

00571



# REPORT TO THE CONGRESS

BY THE COMPTROLLER GENERAL  
OF THE UNITED STATES



LM100571

## Hungry Nations Need To Reduce Food Losses Caused By Storage, Spillage, And Spoilage

Department of State and Other Agencies

Developing countries have inadequate food storage facilities and poor storage practices. Spillage, contamination, and deterioration waste food that is needed urgently.

U.S. Government agencies should put more emphasis in their agricultural assistance programs on the adequacy of facilities and practices for preserving food, including self-help measures by recipient countries. They also should encourage countries and institutions to reduce food losses and to establish effective coordination for such actions.



COMPTROLLER GENERAL OF THE UNITED STATES  
WASHINGTON, D.C. 20548

B-159652

To the President of the Senate and the  
Speaker of the House of Representatives

This report is part of our continuing effort to recommend ways U.S. agencies can better help developing countries to improve their food situation. Whereas our previous reviews focused primarily on the critical need for such countries to increase food production, this report focuses on the need to reduce postharvest food losses.

We made our review pursuant to the Budget and Accounting Act, 1921 (31 U.S.C. 53), and the Accounting and Auditing Act of 1950 (31 U.S.C. 67).

We are sending copies of this report to the Director, Office of Management and Budget; the Secretaries of Agriculture, State, and the Treasury; and the Administrator, Agency for International Development.

A handwritten signature in cursive script, reading "Lewis A. Atchefs".

Comptroller General  
of the United States

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ABBREVIATIONS

AID      Agency for International Development  
FAO      U.N. Food and Agriculture Organization  
GAO      General Accounting Office

COMPTROLLER GENERAL'S  
REPORT TO THE CONGRESS

HUNGRY NATIONS NEED TO  
REDUCE FOOD LOSSES CAUSED BY  
STORAGE, SPILLAGE, AND SPOILAGE  
Department of State and other  
agencies

D I G E S T

World population is projected to increase from 4 billion to between 6 and 7 billion by the year 2000. Estimates indicate, however, that between 300 million and 500 million people do not have enough to eat now and that this number may increase to a billion by the year 2000.

To cope with current and future demands, emphasis has been placed on

--reducing future demand by slowing population growth and

--increasing food supplies by increasing production.

However, a third vital area--increasing food availability by effective complementary measures to reduce the loss of food after harvest--has not been adequately emphasized.

Losses resulting from spillage, contamination, and deterioration in developing countries waste food urgently needed to abate hunger and malnutrition. A tremendous opportunity exists for increasing the critically needed food supply by reducing such losses.

Billions of dollars have been provided to help developing countries to produce food, but reduction of food losses has not been emphasized. With the large increases in production required to feed spiraling populations, food losses will multiply unless developing countries and donors of economic assistance concentrate on establishing and maintaining adequate facilities and handling practices.

The contribution that reducing food losses could make toward closing the food gap has been reported for a number of years by the Food and Agriculture Organization and others. For example, the President's 1967 Science Advisory Committee reported that, if only half of the estimated world loss of food grains were prevented, there would be an additional 55 million tons--enough to make the diet of 500 million people adequate in total calories.

Since 1967, food loss reduction actions have not been adequately identified and implemented under either the U.S. or international programs for assistance in agricultural development. The need to identify and implement such actions is particularly urgent because of the increasing demand for available food supplies which will continue in the future.

Because of the many variables affecting losses, estimates of the total losses in developing countries are uncertain. Estimates of about 10 percent for durable products are considered by some authorities to be a best guess, although losses have been determined to be much higher in specific situations.

In citing examples of losses, the Food and Agriculture Organization reported that

- archaic threshing methods led to rice losses of 10 percent in Malaysia;
- insects caused rice weight losses of 5 to 10 percent in Malaysia and up to 10 percent in Pakistan;
- insect losses for corn ranged from 23 percent in Kenya to 35 percent in Ghana;
- overall storage losses of corn were 15 percent on the farm and 8 to 10 percent in the marketing system in Nepal.

GAO feels that the Administrator, Agency for International Development, in programing agricultural assistance, should emphasize better preservation of food being produced and to be produced by recipient countries, including the adequacy of their self-help measures.

Likewise, the Secretaries of State, Agriculture, and the Treasury and the Administrator, Agency for International Development, should stimulate concerted actions by developing countries and donor countries and institutions to

- reduce postharvest losses,
- make loss reduction measures an integral part of programs to increase production,
- establish an effective mechanism for coordinating loss reduction actions, and
- lay the groundwork for a future assessment of progress toward reducing losses. (See ch. 3.)

Appeals were made at the 1974 World Food Conference to reduce food losses. In September 1975 the Secretary of State told the U.N. General Assembly that investment in better storage and pesticides could prevent enough food losses to match the total of all food assistance worldwide. He urged that post-harvest losses be cut in half by 1985 and that a comprehensive program be developed to achieve this. (See ch. 2.)

The U.N. General Assembly, and subsequently the November 1975 biennial Conference of the Food and Agriculture Organization, adopted the goal suggested by the Secretary of State. The Food and Agriculture Organization, however, did not allocate additional funds for this purpose. (See ch. 2.)

Several donors have recognized the food-loss problem, but they have not demonstrated a sense of urgency in dealing with it. A

50-percent reduction in losses in less than 10 years will require concerted efforts by the developing countries and the aid donors, especially because of the projected increase in demand and in production to meet that demand. Such a reduction would result not only in increased food, but also in saved production costs, including energy and environmental costs and fertilizer, labor, time, and monetary costs. (See ch. 3.)

The Departments of Agriculture, State, and the Treasury and the Agency for International Development agree that more action should be taken to reduce postharvest food losses and agree with the thrust of the recommendations to bring about these reductions. (See ch. 3.)



