or by another traditional way

MORE DEPENDENCY
control in the hands of institutions and professionals

MORE SELF-SUFFICIENCY
control in the hands of the family

ADVANTAGES AND DISADVANTAGES

Control and responsibility mainly in the hands of professionals, institutions, and drug companies

Measurements more precise and 'controlled' (at least in theory)

More magical; acceptance may be quicker but with less understanding

More dependency—on high technology, on outside resources, on centralized services, and on local and international politics

More expensive

Easier to gather data on, and prepare statistics about

Reaches fewer people; supply often uncertain and inadequate

Sometimes causes delay in treatment, because special materials have to be obtained; effect is more curative than preventive

Focus is on materials and supply (so cost goes up each year)

May give better (safer) results for individuals treated in time, but has worse results overall since many children never receive the liquid, or are given it too late

ADVANTAGES AND DISADVANTAGES

Control and responsibility mostly in the hands of the family

Measurements less precise, less 'controlled'

More practical and easier to understand

More self-sufficiency; uses local resources (whatever is available in the home or in stores)

Cheaper

Harder to gather data on, and prepare statistics about

Reaches more people; supply is local and almost always available

Treatment can begin at the first sign of diarrhea; more preventive than curative

Focus is on people and on education, so the people's capacity for self-care increases over the years (cost goes down)

May be less safe in individual cases due to the possibility of errors in preparing or giving it, but it probably saves many more lives—since it reaches more children more quickly

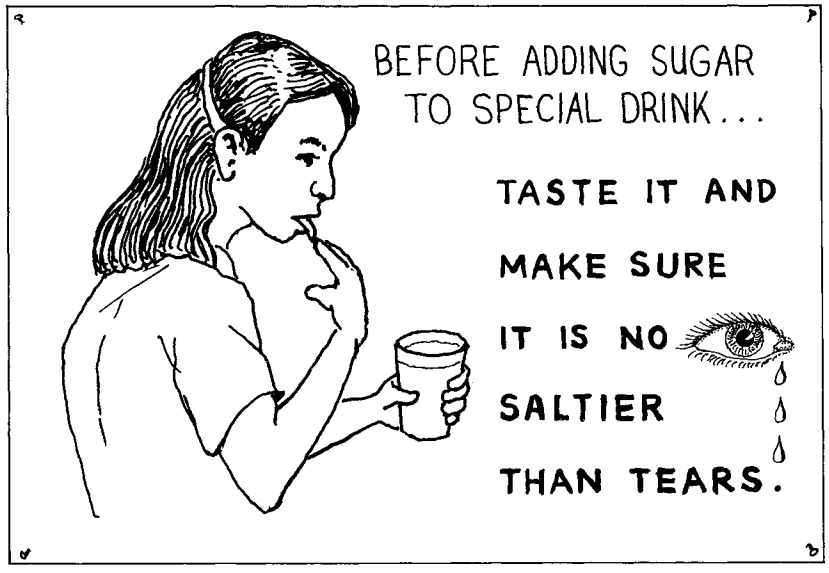
2. What amount of salt should be used in Rehydration Drink?

Doctors, scientists, and 'armchair experts' usually recommend that rehydration drinks have about the same concentration of salt as is in the human body (about 3½ grams, or 1 level teaspoon per liter). This is the amount used in the UNICEF packets.

However, people do make mistakes sometimes. When it comes to medicines, many persons think, "The more, the better." Because the most common mistake is to put in too much rather than too little, many persons with community experience believe it is wiser to recommend a lower salt concentration. (In ***Where There Is No Doctor,*** we suggest half the UNICEF amount.) Since a lower concentration usually causes no problems, and a higher concentration can be dangerous, this is a sensible precaution. It takes into account not only the scientific ideal, but the reality of human nature. This is a factor the experts often forget.

Even the WHO, belatedly realizing this human factor, now often recommends that you "give a glass of plain water between each glass of ORS (Oral Rehydration Solution)." A wiser plan would be to face up to human error—their own as well as other people's—and put less salt in the packets.

