

Export Potential of Fine Rice From Pakistan

by

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I: INTRODUCTION

In recent years, rice has emerged as an important foreign exchange earner for Pakistan. All the rice exports since 1958-59 were supplied by West Pakistan, a surplus rice area under the present price and procurement policies. In spite of an overall rice deficit, due to deficiency of production in East Pakistan, high-priced fine varieties were exported at the same time that PL 480 foodgrains were being imported.

The current thinking in and outside the government is to raise substantially the production and exports of fine rice (especially Basmati rice). In order to examine the rationality of increasing the production and exports of fine rice, certain basic information on world supply and demand are essential.

This paper attempts to provide and build up some of the necessary information on the supply of and demand for Pakistan's fine rices. Moreover, the rationality of increasing the production and exports of fine rice and of continuing the present policy and institutional framework for the procurement and export of rice, is examined. The paper is divided into four parts (in addition to the introduction and conclusion): *i*) supply potential of fine rices, *ii*) potential world demand for fine rices; *iii*) policy and institutional framework for the procurement and export of fine rice; and *iv*) rationality of increasing the production and export of fine rice.

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II. SUPPLY POTENTIAL OF FINE RICES¹

There are many varieties of rice grown in the former Punjab and Sind areas that can be labelled as fine². Rice is *fine* if it has slender kernels, and, after cooking, the grains maintain their slenderness and do not burst or stick together³. Among the fine rices, Basmati, Mushkan, Bara (Hansraj) and Permal in the former Punjab areas, and Sugdeshi group (J.J. 77, Bengalo, Sunhari, Ghulab, etc.) and Dokri Basmati in the former Sind areas, are well known. However, Basmati rice (particularly Basmati Lahore 370) is very well known in Pakistan, India, and Middle East, for its extra fineness and unique flavour when cooked.

It is estimated that at present, the production of fine rices is about 2,50,000 tons, mainly concentrated in the Districts of Gujranwala, Sheikhpura, Lahore and Sialkot (Table A-2(b)).

Since Basmati rice has good cooking quality and has the largest production among all the fine rices grown in West Pakistan, it is desirable to discuss its supply potential in detail.

(A) Areas of West Pakistan Suitable For Basmati Cultivation

Basmati and other slender type rices require fertile clay or clay loam soils, abundant water supply and mild climate at the ripening time of the crop⁴. *Mild climate* at the ripening time is the most crucial requirement. Poor soils and/or inadequate water supply can affect the crop yield to varying degrees, but without suitable climatic conditions, Basmati rice cannot acquire its characteristic fineness and good cooking qualities. Hot and comparatively dry climatic conditions at the time of ripening make the kernels chalky or cause abdominal whiteness. Moreover, hot and dry climate will *i*) reduce the moisture content of the kernels and cause cracks in them, leading to a high proportion of broken grains when husked, *ii*) cause air cavities which make the grain burst when put in boiling water and distort the shape of the cooked grains, *iii*) cause the development of Dextrine and some Maltose in the starch of the grain which make the grains stick together when cooked, and *iv*) prevent the synthetic chemical reactions that lead to the formation of *aromatic compounds* which are responsible for the special Basmati flavour. Since the water supply can be increased through

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² The former Punjab areas include four divisions: Rawalpindi, Sargodha, Lahore and Multan. And the former Sind areas include two divisions: Khairpur and Hyderabad.

³ *Rice Trade Glossary* defines a slender kernel as having a length/breadth ratio of 3 or more in husked form [15, p. 54].

⁴ For a detailed introduction to Basmati rice, see [23, Appendix A].

canal and tubewell irrigation in most cases, the climatic conditions are the most important limiting factor for Basmati rice cultivation.

The climatic requirements are temperatures ranging between 68-100 degrees Fahrenheit during the growing season, and mild temperature ranging between 60-80 degrees Fahrenheit during the ripening season. Moreover, for good Basmati cultivation, a relative humidity range of 40-60 per cent, during the ripening season, is equally important.

