

March 25, 1968
Lahore, Pakistan

To: Hon'ble Mohammad Musa
Governor of West Pakistan
Lahore.

Hon'ble Malik Khuda Bakhsh
Minister for Food & Agriculture
Government of West Pakistan
Lahore.

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Subject: A TARGET REACHED- A Report to the Government of West
Pakistan on the Progress Achieved by the Accelerated
Wheat Improvement and Production Program during the
1967-68 Rabi Season

Before departing from Pakistan I wish to leave this brief report summarizing my impressions on the progress that has been made by your Accelerated Wheat Improvement and Production Program during the past year. In it I am also indicating certain specific actions needed to keep your Food Production Program moving forward with growing momentum.

1. A TARGET REACHED

Sirs, I am confident Pakistan will either reach, or very nearly reach, self-sufficiency in wheat production during the current harvest. I predict a harvest of approximately 6.5-7 million metric tons. If this prediction is correct, Pakistan will have reached its self-sufficiency target two years ahead of schedule. Pakistan has done in 3 years what it took 13 years to accomplish in Mexico.

This is a tremendous achievement and I wish to congratulate all government officials, scientists, extension workers, and farmers for their contributions to this accomplishment. The spectacular success of Pakistan's revolution in wheat production will undoubtedly serve as a model for wheat deficit countries in many other parts of the world who are grappling with similar problems.

2. A BATTLE WON - BUT THE WAR MUST CONTINUE

Although self-sufficiency in wheat production may be achieved during the current season - this is no time for complacency. The current rabi season has been characterized as having the most favourable rainfall in recent years. This has resulted in greatly increased yields and production on barani lands. It is extremely unlikely that similar conditions will prevail again next year.

A second significant factor has contributed greatly to increasing both yields and production during the current rabi wheat crop. This is the extensive cultivation of the "high yielding dwarf Mexican wheat varieties" under intensive management practices. It is estimated that dwarf varieties are growing on approximately 3 million

acres, which although only 20 per-cent of the total area sown to wheat, nevertheless will produce about 43 per cent of the total harvest. In order to assure self-sufficiency again in 1968-69, assuming less favourable winter rains, it will be necessary to spread the use of the dwarf varieties, together with the new technology used in their intensive cultivation, to at least 6 million acres.

Several other factors mentioned in the following paragraphs must be properly manipulated if the breakthrough in wheat production is to be maintained and made a permanent force in the production of wheat and other cereal crops.

3. NEW PROBLEMS ARE APPEARING WITH ABUNDANCE

A. Defending the Floor Price

New problems are arising as Pakistan reaches self-sufficiency in wheat production. The official floor price of Rs.17.00 per maund announced by the Government in April 1967, must now be vigorously defended for the first time, in order to stabilize grain prices at harvest. This will require that the Food Department make timely and adequate purchases in areas of heavy production during the harvest period. Adequate funds or credits must be made available immediately to the Food Department in order to facilitate timely and adequate purchases. Failure to defend the floor price now will destroy the farmers' enthusiasm and faith in the government's "GROW MORE FOOD CAMPAIGN", and in turn will transform temporary success into dismal failure. Prompt and aggressive action by government is needed to meet this new situation.

B. Warehousing

The farmers' very rapid acceptance of the new high yielding dwarf varieties, together with the package of technological improvements which makes these varieties highly productive, has caught the government short of storage capacity.

Although considerable new storage capacity has been built during the past year, it will be inadequate for present needs. This situation calls for adding more storage capacity as soon as possible. The shortage of storage facilities will worsen as the full impact of the revolution in wheat, rice and maize production gains momentum. Two types of action are needed by government, one to meet the long time needs, and one of a temporary emergency nature.

The government must now embark on an aggressive program to expand permanent grain storage facilities, not only for wheat, but for rice, maize, sorghum and millet. It should conduct a study to determine what type of storage facilities will best meet the country's needs. It should examine the feasibility and advisability of encouraging the private sectors to take an active role in constructing storage facilities. In Mexico CONOSUPO (The "Food Department") has found it advantageous in some large surplus producing areas to encourage the private sector to construct part of the storage facilities. Government grain is stored in such private warehouses on a rental basis. CONOSUPO has entered into long term agreements for lease of storage facilities. This has stimulated the private sector to make the capital investment in facilities, and supervise handling of the stored grain.

Temporary storage facilities must now be given top priority in order to protect that portion of the current harvest which will overflow present storage capacity. Mexico has used temporary storage facilities successfully to protect wheat for 2 to 3 month periods. These facilities consist of a raised "concrete platform" on which loose grain is stored. Retaining walls are formed with bagged grain to protect and hold the loose grain in place. The storage is protected from rain by large plastic covers which are fabricated on the site by thermosealing strips of plastic sheets.

