Avoidable dangers on the farm
Dinesh Mohan

Research in a small area of India showed that farm equipment must cause millions of injuries every year.

A large proportion of the world's population live in rural areas and a majority of these people are involved in agricultural activities. In spite of their numbers, people living in rural areas do not have access to adequate health care, and in most countries we do not have detailed epidemiological information about their health problems. This is partly because information on details of illness and injury do not get recorded in city hospitals, which is where most research is conducted.

In the 1960s and 1970s agricultural machinery was introduced to India in large numbers, particularly in those areas where "green revolution" practices were being followed. By the mid-seventies, reports started appearing in the press that many farmers were getting their hands crushed in machines which are used for the threshing of wheat - separating the grain from the chaff. This prompted scientists at the Punjab Agricultural University in northern India to undertake a scientific study of the threshing operation, as a result of which the first safety standards for the threshing machines were established.

At about the same time, India adopted a Dangerous Machines Act which makes it illegal to sell and use agricultural machinery which is declared hazardous. Nevertheless, reports detailing traumatic injuries among farm workers continued to appear in our newspapers.

In 1985, we decided to do a detailed study of agricultural accidents, and by the end of 1986 we had assembled a team of engineers, designers, medical specialists and epidemiologists. We selected nine villages with a population of about 3500 families as our study area, and trained 15 local men and women to work as research assistants. These research assistants visited every home once every two weeks to record details of all illnesses and injuries over a one-year period.

We discovered that a large proportion of illnesses and injuries are treated at home or by local healers and doctors. If we had just gone to the large hospitals to collect data, we would have missed most of the cases. It was also surprising to find that injury cases comprised a total of 14% of all cases of morbidity; injuries were more frequent than diseases like malaria, hepatitis and chickenpox. This is very similar to the situation in many of the industrialized countries.

The study showed that about one in ten persons can expect to sustain an injury which disables for one day or longer. One-third of these injuries were due to activities related to agriculture and one-seventh while travelling from one place to another. One-fifth were due to play and leisure activities and only one-eighth to domestic activities. Violence was responsible for 6% of the injuries and suicides for 14% of deaths due to injury. All suicides involved ingestion of pesticides. Most of the very serious injuries were due to transport, or use of machinery and electric power.

Our data clearly showed that introduction of more powerful equipment, machinery and vehicles in a population results in an increase in traumatic injuries unless care is taken to make their use safer. Agriculture-related injuries in our study villages amounted to about 20 minor and three moderate-to-serious injuries per thousand people every year. This obviously means that in a country like India agriculture-related serious
injuries and deaths would be in the region of 5 million and half-a-million respectively. Most of the minor injuries are due to hand tools.

Women and children were also found to be victims of injuries with agricultural equipment. Women and older children work alongside men in threshing machines, and some women got their hands crushed while playing with fodder-cutting machines, and some women got their hands crushed while feeding grass into the machines. Threshing machines are also responsible for many hand-crush injuries.

A detailed examination of the conditions under which these accidents took place makes it very clear that, though the farm workers are very much aware of the hazardous nature of their machinery, they still end up being involved in accidents. This is why it is very important for safety features to be built-in when these machines are designed. The designer also has to take into account the realities of local life. For example, tractors are regularly used for transporting people, children play with equipment when not in use, and machines are dismantled and repaired on farms.

Our experience shows that it is possible to design inexpensive and practical safety features for farm machinery. To be acceptable, such safety equipment must not make the operation of the equipment more cumbersome or less efficient. It is best if these safety guards are permanently fixed on the machines.

In consultation with farmers, artisans, engineers and product designers we were able to make fodder-cutting machines much safer without increasing the cost significantly. This has been done by incorporating a warning roller before the crushing mechanism and attaching a blade guard which pushes children’s hands away before the blade can touch the fingers. Over a hundred farmers in this area have now fitted these devices to their machines.

Similar improvements to equipment such as threshers, tillers and harrows can make farming a much safer occupation. But many more professionals will have to be involved and many more people will have to take up such work seriously. Otherwise the unnecessary maiming and killing of millions of farmers and their families will continue around the world.

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Surviving burn injuries

Inferno injures hundreds when jumbo jet slams into apartment building. Workers die in fire at chemical-processing plant. Cigarette fire kills family of five. Burn scars disfigure young woman when sari ignites at kerosene stove. Burn disasters make international and national headlines, yet most burn injuries occur in the home in all societies. Children under four years of age are three times more likely to be burned than any other age group, although the elderly have a high risk of dying from their burns. In homes throughout the developing world, the most common flame burn risk is associated with kerosene lamps and stoves. In industrialized countries, lighted tobacco products — primarily cigarettes — are the major cause of fire deaths.

There are massive discrepancies in survival rates between higher and lower income countries. By 1980 in wealthier countries, more than half of all patients with burns over 63% of body surface area survived. But a recent study in India found only four survivors out of 1617 patients with burns over more than 50% of the body surface.

What world and community leaders can do

- Support the training of health personnel in how to care for burn patients.
- Mount education campaigns to teach people to apply cold water as best first aid for burns.
- Support the efforts of the International Society for Burn Injuries (ISBI) to ensure that countries develop realistic “disaster planning protocols” to care for those injured in a major fire.

In cooperation with ISBI, WHO has been carrying out an information collection process for the past five years. A training manual has also been produced for use at primary health care level, and an overall assessment of burn epidemiology and prevention programmes will be made by 1994.