## CHAPTER 1

### THE FOOD LOSS PROBLEM

#### THE ISSUE

The President's May 1976 report entitled "U.S. Actions Affecting the Development of Low-Income Countries" stated that

"Between 300 million and 500 million people in developing countries do not get enough to eat now and there may be as many as a billion malnourished people in the world by the year 2000 \* \* \*."

The estimated world population of 4 billion is projected to increase to between 6 and 7 billion by the year 2000. The need to curb rising demand resulting from world population increases has received widespread attention, and a major effort is directed to population planning through the foreign assistance program.

The need for increased emphasis on helping developing countries to increase food production has been dramatized by the proceedings of the World Food Conference, and new initiatives have been developed to promote agricultural development.

A third prerequisite, which complements programs to increase production, has been less well recognized and promoted. That is the need to develop adequate programs to reduce loss of food after harvest. The gap between food supply and demand could be greatly reduced by concentrating on increasing the amount of production that actually reaches the consumer. The most promising first step in this direction is to reduce the loss from spillage, contamination, and deterioration by concentrating on establishing and maintaining adequate facilities and handling practices.

Regarding the prospect of meeting future food demands, a National Academy of Sciences advisory committee in a July 1975 report said that the optimism among many agriculturalists about the availability of food in the near future may be ill founded if losses are as great as expected. According to the report, food losses can be expected to be compounded in specific areas of increased production, if as yet unidentified means are not employed to cope with the increased problems of harvesting, storage, and handling.

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Thus, the issue addressed in this report is: How will food be preserved and distributed to those in need, and how will the spiraling populations be fed without effective food loss reduction measures?

#### EFFECT ON FOOD AVAILABILITY

Food that could be used to help feed the 300 to 500 million people estimated to be suffering from hunger and malnutrition in developing countries is being lost after harvest because of spillage, contamination, and deterioration. Inadequate storage facilities and poor storage practices result in massive grain losses caused by insects, rodents, birds, micro-organisms, and moisture.

Food losses are not confined to developing countries, but in these countries better storage is especially needed and can most greatly affect food supplies for those in need. In 1963 Nigeria's Minister of Economic Planning and Community Development reported:

"It is common knowledge that of all the agricultural problems facing underdeveloped countries in tropical Africa today, storage problems are among the most urgent. \* \* \*"

The need to reduce losses may be more urgent now because of increasing demand.

The U.N. Food and Agriculture Organization (FAO) has long reported that hunger and malnutrition would be alleviated by preventing or reducing losses of produced food. For example, it reported in 1962:

"Between 5 and 10 percent of the world's food grain--5 percent representing about 50 million tons--is lost because of faulty storage, most of it in countries which are short of food and can least afford it. These losses alone would be sufficient to feed 400 million extra people, at a per capita consumption rate of about 120 kilograms. Wider access to better storage could thus stretch the world's food supply very considerably. \* \* \*"

In May 1967 the President's Science Advisory Committee reported that, if only half of the estimated world loss of food grains were prevented, there would be an additional 55 million tons--enough to make the diet of 500 million people in developing countries adequate in total calories.

More recent reports show that the situation has not improved. In 1970 a French research institute estimated that 55 million people, equivalent to the population of France, could have been fed for a year with the products lost in Africa. This organization believes that one of the best ways to increase both the quantity and quality of food without increasing either the crop area or production efforts is to improve food storage.

Although it is generally agreed that reducing food losses would add tremendously to available food supplies, information is lacking to substantiate the reliability of estimates of overall losses. Overall storage loss estimates of about 10 percent for durable products are generally accepted as a best guess.

Postharvest losses have been reported to be much higher in specific situations, but because of the many variables affecting losses, projecting losses beyond such situations is difficult. Losses vary by crop; pest and pest combination; length of storage; and method of threshing, drying, handling, storage, processing, transportation, and distribution. They also vary because of cultural factors and climate.

The following examples of losses for rice were cited in FAO reports.

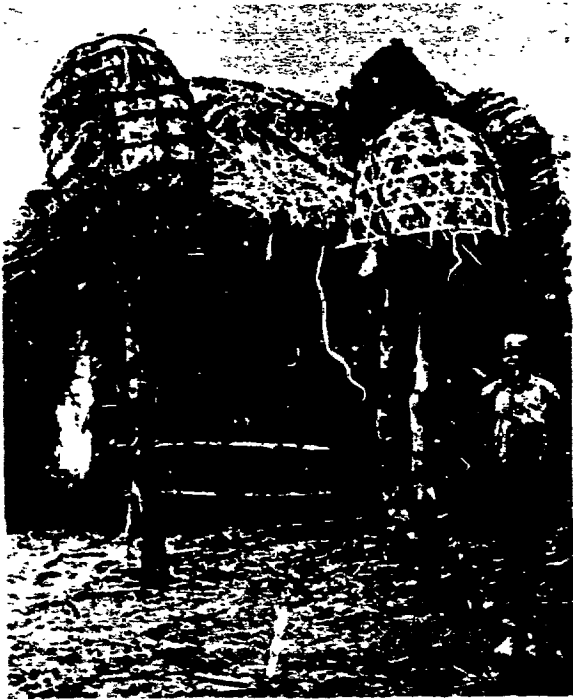
--In Malaysia, archaic threshing methods led to losses of up to 6 percent and insects caused losses of 5 to 10 percent.

--In Thailand, insects caused losses up to 10 percent after 6 months of storage.

--In Nepal, overall losses were about 15 percent during 3 to 6 months' of onfarm storage and 8 to 10 percent at traders.

