



IDRC FEATURE

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DISCOVERING THE HIDDEN HARVEST

by MICHELLE HIBLER

Without one more ounce of fertilizer, one more new seed variety, one extra acre of farmland, it is possible to increase the world's annual food output by millions of tons. Billions of dollars worth of vital food are, in fact, lost between the field and the kitchen, waste that could be prevented by adopting a totally integrated system for harvesting, processing, storage, transportation and marketing.

The scope of the problem is enormous: as much as 30 percent of food crops harvested in tropical countries is lost due to inefficiencies in the post-harvest system. In Upper Volta, for instance, from 50 to 100 percent of the harvested food legumes are lost during a 12-month storage period: 90 to 100 percent of Zambia's maize crop is lost over the same period. In Bombay, 3 600 tonnes of cereals are lost annually from rodent damage alone -- enough to feed over 20 000 people for a year.

Inefficient harvesting and drying methods, inappropriate processing techniques, inadequate methods of storage and distribution, even insufficient preparation or use of foodstuffs in the home: all contribute to the loss of the grains themselves and to the reduction of their economic and nutritive value. To offset these losses an increase of 50 percent in the crops grown would be needed. Between 1952 and 1972, however, total food production in developing countries increased by barely 3 percent annually.

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While attempts are being made to improve individual steps in the post-harvest process, the technology used is often unsuited to local conditions and fails to take the whole process into account. "Strangely, the system has rarely been examined as a whole", says David Spurgeon, author of Hidden Harvest, A systems approach to post-harvest technology, recently published by the International Development Research Centre (IDRC) of Canada. Experts tend to look exclusively for improvements in their own specialities and international agencies have been mainly concerned with storage -- only one aspect of the problem.

The approach proposed by Mr. Spurgeon considers the post-harvest system as encompassing the delivery of a crop from the time and place of harvest to the time and place of consumption, with minimum loss, maximum efficiency and a maximum return for all involved. The systems approach -- a problem solving technique that put man on the moon in 1969 -- analyzes the interaction of the various components in the system (harvesting, threshing, drying and storage, processing, packaging, marketing, utilization) and then interconnects them in such a way as to maximize the performance of the entire system.

The magnitude and complexity of the system of course varies from country to country according to the crop. Where subsistence farming is predominant -- as in most parts of Africa -- it is only a question of harvesting, storing and processing the crop on the farm itself. But with the need to produce more to feed expanding urban populations, the crop must go through a more complex system.

The problems that arise are numerous. Where should the storage points be located? How and when are the crops transported? If a processing unit is required, of what type should it be to meet the varied consumer needs in the region? What kind of dryer should be used? Should it be located close to the mill or nearer the fields to avoid deterioration of high moisture crops? Whatever system or equipment is used, it will obviously need to be tailored to the area it serves.

The Maiduguri Mill project, a joint venture of Nigeria's Ministry of Agriculture and Natural Resources, the North Eastern State's Ministry of Natural Resources and the IDRC, is a case in point of how the systems approach can -- and does -- work in a post-harvest system.

Maiduguri, a town of some 150 000, lies in the centre of an area where sorghum, maize, cowpeas and some wheat are grown. According to a 1972 survey, most of the production was retained by the farmers for their own needs, only 10 to 15 percent of the crops entering market channels. Most of the grain was custom ground in small plate mills located in towns and further processing was done manually, either by women in the home or by flour vendors.

As a first step to combining the post-harvest activities into an efficiently functioning whole, a consumer grain preference study was undertaken. Next, a Mill Managing Committee was set up, forming a single system embracing supply, mill management, marketing and access to household consumers. A training scheme was also established. The pilot mill itself was, from the beginning, considered to be simply part of the overall post-harvest system.

The consumer-preference study having shown an increase in the use of packaged flours and processed foods in recent years, this provided an opportunity to develop more nutritious foods from local cereal and legume flours. A test kitchen was established, under the direction of a Nigerian home economist, to undertake quality control of milled products, test traditional recipes and develop and test new recipes using legume flours rather than expensive imported wheat flours. A variety of high protein products -- fried snacks, noodles, breads -- was developed with considerable success.

The benefits of the system are considerable, Mr. Spurgeon explains in his booklet. First it creates a climate of confidence necessary to persuade farmers to increase their grain production. A more consistent supply of food crops discourages cycles of surpluses and deficiencies and ensuing price fluctuations. Rural and urban employment opportunities are also increased -- in harvesting, grading, storing, transporting and processing, as well as in the manufacture and distribution of machinery and the construction of facilities.

By reducing spoilage a good post-harvest system can enhance acceptability, utility and nutritional quality of food grains. It can also lead to the establishment of entirely new industries for producing processed foods, thus providing a consistent, year-round demand for local grains.

Mr. Spurgeon considers that such a total systems approach to post-harvest improvement is essential. Anything short of it -- particularly an ad-hoc piece-meal approach -- will actually aggravate rather than ameliorate the present dismal post-harvest situation" he says. Essential, however, is the recognition by national policy-makers of its necessity and the political will to create an efficient post-harvest policy adapted to local needs, resources and capabilities. International cooperation is also called for in adaptive and applied research, training, coordination and information dissemination.

But of greatest urgency is recognizing the problems and the already existing possibilities in institutions and export-market systems for solving them. Through such action, says David Spurgeon, an enormous hidden harvest could be uncovered for developing countries.

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Hidden Harvest, A systems approach to post-harvest technology, is available from the Publications Division, IDRC, P.O. Box 8500, Ottawa, Canada.

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Discovering the Hidden Harvest



This pilot mill in Maiduguri, Nigeria, uses a systems approach to solve the problems involved in the post-harvest handling of local grains such as sorghum, millet, maize and cowpeas.

PHOTO: Neill McKee
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