

April 2, 1969.

COMMENTS ON

J. Wallace Madill Report:

WHEAT MARKETING IN PAKISTAN:  
AN APPRAISAL OF PROSPECTS AND REQUIREMENTS

by

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Lahore,  
April 2, 1969.

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Subject: COMMENTS ON J. WALLACE MADILL REPORT "WHEAT MARKETING IN  
PAKISTAN: AN APPRAISAL OF PROSPECTS AND REQUIREMENTS"

## I. INTRODUCTION

Mr. Madill's report represents an outstanding contribution for which he should be saluted. The primary objective of the Madill report, however, as indicated by its title, was to advise the Government of Pakistan on how to organize wheat marketing, storage and transport to meet both the domestic and potential export needs. Many of the observations embodied in the first part of the report which relate to production are inadequately founded and irrelevant to the primary purpose of the report, i.e., salinity and drainage, fertilizer use, tubewell development, seed

multiplication, breeding for rust resistance. A considerable number of previous reports have been submitted to the Government of Pakistan covering these points in considerable detail, and these reports are for the present considered adequate for government planners who will be involved in making future decisions relating to wheat production. We are not therefore, commenting on these aspects of the Madill report.

There is, however, need for focusing attention on the rapid change that is taking place in wheat production in Pakistan, if we are to understand the past, present and potential efficiency (or inefficiency) of production.

Although Pakistan's per hectare (or acre) yields of wheat are still low, especially considering that 2/3 of the area grown to wheat is under irrigation, there is no other country in the world - with the possible exception of India - where yields are increasing as dramatically as they are in Pakistan.

During the 10 year period 1956-66 national wheat yields per unit area were static, averaging 800± 50 kilos per hectare (12± 1.25 bushels per acre). These minor variations were largely the result of fluctuations caused by weather during the growing season. The widespread introduction of the high yielding varieties and new technology on only 1/5 of the cultivated area during the 1967-68 season, which was favorable for wheat production from the standpoint of weather, jumped the yield to 1150 kilos per hectare

(17.25 bushels per acre), an increase of 43 percent. This yield increase was not primarily the effect of favorable weather for the forthcoming 1968-69 crop, which has been cursed by a shortage of winter rains combined with higher than normal temperature during the fruiting period, will show another large increase in both total production and in the national average yield. During the present crop season it is estimated that the high yielding dwarf Mexican varieties and new technology have spread to 60-65 percent of the total irrigated wheat area. Nor do changes in the national average yields truly indicate the true magnitude of change on a vast number of farms - both small and large - employing the new technology. Many farmers are now producing crops averaging between 4000 to 5000 kilos per hectare (60 to 75 bushels per acre). In fact the larger Pakistan wheat farms when effectively mechanized and intensively cultivated under proper water management in a double cropping (2 crops each year) of wheat and rice, wheat and cotton or wheat and soybeans will achieve very high yields and will produce wheat at a per ton cost that will compete with any of the most efficient wheat producing areas of the world. It is thus abundantly clear that Pakistan's efficiency in wheat production is increasing very rapidly and this factor must be taken into consideration in the current planning of production and marketing. For this reason the calculations used in the Gill Report (Cost of Production of Major Crops 1961-62 to 1963-64 Board of Economic Inquiry 1966) or in

the Madill Report for estimating the cost of production and efficiency of production have only limited reliability for the future situation.

One of the greatest thrusts towards efficiency has been the higher grain/nutrient ratio through the new varieties. While the traditional wheat varieties on the average had a grain/nutrient ratio of about 7 to 9, the new varieties have a grain/nutrient ratio of about 14 to 18, i.e. that for each ton of fertilizer used the farmers get the double amount of grain in response compared with the previous situation. This has been the main factor resulting in high demand for fertilizer for wheat in the last two years. It is a fact that the demand increased so much that it could not be met for the 1968/69 season.

Because of his short stay Mr. Madill did not have time to deal fully with the question of whether West Pakistan should plan for export of wheat or not. This question can only be answered on the basis of studies of the comparative advantage of wheat exports versus other alternatives for exports. Moreover he did not consider the difficulties of immediately shifting a large area of current wheat acreage to other crops which would be necessary if the wheat surpluses could not be exported. We, therefore, have found it necessary to write a few comments on these problems plus on a few technical aspects of the report.