FAO noted that in Kenya insect infestation caused corn weight losses of 10 percent after 4 months in storage and 23 percent after 6 months. Losses in Uganda ranged from 9 to 22 percent after 7 months. The loss in Ghana after

**TRADITIONAL STORAGE FACILITIES**

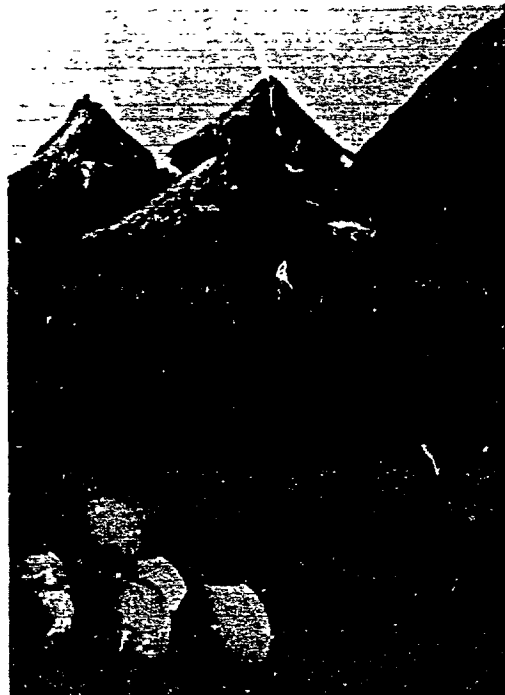


**INVERTED WOVEN GRASS BASKETS USED AS CONVENTIONAL STORAGE CONTAINERS IN ANGOLA.**

**Source: U.S. Department of Agriculture**

**MUD-WALLED RICE STORAGE FACILITIES IN A NORTHERN IVORY COAST VILLAGE. VESSELS IN FOREGROUND ARE FOR TEMPORARY GRAIN STORAGE.**

**Source: U.S. Department of Agriculture**



6 months was 35 percent. Additional losses of rice and corn result from such causes as rodents and moisture

Following are other examples of losses.

#### Sri Lanka

The Government of Sri Lanka estimated losses of 17 to 38 percent in storage and processing of Government-procured rice (the Government purchases 30 to 40 percent of rice produced). Statistics for rice not procured by the Government are not available, but an Agency for International Development (AID) document said that one can assume similar losses in processing that part of production.

#### Indonesia

Some Indonesian farmers must sell their rice when harvested because of inadequate storage. This has been a disincentive to greater production.

#### India

A 1972 Indian research report on insect pests of stored grain and their control said that India's food shortage is due primarily to postharvest handling and storage losses. The U.N. Development Program in April 1975 similarly reported that, were it not for rodents, pests, and poor storage, India would be a food surplus country. The report said India's food losses in 1974 represented a net loss of more than \$1 billion at current market prices.

#### Tanzania

According to an FAO report, there are over 120 tribes in Tanzania, each with its traditional customs and rites which determine the type of storage containers and their location. These traditional storage methods allow easy access for rodents, insects, and moisture. Efforts were being made to increase production, but production increases may never result in greater food availability, FAO said, because the harvested crop is allowed to deteriorate.

AID financed a May 1975 study of onfarm corn storage which estimated, based on a conservative loss estimate of 14 percent due to insect damage, that 88,000 tons of farm-stored corn (or enough to feed 1 million people for a year) is lost annually. Aside from lost revenue to producers and reduced food supply, the Tanzanian Government could have

saved almost \$20 million worth of foreign exchange based on its 1974-75 corn imports had its corn losses been prevented.

#### Egypt and Sudan

FAO reported that grains continued to be stored in the open in Egypt and were extensively damaged by rats and birds though frequent fumigation protected them from insects. Improvements were needed in the Sudan for onfarm and off-farm storage and for the physical handling of products in transit.

#### Ghana

An AID assessment in Ghana rated storage second in importance to transportation in presenting major marketing difficulties. The nature and magnitude of storage and loss problems varied for different crops in different areas, but some losses were estimated to be 25 percent of total production. The assessment noted that distribution of the food had not been concurrently emphasized with production. According to AID's assessment, if major improvements were not made in the marketing system soon, producer disincentives would be strong and inevitable.

#### EFFECT ON PRODUCTION

Our report to the Congress "Disincentives to Agricultural Production in Developing Countries" (see app. 7) discussed the need for governments to change disincentive policies and to provide farmers economic incentives to realize their production potential. As noted for some of the preceding countries, the absence of adequate storage or other postharvest preservation facilities discourages farmers from taking full advantage of production incentives.

With adequate storage facilities, producers and marketers are able to regulate more effectively the marketing of farm products. In the absence of adequate storage facilities large quantities of foodstuff have to be marketed in a relatively brief period of time to avoid spoilage and deterioration. This flooding of the market often results in abnormally low producer prices and can deter farmers from increasing production.

Ecuador is another country which has had such a situation. The Department of Agriculture in its February 2, 1976, issue of Foreign Agriculture, reported that Ecuador's rice storage and milling facilities were nearly filled as a result of two exceptionally large rice crops during 1975. Small

rice millers were offering producers substantially less than the official price, and producers were accepting the offers rather than lose their harvests through spoilage. The Department said the merchants also did not have excess storage and had to consider the probability of spoilage in making their price offers.

The effects of insufficient storage in other countries has been cited by the news media. For example, on November 15, 1975, it was reported that the President of the Philippines had authorized using some public buildings and halls as temporary warehouses to cope with the expected good rice harvest. On December 18, 1975, Bangladesh was reported as lacking space to cope with a good crop and its flow of imports. It was thought that the resulting low prices would discourage farmers from planting adequate rice crops the next year.

## CHAPTER 2

### WHAT IS BEING DONE

Reduction of food losses received attention at the World Food Conference, and since then, as a way to increase food availability.