4. FERTILIZER REQUIREMENTS

The outstanding responses of both dwarf wheat and tall Pakistan wheats to fertilizer during the current wheat crop cycle will certainly greatly increase demand for fertilizer. The production revolution now rolling forward with IRRI-Pak rice and with synthetic J-1 maize will also increase demands for fertilizer. This is not the time to reduce the projected fertilizer targets for 1968-69. To do so will only foster black market prices on fertilizer and retard crop production. Rather it is a time to remove bottlenecks.

Bottlenecks in distribution of fertilizer, compounded by the late arrival of the phosphate fertilizer both contributed to the shortfall in fertilizer sales during the current rabi season. Bureaucratic procedures required for fertilizer purchases and financing also adversely affected sales. Streamlining of procedures is needed.

A more vigorous extension campaign is still needed to promote the use of recommended rates of fertilizer by farmers and

publicity and demonstrations should specifically point out the value of using phosphate fertilizer in addition to nitrogen.

The government should whenever feasible expand the importation of complex "starter fertilizers", containing both nitrogenous and phosphate, i.e. diammonium phosphate, nitro-phos, etc. The use of such fertilizers automatically circumvents the difficulties of convincing farmers to incorporate phosphate along with nitrogen at sowing, since both nutrients are part of the formula in these complex fertilizers.

Pakistan must now begin to plan for the manufacture of complex starter fertilizers (i.e. nitro-phos, diammonium phosphate, etc.) Such complex starter fertilizers should be produced in new plants whenever the current production facilities are expanded.

This does not imply that the decision to construct factories to produce urea was incorrect. It simply means that Pakistan has now reached a second stage of agricultural development requiring other kinds of fertilizers as well.

5. THE NEED FOR THE RAPID MULTIPLICATION AND DISTRIBUTION OF NEW WHEAT VARIETIES WITH DIFFERENT TYPES OF RUST RESISTANCE

Mexipak has caught the farmers' fancy. It is rapidly replacing the tall varieties C-273, C-591, etc., as well as the semi-dwarf Mexican varieties Lerma Rojo 64 and Penjamo 62. There is a built in danger in Mexipak's own popularity.

No one is able to tell how long the rust resistance of Mexipak will be satisfactory under commercial field conditions. It may not be more than two or three years. Action must be taken

immediately to aggressively multiply several (5 to 6) new high-yielding dwarf varieties with different types of rust resistance so as to reduce the risk from rust losses. Dynamic and aggressive multiplication of seed of new varieties is now urgently needed.

Fortunately several very promising high yielding dwarf lines, which are derived from crosses between Pakistani and Mexican wheats, are in the final stage of testing in the regional research institutes. The best several of these must be multiplied aggressively both during the forthcoming kharif season and in the 1968-69 rabi season. Again complacency must be banished and aggressive action programs must be employed. Delays and indecision could be disastrous.

I wish to state clearly that the introduction of "Mexican wheats" has not increased the dangers of losses from rusts. The tall Pakistani varieties C-591, C-273 and C-271, which have been widely grown in the past, are known to be susceptible to one or more races of black (stem) and brown (leaf) rust. Nevertheless, under the traditional (former) methods of wheat culture (i.e. no fertilizer, inadequate watering and low plant populations) ecological conditions within the grain fields seldom have been favourable for rust development. Hence rust epidemics have been rare. This situation, however, is changing rapidly as fertilizers are used, irrigation schedules are improved and plant populations are increased. If these techniques are applied to the tall Pakistani varieties over an extensive area, the dangers from rust epidemics would become much greater than they currently are on Mexican varieties.

6. THE NEED FOR A PERMANENT HIGH ELEVATION WHEAT RESEARCH STATION
IN THE HILLS

The best new wheat variety in the world will serve no useful purpose, and most certainly won't fill empty stomachs when it is confined to an experimental breeding plot. Every means must be exploited to speed up the rythm and increase the efficiency of the wheat breeding program. A suitable station in the correct ecological site in the hills permits the growing of a second generation of all breeding material during the summer (Kharif) season. This procedure cuts in half the time required to develop a new wheat variety. Such a site can also be used to accelerate the first multiplication of a new variety, thereby saving valuable time whenever such action seems technically desirable.

The Pakistan Coordinated Wheat Breeding Program is one of the largest and most diversified breeding programs in the world. The summer nursery arrangements of the past three years have been an ad hoc basis, and consequently only partially successful. This must be changed.

It is now time that the Government of West Pakistan takes action to establish a satisfactory summer high elevation wheat research station which will serve the aforementioned purposes. Such a site should be obtained on short term lease until the best site can be determined. It should then be acquired permanently. The most desirable sites will probably be found somewhere in Kalam or Kaghan Valley.

Once a permanent location is decided upon, buildings should be erected which can serve both as the station headquarters and for

storage of seeds and equipment. Machinery will be needed. Adequate staff and adequate budget are absolutely necessary.

Prompt action on this matter is vital to the continued success of your Wheat Production Program.