## II. IS WHEAT A GOOD EXPORT ALTERNATIVE FOR WEST PAKISTAN?

Without going into details it is obvious that Pakistan has to increase its foreign exchange earnings in order to reduce the dependence on foreign aid and to avoid an unmanageable future foreign debt service. The next question for the economic planners to answer will then be what are the best alternatives for export. This is the question of "comparative advantage". It is quite possible that wheat export is a good alternative in spite of the fact, as pointed out by Mr. Madill, that West Pakistan may at present be a less efficient wheat producer than some of the traditionally exporting countries. This would be the case if the efficiency is relatively still lower for other alternatives for export.

The best way of ranking the various alternatives for export seems to be to calculate the marginal resource cost for the total economy per unit of foreign exchange earned. The marginal cost of the total economy will often be different from the marginal cost of the individual farmer, since some costs which would be variable for the individual farmer may be fixed costs for the total economy.

The marginal resource cost per dollar earned by industrial and agricultural exports has been studied in a recent paper by Dr. Hufbauer.\* According to his findings, the marginal resource

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\* G.C. Hufbauer: "West Pakistan Exports: Effective Taxation, Policy Promotion, and Sectoral Discrimination". Economic Development Report No. 118, Development Advisory Service, Center for International Affairs, Harvard University, Cambridge, Massachusetts, U.S.A.

cost for manufactured exports is very high: of the level of Rs. 18 or more per dollar earned. Foreign exchange saved through industrial import substitution may have nearly the same cost. These costs substantially exceed the marginal resource cost of foreign exchange earned through increased agricultural exports, which according to Hufbauer's findings is of the level of Rs. 5 per dollar earned, or about one-third of the marginal resource cost for industrial exports. Below is given an extract of a table (No. 6, page 56) in Hufbauer's paper:

	<u>Implied Marginal Resource Cost of Foreign Exchange Rs. per Dollar</u>
<u>West Pakistan Exports</u>	
01 Rice	5.1
02 Wheat	4.8
04 Cotton	5.1
11 Cotton textiles	<u>d/</u>
15 Leather, Leather products <u>e/</u>	35.0
22 Machinery	20.9
28 Miscellaneous manufactures	18.1
<u>East Pakistan Exports</u>	
02 Jute	9.9
12 Jute manufactures	27.7

d/ Data indicate negative net foreign exchange earnings; hence indefinitely high resource costs per net marginal dollar of foreign exchange.

e/ In these calculations it is assumed that inputs from the leather goods sector to the leather goods sector largely take the form of hides and skins, the internal prices of which are the same as the international price.

Even if the findings referred to above should be significantly modified it seems to be obvious that increased exports of grains have to be considered as a favorable alternative compared with increase of most industrial exports. As Hufbauer himself points out, the question inevitably arises "Does the present situation warrant a strategic shift towards agricultural exports?"

In the case of wheat the prospects for increased production leading to surpluses for export are good even at significantly reduced price to the farmers. If the farm price of wheat gradually comes down to, say, Rs. 12-14 per maund, if the prices of special inputs like tractors and combines are adjusted more in line with the social costs and if the taxation problem is dealt with as such (which is the only rational way in the long run), we cannot see any real reason to add a "political cost" to the marginal resource cost of wheat production, as indicated by Dr. Hufbauer. This would be still less acceptable for cotton and rice which are more labor-intensive and relatively more important for the medium and small farmers (less than 12.5 acres). It would, as a matter of fact, be more logical to reason the other way around that export of wheat and other grains represents a "political benefit" as it gives room for increased production and employment by bringing the surpluses out of the domestic market, thus making it possible to stabilize the prices at a higher level of production than corresponding to the domestic

demand. A "go-slow policy" in the wheat program, as indicated by Mr. Madill, would mainly hurt the small farmers since they are just starting to adopt the new technology and would also reduce the possibility to absorb unemployed labor. The question whether or not to export wheat is to a high degree a question of the use of resources which otherwise may be more or less unused since there are few alternative crops for wheat to which substantial acreage can be diverted and only very few alternative export winter crops. In many instances it would be a question of wheat instead of **fallow** after rice, cotton and maize, and use of labor and other inputs which otherwise would be underutilized. It is only possible to gradually divert part of the area now under wheat to other winter crops. This can only be done as the research information and technology on such crops as brassica, safflower, winter forages etc. become available.