The assessment of the world food situation for the Conference stated that food supplies could be substantially augmented if crop losses were minimized. The Secretary of State said that priority must be given to reduce losses resulting from inadequate storage, transport, and pest control. The Conference resolutions affirmed the need for developing countries to emphasize storage, processing, transportation, and marketing in their policies and programs for increasing food production.

The Secretary of State, in a September 1, 1975, address to the U.N. General Assembly, said that the food saved by reducing losses could match the total of all food aid worldwide. He urged that the Food and Agriculture Organization, in conjunction with the U.N. Development Program and World Bank, set a goal of cutting postharvest losses in half by 1985, and develop a comprehensive program to achieve this.

The U.N. General Assembly adopted the goal suggested by the Secretary of State. This goal was later adopted by the November 1975 biennial U.N. Food and Agriculture Organization Conference.

With the aid of external assistance, developing countries have increased food production from 50 to 60 percent over the past 20 to 25 years. In comparison with the efforts to increase production, however, the efforts to preserve and distribute the food produced appears to have been minimal. Consequently, much food has been lost after harvest.

For the most part, available information is very limited on the portion of U.S. and international organizations' agricultural assistance that has gone to reduce food losses. However, from the information available it is evident that the reduction of food losses has not been adequately emphasized nor made an integral part of production programs.

The organizations contemplating actions to take in alleviating postharvest losses expressed a central theme--the need to coordinate the actions of the several donors, countries, and organizations which are considering work in the area.



## AGENCY FOR INTERNATIONAL DEVELOPMENT

AID has designated about 50 percent of its development assistance for helping developing countries increase food production, improve nutrition, and enhance the quality of life for the rural poor. Some efforts have been directed to reducing postharvest losses, but this effort appears to have been relatively small.

We identified 16 ongoing or new projects which may contain some storage elements in both the 1975 and the 1976 appropriation requests. The 1977 appropriation request contained a technical assistance project highlighting the storage loss problem, and 17 identifiable new or ongoing country projects which may contain some storage elements.

AID's primary technical assistance, in addition to its specific country projects, has been through a contract with Kansas State University for technical assistance for food grain drying, storage, and processing. This contract was effective June 1967 and has cost about \$1.4 million through fiscal year 1976.

## U.N. FOOD AND AGRICULTURE ORGANIZATION

For many years, FAO has issued reports on the increase in available food supplies that could be gained by reducing storage and other postharvest grain losses. FAO has also done some work, since 1968, in reducing postharvest food losses such as project identification and formulation, strengthening of marketing boards and institutions, training, and projects to solve specific problems.

Of FAO's \$167 million regular program budget approved for the 1976 and 1977 biennium, an estimated \$2.5 million relates to reducing the developing countries' postharvest losses of all foodstuffs and, of this amount, \$1.2 million will be for food grain losses. FAO's funds for postharvest losses were not increased to respond to the U.N. and FAO Conference resolutions calling for a 50-percent reduction in losses by 1985.

FAO reported that an adequate response to the resolution on postharvest food losses would require a coordinated effort at the international, regional or subregional, and national levels. It is urgent, FAO said, that all interested parties be brought together at the earliest feasible date to agree on priorities for actions and the means to maintain coordination.

STORAGE IMPROVEMENT PROJECT



NEIGHBORS OF NEPAL FARMER HELP CONSTRUCT AN IRON  
REINFORCED CONCRETE STORAGE BIN WHICH WAS DEVELOPED  
BY AID AND THE GOVERNMENT OF NEPAL.

Source: AID

An internal FAO task force has undertaken a study to determine what else FAO can do to help meet the 1985 goal.

#### WORLD BANK

Of the many international development banks, only the World Bank, the major contributor to agricultural development, shows in its annual report the cumulative extent of its activities in food storage and processing.

From 1948 to 1975, the World Bank group provided \$311.5 million which it classified as crop processing and storage. Bank officials identified \$99.4 million for projects in which storage was a major component. Other loans were said to have storage elements which were less important in terms of total project costs.

The Bank's annual report indicates that some Bank-supported projects are designed to dramatically increase grain production, but the project descriptions do not indicate whether postharvest preservation is an integral part of the projects.

Bank officials said that most of the newer rural development projects include storage components. They also said that (1) the Bank is considering how postharvest losses for the small farmer can be reduced and (2) the Bank and other international institutions and donors should coordinate their postharvest activities.

#### GROUP FOR ASSISTANCE ON THE STORAGE OF GRAINS IN AFRICA

Six national or international organizations, having some involvement in research and its application and training in relation to the problems of storing grains and other durable produce in Africa, formed an informal association known as the Group for Assistance on the Storage of Grains in Africa.

In addition to FAO and Kansas State University (representing AID), the members are: the International Development Research Center, Ottawa, Canada; the International Institute of Tropical Agriculture, Ibadan, Nigeria; the Institute for Tropical Agronomic Research and Food Crops, Paris, France; and the Tropical Products Institute, London, England.

The members meet periodically and discuss their activities. We attended the Group meeting at Kansas State University in July 1975 and visited some storage and research

facilities in the area. Group members have many small projects such as providing an advisor or expert for short terms to improve storage facilities in the developing countries. The consensus of the Group representatives, however, was that very little effort was being placed on reducing storage losses because agricultural programs historically have been production oriented. They said that storage capacity and management practices must improve if farmers are to increase their production.

CHAPTER 3  
CONCLUSIONS, RECOMMENDATIONS,  
AND AGENCY COMMENTS

CONCLUSIONS

Preserving food from its harvest to its consumption is crucial in alleviating hunger and malnutrition and in meeting the spiraling demand for food. A tremendous opportunity exists for increasing the critically needed food supply in the developing countries by reducing postharvest losses.