7. NEED FOR STRENGTHENING RESEARCH

The research in wheat must be both broadened and expanded in depth.

Research on diseases of wheat must be greatly strengthened if wheat production is to be placed on a permanently sound basis.

The research on soil fertility (fertilizers), water management, cultural practices, and mechanization as they relate to wheat production is very inadequate. Only by strengthening this research can Pakistan hope to reduce wheat production costs and continue to increase yields.

The weaknesses indicated above for wheat are even less adequate on other crops. Soil, agronomic, pathologic and entomological research must be strengthened, and expanded on all crops. Even more urgent, however, is its reorientation. To expand the research in these disciplines and not simultaneously reorientate it will only compound confusion.

The Pakistan experience in the wheat and rice improvement and production schemes indicates that research must be production-orientated if it is to produce results rapidly. It must include all of the disciplines that influence yields and production. A team of scientists with good training in breeding and genetics, agronomy, soil fertility,

entomology and plant pathology must attack all of factors which limit the increase of yields. This team with province-wide responsibilities must be led by a coordinator with outstanding talents. Goals need to be defined, limiting factors must be identified, responsibility must be fixed with a specific person, he must be given the authority to carry out his mission, sufficient time in his post to achieve the goals and rewarded for accomplishment.

8. THE REVOLUTION UNDERWAY IN RICE, MAIZE AND SORGHUM PRODUCTION

The production revolution that began with wheat is rapidly spreading to rice, and maize and now shows signs of igniting in sorghum. The catalyst in the rice revolution is the variety IRRI-Pak and in maize is the synthetic J-1.

All three of these crops, however, have serious insect pests. Future progress hinges on effective insect control. Fortunately successful control can be attained with timely applications of the right kind of insecticides. In order to keep the aforementioned crop production programs on schedule more aggressive and decisive action must be taken by government to authorize and implement the importation of adequate quantities of the granular insecticides, i.e. Diazinon, Sevin, Endrin, Toxaphene, etc.

Failure to have adequate quantities of these inputs available in time for properly protecting the forthcoming kharif crop could prove to be disastrous. If these insecticides are available and properly distributed, it might result in Pakistan becoming self-sufficient in all cereal grains in the next kharif season.

9. THE EFFECT OF THE TECHNOLOGICAL REVOLUTION IN CEREAL CROP PRODUCTION ON THE PRODUCTION OF OTHER CROPS OF ECONOMIC IMPORTANCE IN WEST PAKISTAN

The technological breakthrough resulting in greatly increased yields of wheat, rice and maize will adversely affect cotton production. The kharif crops - rice and maize, in areas where they are adapted, will soon begin to drive out cotton.

Since cotton is an important export crop, the government must take dynamic action soon to avoid such a shift. Neither a campaign or promotion based on words, nor one on legislation will be able to prevent this shift. Instead a bold action program by both government officials and scientists is required to change the whole technology of cotton production.

The low yielding, long season, varieties currently grown must be replaced. The current varieties have long fruiting periods which complicate insect control. Moreover, they are not highly responsive to improved cultural practices, such as the use of fertilizer and better watering.

Losses from insect pests are now the primary factor limiting yield. Dynamic and vigorous insect control measures must be introduced if cotton yields are to be increased. Such a program must be initiated with the introduction of a region-wide sanitation program (i.e. imposing dates of planting and dates for destruction of stalks), so as to break the life cycle of many of the insects and thereby reduce their population. This is only the first step toward making the use of insecticides economically feasible.

Secondly, farmers must be assisted to develop sound insect control programs based on the proper application and proper timing of the right kinds of insecticides.

The problem of developing an adequate insect control program for cotton is both tremendous in magnitude and very complex. An individual farmer cannot cope satisfactorily with this problem. This problem calls for joint action by government, the private sector and farmer. The time is late for action and the urgency is already great.

Farmers will not improve other cultural practices, such as the use of fertilizer and better watering on cotton until he can protect his crop satisfactorily from the ravages of insects.

10. ANNUAL WORKSHOP FOR THE COORDINATED WHEAT IMPROVEMENT PROGRAM

It is suggested that all of the research workers, including all disciplines, i.e. breeders, agronomists, soil scientists, entomologists and plant pathologists, be brought together in one place for a one-week workshop. In this meeting results of the last year's experimentation should be summarized. New plans should be drawn up for the 1968-69 season. A free exchange of ideas ^{should} precede the drafting of new plans. The annual report should be assembled at this time and a rough draft prepared. Key extension personnel should so be invited to attend and participate. Wheat extension program results for 1967-68 should be reviewed. New extension programs should be drafted for the 1968-69 rabi wheat crop in view of results and recommendations of the research workers' recommendations. Such a meeting might be held in July or early August.

If West Pakistan continues to strengthen its wheat research and production program, I am sure it can become a model for the world. I wish you every success toward this goal.