Imposing outside controls is not the best way to deal with this issue. Instead, help people to realize the importance of using the right amount of salt. And show them how to test for it (see the story on p. **1**-27). Here is a good test to help people make sure that the drink is not too salty:



3. Worldwide standardization or local adaptation?

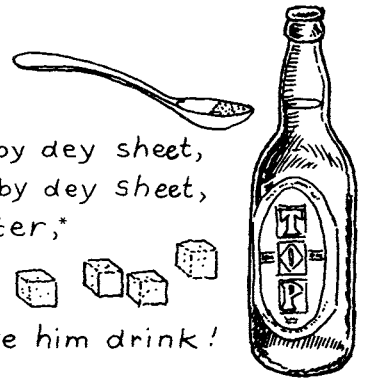
Large organizations tend to want to standardize rehydration methods (along with other aspects of life and health). Although, at conferences, WHO and UNICEF experts may speak in favor of "local adaptation," in fact, they are promoting their standardized packets in as many countries as are willing to accept them.

But this standardization has led to the very problem the experts fear. In many places, one-liter containers are not available—so people mix the packets in smaller containers. The resulting drink has too much salt!

It makes more sense to adapt Rehydration Drink to the resources and traditions of each area. In Bangladesh, for example, women learn to make the drink with crude block sugar from home-grown cane. They measure a 'pinch of salt' with their fingers and this works fairly well.

In Nigeria, families use cubes of 'St. Louis sugar' in the universal 600 ml. beer bottle. To help mothers remember how to make the drink, a group of nuns teaches them the following song, sung in Pidgin English. 'Purge' and 'sheet' are local terms for diarrhea. (Compare with the song on p. **1**-27.)

ORAL REHYDRATION SONG
by Sister Rose U. Nwosu



If baby dey purge, baby dey purge, baby dey sheet,
If baby dey purge, baby dey purge, baby dey sheet,
In a beer bottle of clean boiled water,*
Add four cubes St. Louis sugar,
Add half level teaspoon salt,
Give to baby, make him drink, make him drink!

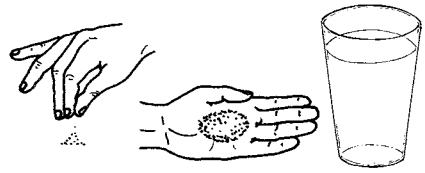
*Taking time to boil the water may not always be best. See the discussion on page **15**-3.

Ways to measure sugar and salt for homemade Rehydration Drink:

One of the biggest problems in making the homemade drink is measuring the right amounts of sugar and salt. Spoons in people's homes are not always the same shape and size.

One method that has been tried is to **'pinch and scoop'** with the hands. Some health experts protest that this method is very inaccurate. And often it is—in areas where people are not used to measuring this way. But in places where people traditionally measure foods and spices with their fingers, the pinch and scoop method appears to be fairly accurate.

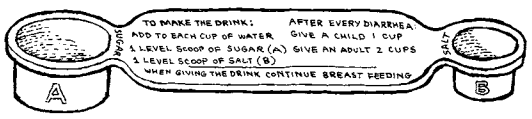
Appropriate where people traditionally measure with their fingers:



3-finger pinch SALT | 1-hand scoop SUGAR | in 1 glass WATER

Special spoons for measuring the sugar and salt have also been used. Some of these spoons are manufactured in developed countries. Others can be made in villages—even by children. The advantages and disadvantages of several kinds are discussed below.

APPROPRIATE AS A MODEL

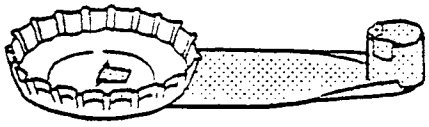


Sugar Salt

Plastic measuring spoons for making Special Drink are now being used in several countries. They are distributed by TALC (see p. **Back**-3). For those who can read, a big advantage is that instructions are printed right on the spoon.