It is obvious that loss estimates are questionable because of insufficient data. Furthermore, different sources cite estimates whose validity has not been established. Nevertheless, there is general agreement that losses are enormous, not only in terms of food but in terms of human toil and other costly inputs.

Increases in food production have become more costly and difficult because of increased fertilizer, energy, and other production input costs and the diminishing land area readily usable for production. Consequently, the time is opportune to increase food supplies by reducing postharvest losses.

As food production increases, there will be an increase in the food lost unless aid donors and developing countries act to establish and maintain adequate facilities and practices for preserving the food.

Losses could be reduced somewhat by relatively simple and inexpensive methods such as better storage practices. Overall, however, the problems are very difficult and complex because losses occur at all points in the system from harvest to consumption and from many causes. The cultural practices in many countries also contribute to the complexity of the problem.

Reducing food losses will involve costs for both developing and donor countries. These costs, however, will have to be balanced against the costs of using scarce foreign exchange for food imports, concessional assistance by donors, increasing production to compensate for losses, wasted resources through food losses, and ultimately, hungry and malnourished people.

Many actions to reduce food losses are within the capability of developing countries and such actions should be self-help measures. Many countries and institutions do provide food and agricultural assistance, and food preservation measures should be an integral part of such assistance.

Agricultural assistance programs have not adequately emphasized food loss problems. To bring about a 50-percent reduction in food losses by 1985--the goal established by the U.N. and FAO--we believe there is a need to recognize food loss as a very serious problem affecting the ability of the world to feed itself and an urgent need to alleviate the problem. If the gap between supply and demand is to be closed, then reduction of food losses must be emphasized along with programs to increase production and to slow population growth.

#### RECOMMENDATIONS

As an integral part of the Agency for International Development's future agricultural assistance programs, we recommend that the Administrator, AID, emphasize better facilities, practices, and self-help measures for preserving and distributing the food (1) already being produced and (2) anticipated to be produced. Such considerations should be part of the programing documentation.

We also recommend that the Secretaries of State, Agriculture, and the Treasury and the Administrator, AID, work for concerted action among major donors, including the international organizations and financial institutions, for reducing food losses in developing countries. Such actions should include:

1. Encouraging developing countries to take appropriate self-help measures.
2. Developing programs to reduce postharvest losses of food already being produced.
3. Making loss-reduction measures an integral part of future programs to increase production.
4. Establishing an effective mechanism for coordinating loss-reduction actions.
5. Laying the groundwork for an assessment in 1980 of progress toward the 50-percent reduction target endorsed by the U.N. General Assembly and the FAO Conference.

## AGENCY COMMENTS

The Departments of Agriculture, State, and Treasury, and AID agreed on the importance of reducing postharvest food losses and with the thrust of the report recommendations.

Some of the agencies said that the actions now being taken should be more specifically identified, and they highlighted some of these actions in their comments which are included in the appendixes. We noted in the report that some actions are being taken and that more interest is being shown in reducing losses, and to the extent that information was available, we indicated the magnitude of such actions. However, on an overall basis the actions taken and in process are relatively minor in relation to the problem. Regarding some of the projects cited in AID's comments, we noted the following.

- The proposed \$30 million loan to India has been postponed until after fiscal year 1977.
- The \$44.5 million loan to Egypt is designed to aid in handling import requirements and is not designed to reduce postharvest losses of domestically produced food.
- The AID mission has requested that the project in Tanzania be phased out because its purpose was price stabilization which is unnecessary under the socialistic governmental policies.

State and AID said that costs to increase production may be less than costs to reduce losses, especially in the short run. Agriculture said, however, that reducing storage losses may be more effective in the short run at increasing market supplies than would efforts to increase production.

As we have noted in the report, costs involved in reducing postharvest losses will have to be balanced against many factors. Very little information is now available on the costs of reducing losses, but with the rapidly increasing costs of continually increasing production and the inherent difficulties in doing so, reducing losses may become more cost effective.

While costs and the other factors enumerated in this report are important considerations, production and postharvest preservation are not competing functions but are complementary functions in the struggle to provide adequate food.

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Is the food produced available for abating hunger or is it wasted? As pointed out in a paper prepared by the Consultative Group on International Agricultural Research Secretariat, "increases in production are unlikely to occur at a uniform rate on all farms; higher production is likely to consist of major increases in some areas and stagnation in others, thus increasing the need to store and move surpluses."

State said that the solution to most of the food loss problems in developing countries is within their capability, and the motivation of these countries to take such actions should be emphasized. Treasury said that while food losses must be reduced, priority should be given to increasing food production and to overcoming disincentives to increased food production in the developing countries.

The comments on the need for the developing countries to take appropriate self-help measures, not only in the matter of reducing postharvest losses but also in removing disincentives to food production, are in harmony with our recommendations in this and other reports. We believe that carrying out our recommendations will be a step in accomplishing these goals.

Our report to the Congress, "Disincentives To Agricultural Production In Developing Countries," November 26, 1975, ID-76-2, recommended that U.S. Government agencies providing food and agricultural assistance should give maximum consideration to the adequacy of the recipient country's self-help measures and work for concerted action among all countries and institutions to induce aid recipients to remove production disincentives and provide adequate incentives.

Also, our report to the Congress, "Providing Economic Incentives To Farmers Increases Food Production In Developing Countries," May 13, 1976, ID-76-34, recommended that the United States join with other donors and assist developing nations to devise an agricultural strategy suited to their needs. Postharvest measures to care for food produced should be an integral part of such an agricultural strategy.



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## CHAPTER 4

### OBJECTIVES AND SCOPE OF REVIEW

This report is part of our planned effort to focus attention on major issues affecting the critical food situation in developing countries. During this review, we examined the impact of storage and other postharvest losses and the adequacy of U.S. and international organizations efforts to alleviate postharvest losses.