Regarding the initial investments in wheat export facilities it is important to look at the total needs for storage and marketing facilities for all grains. This Mr. Madill has not done. Regardless of exports into foreign markets, West Pakistan has to invest in facilities for supplying considerable quantities, of the level of 1.0 million tons, of wheat and rice to East Pakistan for years to come. The province also has to provide facilities for export of 2.0 million tons or more of rice to other countries. Export of maize and sorghum is also a real

possibility. The transport, storage and marketing facilities should, therefore, not be planned independently for wheat, rice, etc., but for all the various grains jointly. Much of the investments would also be needed in order to improve domestic storage and marketing facilities generally as a link in the improvement of marketing for the implementation of a proper food policy. It would most likely pay back through reduced losses, improved quality, etc. The whole problem of marketing facilities has to be considered as an integral part of the policy for modernization of West Pakistan agriculture, including transport, storage, processing, marketing, etc. The present marketing facilities for all grains are outdated and have to be replaced.

The reasoning above leads to the conclusion that wheat (cotton, rice, maize, etc.) is a favorable alternative for export earnings. The next question that arises is what mechanism should be used to facilitate the export of wheat.

### III. THE ORGANIZATIONAL MECHANISM FOR EXPORTS OF WHEAT.

Mr. Madill uses the official exchange rate of Rs. 4.76 to \$1.00 in his price comparisons. It is a fact that most of the agricultural exports today are taking place at this rate, which means a heavy indirect taxation of the agricultural producers and a bias towards industrial exports. It is, however, obvious that wheat cannot be exported at the official rate as this would

not give a satisfactory price for wheat to the farmers. Special arrangements, therefore, have to be made in order to compensate the wheat farmers for the overvaluation of the rupee.

There seem to be three main alternatives to choose among: (1) the subsidy alternative, (2) the bonus voucher alternative, and (3) the bonus voucher plus subsidy alternative.

In evaluating the various alternatives there are several aspects to be taken into consideration. The subsidy alternative would place heavy demands upon government financial resources. This could be avoided through the bonus voucher alternative which would be financed by indirect taxation of those who directly or indirectly buy extra imports under the bonus voucher scheme.

The wheat price in the primary markets corresponding to a given rate or subsidy is given in the table below, which is based on the following assumptions: (1) using the official exchange rate an export price of about Rs. 10 per maund f.o.b. Karachi which corresponds to the minimum prices in the International Grains Agreement, (2) Rs. 2 per maund in total bulk handling and bulk transport charges, and (3) and future premium level of 150 (today it is about 185).

Wheat Price in Primary Markets corresponding  
to various levels of bonus voucher rate or subsidy

Bonus Voucher Rate (Percent)	Subsidy (Rs. per maund)	Price in Primary Markets (Rs. per maund)
0	0.00	8.00
20	3.00	11.00
30	4.50	12.50
40	6.00	14.00
50	7.50	15.50
55	8.25	16.25
60	9.00	17.00

According to the assumptions above, a bonus voucher rate of 60% or a direct subsidy of about Rs. 9 per maund would be necessary in order to pay the farmers the present floor price. It is obvious that adjustments must be made downward in the floor price for the 1970 crop. A grading system should be developed and introduced well in advance of the 1970 wheat harvesting season. This would require (1) import of equipment and (2) training of people during this season. The equipment has to be ordered immediately and the training initiated promptly. The grading system has to be planned in such a way that the deductions cover all the extra costs caused by low quality. These costs are therefore not included in the table above and only bulk handling and bulk transport costs of Rs. 2 per maund are assumed.

For the 1970 cropping season a reduction of the floor price should be considered. As soon as proper arrangements for bulk handling and transport are made export under 40% bonus voucher rate should then become possible. By increasing the quality of wheat for export both through varieties with better industrial quality, improved grading, etc., and further lowering of the floor price, it may in the future even be possible to export under a bonus voucher rate of 30% without any extra subsidy. This possibility will also depend upon the premium level. Today the premium is about 185. At this premium, a rate of 30% and f.o.b. price of Rs. 10 would correspond to a price in primary markets of about Rs. 13.50 per maund.