Unfortunately, these spoons have some of the same disadvantages as the packets of rehydration salts. They are produced using high technology (plastic), so people must depend on an outside supply. Also, they add a sense of mystery to what is basically a simple process. (A mother may feel unable to make the Special Drink because she has lost her 'magic' plastic spoon.) So TALC now recommends that the plastic spoons be used mainly as models for health groups, school children, and villagers who want to make their own spoons using local resources. For that purpose, TALC will send a free sample spoon on request.

MORE APPROPRIATE



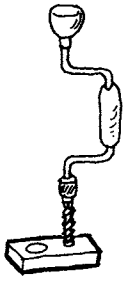
Sugar Salt

A similar spoon can be made from old bottle caps and beer or juice cans—or from other materials commonly found in villages. In Mexico, children have made hundreds of these spoons through the CHILD-to-child program. By making and learning to use the spoons themselves, people realize there is nothing magical about the Special Drink. And if they lose a spoon, they can easily make another one.

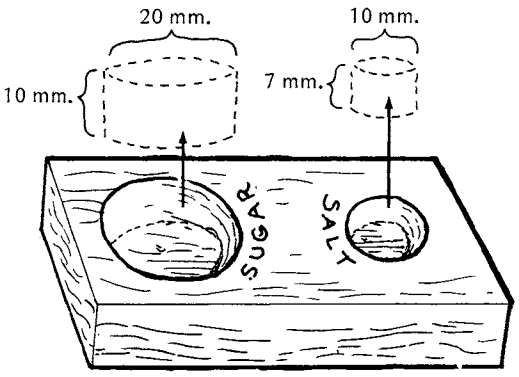
In designing an appropriate homemade spoon for your particular area, take care to see that each spoon made will measure about the same amount. For example, the spoon shown above uses a standard sized bottle cap for the sugar scoop. And the salt scoop is made to the diameter of a pencil. For instructions on how to make this spoon, see p. **24**-21.

Another kind of measuring spoon can be made by drilling holes in a small piece of wood.

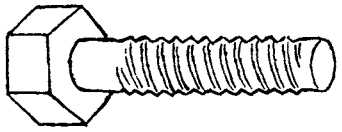
Drill the holes to be as wide and deep as shown in the drawing at right. Or you can carve the holes, taking care to make them the right size. A model plastic spoon like the one shown above can be used to check the sizes of the holes you have made.



MORE APPROPRIATE



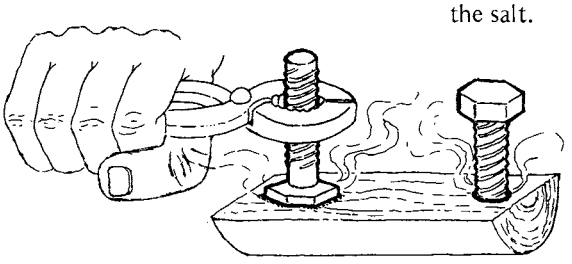
If you do not have a drill for making the wooden measuring spoon, you can try using a red-hot bolt about this size.



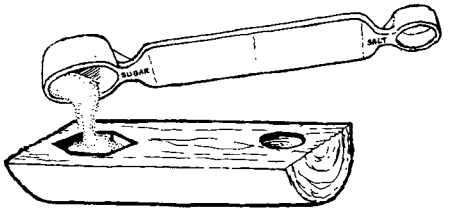
Heat the bolt in a fire, and use it to burn two holes in a piece of wood.

Use the big end for the sugar.

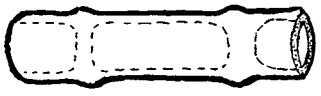
Use the small end for the salt.

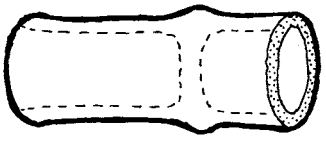


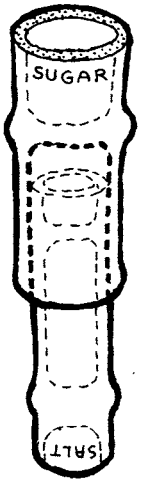
Use a model plastic spoon (if you have one) to check if each hole is the right size. If the hole is too small, burn it deeper. If it is too big, shave some wood off the top.