We researched published information of the magnitude of storage losses; examined available information on Agency for International Development and international organizations efforts to reduce storage losses; and discussed losses and programs with Federal agencies, U.N. Food and Agriculture Organization and World Bank officials. We also attended the July 1975 meeting of the Group for Assistance on the Storage of Grains in Africa and had discussions with Group members.

This report includes our observations on our visits in early 1975 to Kenya, Tanzania, India, Indonesia, Pakistan, Sri Lanka, Peru, and Uruguay when we were reviewing governmental policy disincentives to agricultural production.

APPENDIX I

APPENDIX I

DEPARTMENT OF STATE  
AGENCY FOR INTERNATIONAL DEVELOPMENT  
WASHINGTON, D.C. 20523

Auditor General

July 9, 1976

Mr. J. K. Fasick  
Director  
International Division  
U.S. General Accounting Office  
441 G Street, N.W.  
Washington, D.C. 20548

Dear Mr. Fasick:

Thank you for the opportunity to provide comments on the GAO draft report, "Hungry Nations Need to Reduce Food Losses." Attached are the Agency's comments as prepared and coordinated by our Technical Assistance Bureau. They should be useful to your staff in finalizing the report. If we can elaborate on any of the points presented or provide any further information, please have your staff contact us.

Sincerely yours,

  
Harry C. Cromer  
Auditor General

Attachment: a/s

JUL 8 1976

## MEMORANDUM

TO AG, Harry C. Cromer July 7, 1976

FROM AA/TA, Curtis *CF* Parrar

SUBJECT AID Response to the GAO Draft Report, "Hungry Nations Need to Reduce Food Losses" dated June 8, 1976

In accordance with Mr. Mills' memorandum of June 8 to me, I hereby submit comments on the subject draft GAO Report. These comments represent the AID reply, and have been cleared by each of the AID Regional Bureaus and relevant offices. State will make a separate response to the GAO Report.

In our opinion, the GAO Report: Hungry Nations Need to Reduce Food Losses performs a useful service in reiterating the pervasive problem of post harvest food losses in the LDCs, and in recommending to AID and the donor community that increased attention to the problem is urgently needed.

We concur in the Report's recommendation that the AID Administrator consider as part of the program process, the adequacy of facilities, practices and self-help measures for preservation and distribution of food produced in the LDCs. We also concur in the recommendation that the Secretaries of State, Agriculture, and Treasury and AID Administrator take the lead in working for concerted action among major donors and institutions on this problem.

We believe, however, that the Report gives inadequate attention to the fact that there is considerable cost to activities designed to reduce food losses. In the short term, the energy and other resources needed to reduce losses in the LDCs may, in many cases, be larger than the amount of resources needed to produce the same amount of additional food. In only one place in the Report (page 14) is it recognized: in part of a sentence the author notes that to reduce losses "cost will be involved, but . . .". Further study of the cost factor is included in the AID activities noted below.

We feel the Report could have been more explicit in identifying the range of activities that AID has initiated during the past two years that bear on the food loss problem. For example:-

AID has established a new cluster of centrally-funded activities, "Reduction of Post Harvest Food Losses" to focus analytical attention on the problem and to organize our assistance activities on a worldwide basis. We have had a full time consultant for six months helping the Agency identify potential problem areas that are worthy of increased attention and investment. We have been negotiating with the National Academy of Sciences for a study of food losses in developing countries with the aim of identifying

Mr. Harry C. Cromer

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appropriate points of entry to help reduce the losses. Guidance and recommendations obtained from this study will enable AID to better assess the level of additional manpower and financial resources, which are required to increase our commitment to address the food loss problem. Expanded centrally funded program activity, however, is contingent on Agency concurrence with the NAS findings, and the acquisition of specialized staff to implement additional activities. The study -- to be carried out in collaboration with other major donors and institutions, including FAO, IBRD, Tropical Products Institute (UK), International Development Research Center (Canada), and the Central Food Technological Research Institute (India) -- is planned for completion in the summer of 1977.

Other ongoing activities include three AID-sponsored seminars in Food Storage and Handling Practices for food supplied under Title II PL 480 were held - Dakar, November 1974; Manila, April 1975; San Pedro Sula, Honduras January 1976, and additional seminars are planned for the future. Although these regional seminars focussed on in-country storage practices for PL 480 foods, the demonstrations and lectures on such topics as fumigation procedures, rodent and insect control, and application of insecticides are applicable to other foods as well. The seminars, organized on a regional basis, were attended by over 300 participants from surrounding countries which are expected to benefit from the dissemination of information and techniques reviewed in the seminars.

In addition, as a donor member of the International Group for Agricultural Development in Latin America (IGAD/LA), AID has recommended that this group consider the reduction of post harvest losses as a principal area for possible action by IGAD/LA. Specific areas which have been suggested for careful examination and prompt attention include losses occurring in the field, in on-farm storage, and during warehousing, processing and transportation, as well as food preparation at home. Given that IGAD/LA is newly established, specific programs that are to be undertaken are still in the process of selection.

As to AID's "emphasis . . . on production oriented projects" (page 9) it should be noted that many food and nutrition funded projects include efforts to address the problems of inefficient and inadequate marketing functions, i.e., storage, processing and transportation, etc. The development of vertically integrated programs which encompass the entire production-marketing-consumption system is being pursued in various countries. For example, during FY 1975 and 1976 our involvement in agribusiness activities included projects in the Caribbean, Chile, Colombia, Nicaragua, Panama, Peru and Uruguay.