In our opinion export of wheat under the bonus voucher scheme is feasible and consistent with a sound economic policy. Increasing the coverage of the bonus voucher scheme for exports and imports would in itself lead to a better allocation of scarce foreign exchange resources. On the other hand, it would increase the inflationary pressure. This could, however, be counteracted by lowering the issue price of wheat corresponding to the decrease in the floor price. We would advise to stick to the floor price system in order to eliminate the price risk of the farmers and to stabilize the wheat price at the decided level. Among possible changes which may be considered are :(1) a certain seasonal pattern in the floor price in order to

stimulate the private sector, including the farmers, to take over part of the storage function and (2) provision of a higher floor price for the small farmers than for the bigger farmers. This could in practice be done by paying a given price for a limited amount of wheat from each producer and a lower price for any additional quantity. A similar system is used for maize in Mexico.

A uniform bonus rate for all agricultural exports would seem to be a desirable general principle. We doubt, however, if this is practicable in the short run, since the necessary rates would differ very much among the various export crops. The reasons for a uniform rate are the strongest for alternative crops grown in the same cropping season as for the kharif crops - cotton, rice and maize. For cotton and rice this principle would not create any problem while maize and sorghum only could be exported at a relatively higher rate than for cotton and rice.

Through shorter-season varieties, earlier planting, mechanized harvesting, etc. of kharif crops and wheat varieties which can be planted later there will be less and less competition for land between kharif crops and wheat. Currently, it is obvious that assuming available water wheat can be planted after cotton, rice or maize, and that this is taking place to an increasing extent. It may, however, as for example in the case of wheat after cotton, lead to slightly lower yields of wheat or

cotton or both as the last picking of cotton might have to be finished earlier than would be otherwise and/or wheat to be planted later than the optimal planting time. This will be less of a problem with new shorter-season varieties, new practices, new equipment, etc. The risk that higher bonus voucher rate for wheat than for the kharif crops shall lead to misallocations may, therefore, gradually become insignificant.

#### IV. MARKETING CONSIDERATIONS, STORAGE AND TRANSPORT

The information included in the sections of the Madill report covering these aspects of Pakistan wheat commercialization and utilization is excellent. Madill indicates very clearly the great weaknesses in the current marketing and utilization system.

We fully agree with Mr. Madill that the quality of commercial wheat grain currently entering the market, and also being sold to the consumer, is below the standard considered acceptable in most countries. A two-pronged attack, one at the farm level and the other at the marketing and warehousing level, is needed to correct this defect. Nevertheless, we feel that if proper action is taken to implement the recommendations made by Madill, rapid improvement in quality will be forthcoming.

##### Grading System

The establishment and enforcement of a Grading System is the first step that must be taken to improve grain quality. A

system that will reward farmer financially for delivering good quality grain, while punishing him financially when he falls below certain standards, will now result in rapid improvement in the quality of the grain the farmer delivers to the market. The changes required to attain these goals would not have been economically feasible for the farmer prior to the recent breakthrough in yield. Some of the rapid changes that will now accrue as the result of the adaptation and implementation of a practical Grading System include:

A. Improvements in Physical Quality of Commercial Wheat

1. Reduction in Foreign Matter (dockage)  
i.e. dirt, stones, manure, straw and chaff

As long as the majority of the wheat is threshed by treading with animals admixtures with the forementioned foreign matter is inevitable. The breakthrough in grain yields during the past two years has resulted in the introduction of thousands of new mechanical threshers. This shift to mechanical threshers should be encouraged. The implementation of a grade system into the marketing organization to impose reductions of prices for grain below standard for dockage and foreign material will greatly accelerate the shift to mechanical threshing. Manufacturers should be encouraged to redesign the threshing machines

now available so that they will also do a better job of grain cleaning, especially removing the chaff and small bits of straw. Where this is not feasible separate small cleaners should be designed, manufactured and introduced. In all cases ways must be found to avoid winnowing the mechanically threshed grain on the ground which will simply reintroduce the problem of mixture with dirt and stones.