Yet another kind of measuring spoon can be made out of bamboo. Find 2 pieces of bamboo with hollow centers about as big around as the scoops of the model plastic spoon.







Cut the bamboo so the dividers form cups that can hold just a little more than the scoops of the plastic spoon. File or trim them until they hold the right amounts of sugar and salt. Then slip the two pieces together to form a double-headed measuring spoon.

The important thing in making homemade spoons is to encourage local people to use their imaginations to adapt whatever materials they have on hand. But at the same time, care must be taken to see that the spoons are reasonably accurate.

Helping people use local resources to meet their needs means they will not have to depend as much on outside supplies and assistance. Their increased self-reliance will give them more control over the things that affect their well-being.

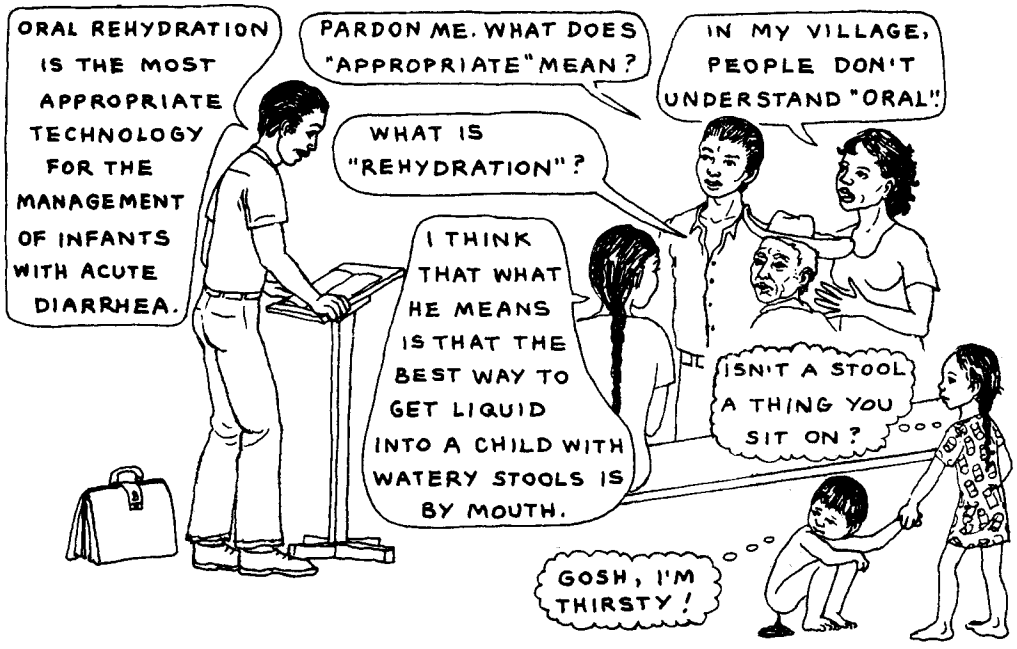
APPROPRIATE USE OF LANGUAGE

The use of complicated language is one of the biggest obstacles to making the tools and knowledge of modern health care available to ordinary people. Several times in this book, we have emphasized the need to keep language clear and simple. This point is extremely important.

Many instructors use big, 'scientific' words to explain things to health workers. Then they instruct the health workers to "put it into the people's language" when they work with parents and children. By doing this instructors not only set a poor example, they also fail to prepare the health workers in one of the most basic skills they will need: the ability to say things in a way that people can understand.

It is the job of the instructor, not the health worker, to translate the big words of textbooks into ordinary language.

If instructors have trouble speaking simply, and many do, they can ask the help of their students. At the training course in Ajoya, **the instructors urge students to interrupt each time anyone uses a word they do not understand.** The students quickly become capable 'language watchdogs'. In this way, instructors and students teach and challenge each other. Sometimes visiting instructors, though warned to use simple language, get interrupted several times in their first sentence—a marvelous learning experience for them! (See the story on page **2**-16.)



The first rule for any 'appropriate technology' is to explain it in words that people can understand!