Finally, the Report fails to acknowledge the several ongoing and proposed AID activities which address specific country loss problems cited in the Report:

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Sri Lanka (page 3), where AID is currently working on a project to alleviate the loss problem, the FY 77 Congressional Presentation contains an estimated development loan authorization of \$4,000,000 for this project; for India (page 3), the FY 77 Congressional Presentation also contains a proposed development loan of \$30,000,000 for improvement of storage and milling facilities; Bangladesh (page 5), where arrangements have been made with Kansas State University to send an expert team out in July 1976 to survey the storage situation and recommend corrective measures; Tanzania (page 3), where AID is implementing a \$1,800,000 project designed to reduce food losses and improve the marketing of maize, rice, wheat and oilseeds; Egypt (page 4) a \$44,500,000 loan for the construction of port and buffer stock storage facilities has been authorized; and in Ghana (page 4), a major project has been approved that impacts on storage, pricing, and marketing problems.

In summation, AID considers the improvement of food grain storage and processing in the LDCs to be an integral component of our food and nutrition program strategy. We agree that post harvest food loss reduction should have increased attention. Accordingly, the Agency is emphasizing food storage, processing and transportation systems in our agricultural production and development programs.

Clearances:

AA/PPC, P. Birnbaum(phone)  
AA/IDC, C. Herter (phone)  
C/FFP, R. Spitzer (phone)  
AA/LA, H. Kleine(phone)  
AA/ASIA, A. Cardiner (phone)  
AA/AFR, S. Scott (phone)  
AA/NE, R. Nooter (phone)  
TA/AGR, L. Hesser *HL*

cc:

AG, Aubrey F. Mills



DEPARTMENT OF STATE

Washington, D C 20520

July 19, 1976

Mr. J. K. Fasick  
Director  
International Division  
U.S. General Accounting Office  
Washington, D. C. 20548

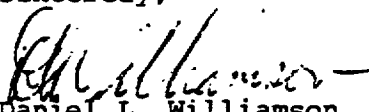
Dear Mr. Fasick:

I am replying to your letter of June 8, 1976, which forwarded copies of the draft report: "Hungry Nations Need To Reduce Food Losses."

The enclosed comments were prepared by the Deputy Assistant Secretary for International Organization Affairs.

We appreciate having had the opportunity to review and comment on the draft report. If I may be of further assistance, I trust you will let me know.

Sincerely,

  
Daniel L. Williamson  
Deputy Assistant Secretary  
for Budget and Finance

Enclosure: As stated

GAO DRAFT REPORT: "HUNGRY NATIONS  
NEED TO REDUCE FOOD LOSSES"

The report adequately cites the need and presents an overview of the current world situation in regard to the problem of post-harvest losses. We generally agree with the presentation and concur in the recommendations made to assist in solving the food loss problem.

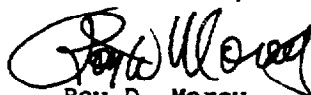
Post-harvest losses are significant, particularly in the developing countries. As the report indicates, losses are most apt to occur in those areas least able to afford the waste of food.

The report, however, fails to provide an adequate balance with the overriding need for world efforts to increase food production and the necessity of strong action on the part of the vulnerable nations. Page 14 of the report notes: "No doubt many actions to reduce food losses are within the capability of developing countries...." The solution to most of the problems of food losses in developing countries is within the capability of those countries. As pointed out two paragraphs earlier in the report, much of the loss could be reduced by relatively inexpensive and simple methods. The motivation of developing countries to reduce losses and to take actions necessary to alleviate the problem should receive more emphasis.

While reduction of losses can provide significant increases in amounts of available food, costs for increased production may often be less than costs to reduce losses. For example, it is sometimes more economical to apply increased fertilizer than to control insect damage in storage through pesticide application when both measures could provide the same total usable food. Carefully controlled management is required to make such decisions.

In the list of five recommendations given on page 15 of the GAO report, item number 4 should be eliminated or modified. "Establishment of mechanisms for coordination" seems to endorse establishment of new bureaucratic commissions and committees, etc., in relevant international organizations. Item number 4 could be modified as follows to emphasize that coordinated national programs should be encouraged:

- [For example] 4. establishing at the country level effective mechanisms for coordinating loss reduction actions; and



Roy D. Morey  
Deputy Assistant Secretary for  
International Organization Affairs



DEPARTMENT OF AGRICULTURE  
OFFICE OF THE SECRETARY  
WASHINGTON, D. C. 20250

July 20, 1976

Mr. J. K. Fasick  
Director, International Division  
United States General Accounting Office

Dear Mr. Fasick:

This is in response to your request for the Department's comments on the GAO draft report, "Hungry Nations Need to Reduce Food Losses."

We are in general agreement with the report's finding that improved warehousing could substantially alleviate world nutritional shortages. However, we believe the report could be strengthened and made more useful by a tightening of facts and shift of emphasis in presentation.

Following are specific suggestions for possible changes:

Page ii, paragraph 2: "... losses may be as high as 50 percent of total production in some situations." The report could show some concrete examples of what is meant by "in some situations." Does the 50 percent apply to an entire country's production, a region's production, or a small locality? Is it the result of poor weather at harvest? Further explanation is needed to understand the significance of the statement.

Page iii, paragraph 3. The final sentence could be reworded to emphasize that reduced storage losses from quantities already produced may be more effective in the short-run at increasing market supplies reaching city consumers than would efforts to raise yields or develop additional acreage.

Page 3, paragraph 3. Sri Lanka's estimate of rice losses at "17-38 percent of production" seems high. Maybe this estimate should be applied to the supplies which enter the market system. In a subsistence economy, a small percentage of total production goes to market. Does GAO have information on whether the high loss rate in the market channels is a substantial deterrent to increasing the marketable surplus (off-farm sales)?



Page 5, paragraph 3. It should also be noted that Ecuador's merchants did not have excess storage facilities and had to consider the probability of spoilage in making price offers to farmers who likewise did not have adequate storage facilities for their large crop.