## 2. Mixtures of Other Grains

A Grading System that discount wheat grain containing other grains such as barley, oats and mustard will now result in a rapid reduction in these mixtures. The relatively cheap hand labor will permit the farmers to remove all such plants from fields, while they are still green and can be used as feed for livestock, while simultaneously reducing these grains mixtures in the harvested wheat.

## 3. Grain Plumpness and Test Weight

The introduction of an effective grading system will descriminate against the production of shrivelled grain and grain of low test weight. Grain plumpness and test weight will influence

both the variety grown and cultural practices, i.e. irrigation. In general, however, Pakistani wheats are characterized by good test weights.

#### 4. Insect Damaged Grain

The problems of insect infestation must largely be attached at the primary markets (mandi towns) both in the warehouses of the commission agents, the Food Department and private mills. Most farmers sell their grain as soon as threshed and hence most of the infestation takes place largely in the mandi markets and warehouses. Again an effective grading system, involving discounts for weeviled or insect damaged grain will encourage rapid improvement in both warehouse "sanitation" and fumigation.

#### 5. Care of Grain at Mandi Markets Prior to Entering Warehouses

The handling of grain in the mandi markets will need to be completely revolutionaized if grain quality is to be greatly improved. There will be little gained if the farmer delivers wheat grain with less dirt, stones, manure, other seeds, straw and insects if it is promptly dumped in piles on the ground and contaminated with dirt, stones,

infested with insects and moistured by the rain as has usually happened in the past.

An aggressive extension program will need to be established to make both the farmer and grain commission agents aware of the consequences of delivering inferior grades of grain once the grading system has been established. A training program for the trainers should get underway soon to prepare qualified employees for these responsibilities.

B. Other Quality Characteristics of Importance that must be taken into consideration in Formulating an Effective System of Classes and Grades to meet the Utilization and Market Requirements for Pakistan Wheat

1. Grain Color

Grain Color itself is of little or no significance where the wheat is ground into white flour in roller mills and used for the production of leavened bread. This is the case with most wheat that is utilized for human food in the U.S.A., Canada, Latin America, Western Europe and Australia. However, in many countries in a vast area stretching from Morocco to India grain color is one of the principal quality considerations. In these countries white grain is preferred over

red for the grain is ground into whole-meal "ata" (instead of white flour) and is used to produce chapati or nan. The consumer in this vast area prefers white chapatis or nan over the pink colored chapati which results from the use of red grain. This may not seem like a very sound basis upon which to base preference but it is an economic fact. White grained wheat varieties in India and Pakistan when sold on the domestic free market will command a premium of 15 to 20 percent over that of red grained varieties of the same grade.

## 2. Gluten Characteristics and Baking Quality

The physical dough handling properties, such as gluten strength and elasticity, and the baking or bread making properties are largely governed by hereditary factors, these are in a secondary way modified by environmental effects which influence grain protein levels etc. The Canadian and Northern Spring Varieties of the U.S.A. have been bred for strong elastic dough which results in excellent baking characteristics.

The white grained Pakistani (and Indian) varieties, which are preferred and largely used for the production of chapati and nan have strong

dough which is somewhat less elastic than the Canadian or U.S.A. varieties, and more similar in this respect to the Australian varieties.

Currently Pakistan has four different types of high yielding dwarf varieties available for use. These include such varieties as the white grained Mexipak and Mangla, which are similar in quality (gluten) to the former tall strawed Pakistani varieties. It also includes a group represented by Lerma Rojo 64 which is especially well suited to biscuit and cookie production. A third group with excellent leavened bread making characteristics is represented by INIA 66 and Sonora 64 (red grain) and Norteno 67 (white grain).

Within the Pakistan and CIMMYT breeding programs which are both very large and diverse, wheat varieties are being developed to fit a wide range of market demands. It should be pointed out that the newer Mexican varieties such as INIA 66, CIANO 67, NOROESTE 66 and NORTEÑO 67, all have good milling and bread making properties. In this respect they are very different from the varieties that typified the Mexican wheats under the International Grains Agreement (Table 2 in the Madill report).

### 3. Grain Protein Content

The protein content of Pakistan wheats is currently low probably averaging about 10%. There is, however, a wide variation, ranging from 8 to 13 percent. With the increasing use of fertilizer at the higher dosages (100 kilos of nitrogen or more per hectare) there will be an appreciable increase in grain protein content. The aim should be to lift the average grain protein content to a level of 12 percent within five years.

#### Adapting a Grain Market Class and Grading System

It is suggested that Pakistan consider establishing the three following market classes:

- 1) "PAKISTAN-CHAPATI AMBER": Characterized by strong gluten, and hard vitreous white grains i.e. C273, C591, Mexipak 65, Mangla 68.
- 2) "PAKISTAN-PAN BREAD-Red": Strong elastic well balanced gluten with good bread baking characteristics hard vitreous red kernels, i.e. Sonora 64, Inia 66.
- 3) "PAKISTAN-PAN BREAD-White": Strong elastic well balanced gluten with good bread baking characteristics. Grain large and white i.e. Norteno 67.
- 4) "PAKISTAN-BISCUIT Red": Weak elastic dough suitable for biscuits and pasteries. Grain large soft red, i.e. Lerma Rojo 64.

We suggest that a simplified system of grades based on the system under use in the U.S.A. as recommended by Madill be adopted. This would be developed by modifying the U.S.A. system as follows:

Grade	Minimum	% MAXIMUM LIMITS OF					Wheats of other	
	Test Weight	Defects					classes	
	Lbs/bushels	Heat	Total	Foreign	Shrunken	Total	Contrast-	Total
	All	damaged	damaged	material	& broken	defects	ing	
	classes	kernels	kernels		kernels		classes	
1	61	0.1	2.0	0.5	3.0	3.0	1.0	3.0
2	57	0.4	6.0	2.0	7.0	7.0	3.0	10.0
3	52	3.0	15.0	5.0	20.0	20.0	10.0	10.0

Point of Application of Grading System

Madill has correctly suggested that it is physically impossible to impose grading of all wheat received at the smaller markets. At the outset he suggests that all wheat be graded as it enters government warehouses (godowns). We concur that this approach is in the early stages the only practical approach. We, however, suggest that in a couple of primary markets of importance where there are no government warehouses (godowns) that a government grading station be established. In such a case the official grader would grade samples from farmers who were dissatisfied by the "grade" offered by the grain commission agents. The availability of such a service might restrain unscrupulous grain

merchants somewhat from degrading grain where there is no government warehouse.

#### Bulk Handling of Grain

Mr. Madill has spoken out very clearly for converting to bulk handling of grain at all levels of marketing as soon as possible. We concur.

#### Warehousing

The Madill report strongly urges the construction of a series of government and private large-sized bulk mechanized warehouses on rail-lines in the main wheat production centers. Again we wholeheartedly concur.

#### Terminal Elevators and Facilities for Direct Mechanized Loading of Ships at Karachi Port

The efficient bulk handling of grain (both wheat and rice) at Karachi Port for either shipment to East Pakistan and/or into international market channels is now blocked by both obsolete costly methods of grain handling and inadequate facilities.

A large terminal elevator of 100,000 to 125,000 tons at dockside is urgently needed in Karachi Port. This elevator should be equipped with machinery for drying and cleaning as well as for rapid mechanical loading of large cargo grain freighters. Deep water berths for grain freighters and direct rail-line access to the terminal elevator are both absolute necessities. These

facilities if properly planned will be valuable for export of all grains but at the outset will be used primarily for handling rice and wheat.

The need for the terminal elevators and port improvements have to be given high order of priorities by the planners. We concur with both Efferson and Madill that the crisis is at hand and the urgency is great for coming to grips with this problem.

#### V. CONCLUSIONS

1. Wheat represents a good export alternative for West Pakistan. Generally the great difference in marginal resource cost per dollar earned between agricultural and industrial exports warrants a shift towards agricultural exports with emphasis on cotton and grains.

2. The bonus voucher scheme represents a feasible alternative for compensating the producers and exporters for the over-valuation of the rupee.

3. We will advise that West Pakistan immediately plans for grain marketing and export facilities according to the lines suggested by Mr. Madill with a total capacity of 3.0 million tons annually for all grains. Further expansion may take place as found necessary.

4. The capacity of the railroad and of Karachi Port has to be expanded as rapidly as possible to meet the requirements of total shipment of 4-5 million tons of grains annually. Later this capacity for shipments of grains may have to be increased.