Page 6. The future outlook could address the likely situation of increased trade within a country as well as internationally, which presumably would call for a larger transportation and storage system than a situation in which grains are consumed where grown.

Page 8, paragraph 1. "Consequently, much of the food that has been produced has been lost after harvest." This sentence refers to the 50-60 percent world production increase in the last two decades and seems to imply that the system is performing poorer now than in the past. If the grain stayed in the village, it is doubtful that percentage-wise any greater amounts would have been lost, since farmers tend to have traditional storage facilities for their families' needs. However, the grains which enter the marketing channel may have higher loss ratios than those which stay in the village.

Many of the developing countries are trying to shift from subsistence farming to market-oriented industrialized economies. Storage performance is probably poorer in emerging market channels than it is in the traditional farming sector. Also, it is probably poorer in the traditional farming sector of less-developed countries than it is in developed countries. The report's usefulness could be improved with the addition of specific and concrete alternatives for developing storage and transportation systems in those areas where opportunities for success appear greatest.

The report emphasizes, and rightly so, the need to reduce losses due to spillage, contamination and deterioration of bulk grain. However, grain based diets also need other sources of essential amino acids, vitamins and minerals ordinarily derived from animal, fruit and vegetable sources. These are most often lacking in the LDC's and rarely available on a year-round basis. In this context, we believe the report could be further strengthened by incorporation of material demonstrating that development of a food processing capacity to achieve preservation of highly perishable, but vitally important, foodstuffs is also badly needed to reduce losses and improve nutrition in the LDC's.

Sincerely,



DALE SHERWIN

Deputy Assistant Secretary



DEPARTMENT OF THE TREASURY  
WASHINGTON, D.C. 20220

ASSISTANT SECRETARY

JUL 26 1976

Dear Mr. Fasick:

We have carefully reviewed the draft report entitled "Hungry Nations Need to Reduce Food Losses" as requested in your letter of June 8, 1976.

I agree with your emphasis on the importance of reducing food losses in developing countries and the need for concerted action in this area by the international community, including both developed and developing countries. Your report, however, does not reflect the extent of current activities in this area which are already underway.

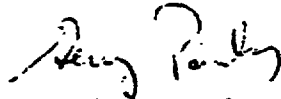
The Departments of State and Agriculture and the Agency for International Development will comment, I am sure, on what they are doing individually and through various international organizations to promote a comprehensive program to reduce post-harvest losses. The report notes the World Bank's financing of storage projects in developing countries. The Bank will continue to finance such projects and, as its officials indicated to your staff, is working with other international institutions and donors on the problem of reducing post-harvest losses. These forums include the Consultative Group on Food Production and Investment (GGFPI), the Consultative Group on International Agricultural Research (CGIAR), and the International Group for Agricultural Development in Latin America (IGAD/LA).

While attention must continue to be directed to eliminating post-harvest losses, your report has not clearly addressed the issue of whether the problem in developing countries is insufficient storage facilities or inadequate domestic policies to promote increased food production. I personally believe that the key problem we face in dealing with the world food situation is overcoming the disincentives to increased food production in developing countries so they can better feed themselves. I therefore suggest that you temper the thrust of the "Conclusions and Recommendations" section of the report (Chapter 3) to put first priority on increasing food production in developing countries with secondary attention to continued efforts to reduce post-harvest losses.

(See GAO note)

I hope these comments will be helpful in your revision of the report.

Sincerely yours,



Gerald L. Parsky  
Assistant Secretary for  
International Affairs

Mr. J. Kenneth Fasick  
Director  
International Division  
U.S. General Accounting Office  
441 "G" Street, N.W.  
Washington, D.C. 20548

Paragraph dealing with matter no longer contained in this report has been deleted.

RECENT GAO REPORTS ON RELATED SUBJECTS

"U.S. Actions Needed to Cope with Commodity Shortages,"  
ID-74-37, Apr. 29, 1974.

"Increasing World Food Supplies--Crisis and Challenge,"  
ID-75-4, Sept. 6, 1974.

"The Agricultural Attache Role Overseas: What He Does  
and How He Can Be More Effective For the United States,"  
ID-75-40, Apr. 11, 1975.

"The Overseas Food Donation Program--Its Constraints and  
Problems," ID-75-48, Apr. 21, 1975.

"Disincentives to Agricultural Production in Developing  
Countries," ID-76-2, Nov. 26, 1975.

"Grain Reserves: A Potential U.S. Food Policy Tool,"  
OSP-76-16, Mar. 26, 1976.

"Agricultural Research--The Organization and Management,"  
RED-76-92, Apr. 9, 1976.

"Need for an International Disaster Relief Agency,"  
ID-76-15, May 5, 1976.

"Providing Economic Incentive to Farmers Increases Food  
Production in Developing Countries," ID-76-34, May 13, 1976.

"U.S. Participation in International Food Organizations:  
Problems and Issues," ID-76-66, Aug. 6, 1976.

PRINCIPAL OFFICIALS RESPONSIBLE FOR  
ACTIVITIES DISCUSSED IN THIS REPORT

APPOINTEDDEPARTMENT OF STATE

## SECRETARY OF STATE:

Henry A. Kissinger

Sept. 1973

AGENCY FOR INTERNATIONAL DEVELOPMENT

## ADMINISTRATOR:

Daniel S. Parker

Oct. 1973

DEPARTMENT OF AGRICULTURE

## SECRETARY OF AGRICULTURE:

Earl L. Butz (note a)

Dec. 1971

DEPARTMENT OF THE TREASURY

## SECRETARY OF THE TREASURY:

William E. Simon

May 1974

a/Resigned October 4, 1976, and Under Secretary John A. Knebel  
 became Acting Secretary.