Basmati is a *time-fixed* variety which means that it is ready for harvest after a fixed number of days (110-115) from the time of transplantation. Appendix Table A-1(a) shows average monthly temperature from May to December for 11 centres in West Pakistan. All the 11 centres show mild temperatures either during October-November or during November-December. In areas where the mild weather occurs in October-November, the transplantation time falls during July-August and when mild weather occurs during November-December, the transplantation season is August-September. In the former Sind areas late sowing is essential in order to take advantage of mild weather, but late sowing involves lower yields, as early sowing followed by comparatively high temperatures will give comparatively high yields.

Table I summarises the areas where the temperature and humidity conditions seem to be suitable. Areas around Lahore (where at present Basmati is widely grown) have the ideal climatic conditions necessary for the ripening season of Basmati rice. However, areas around Hyderabad are only suitable if Basmati rice is transplanted late⁵. Parts of Lyallpur, Montgomery and Sukkar, where the necessary climatic conditions prevail, might be found suitable.

Two important points should be noted: *i*) when the ideal temperature and humidity conditions do not prevail, Basmati could be grown, though the cooking quality of the grains will be adversely affected to varying degrees, and *ii*) areas shown as suitable in Table I will always include some patches of land where the ideal climatic conditions are missing, and the vice versa.

(B) Soil and Water Conditions in Suitable Areas

Basmati rice can be successfully grown in fertile clay or clay loam soils. Since one of the most important requirements is abundant water supply (to have standing water in the fields), an impervious subsoil is needed to make an economical use of water.

In the fine rice growing areas of former Punjab (Lahore Division, parts of Lyallpur and Montgomery) the soil is fairly fertile and an impervious subsoil is available or is made available by the process of "puddling" fields. In the rice

⁵ Late transplantation is not necessary if some early maturing variety of Basmati (e.g., Dokri Basmati) is cultivated.

TABLE I
AREAS SUITABLE FOR BASMATI RICE CULTIVATION

Area	Temperature and humidity conditions (ripening season)	Suitable transplantation season	Most productive sowing season	Sowing late or early	Effect on yields
(1)	(2)	(3)	(4)	(5)	(6)
Group A					
1. Lahore Division	Suitable (October-November)	July-August	—	—	—
2. Hyderabad	Suitable (November-December)	August-September	May-June	Late	Adverse
Group B					
1. Lyallpur	Suitable for small areas where humidity is high (October-November)	July-August	—	—	—
2. Montgomery	Suitable for small areas where humidity is low (October-November)	July-August	June-July	Little late	Slightly adverse
3. Sukkar	Suitable for small areas where humidity is low during November-December	August-September	May-June	Late	Adverse

Source: Based on information contained in Appendix Tables A-1(a) and A-1(b).

Note: Lahore Division consists of districts: Lahore, Sheikhupura, Gujranwala and Sialkot. The districts with comparatively moderate climate in Hyderabad Division are Hyderabad, Thatta and Southern portion of Dadu.

growing areas of former Sind (Hyderabad, Dadu, Sukkar, Thatta), the soil is as good as in the former Punjab areas and, during the cultivation season, the underground watertable rises close to the surface which minimizes the leaching of surface water. Thus, the soils in all the areas sorted out in Table I are reasonably suitable for Basmati cultivation, though poor in certain cases.

Slender rices require more water than do coarse rices. It is estimated that under normal circumstances, the water requirements for Basmati are 70 to 75 acre inches⁶. The rainfall during Monsoon season is roughly 20 inches in areas around Lahore and 8-10 inches in areas around Hyderabad, neither of which is sufficient. Canal irrigation is the main source of water supply.

Canal water is in acute shortage in areas around Lahore however, and water requirements for rice cultivation are not adequately met. In these areas, canal water is supplied for one-fourth of the area owned, at the rate of one cusec for 64 acres [1, p. 93]. It should be noted that the regularity and adequacy of water, especially at the time of flowering, affect the slender rice yields significantly. Therefore, the use of tubewell irrigation is increasing rapidly to insure water with more certainty.

(C) Maximum Potential Acreage/Production of Basmati Rice

It is not possible to estimate, precisely, the potential acreage that could be brought under Basmati rice cultivation. However, there are certain indicators that can help to form some idea. There are four ways of increasing the present production of fine rices: *i*) by shifting the present area under medium and coarse rices to fine rices; *ii*) by shifting the area under the alternate *kharif*⁷ crops (cotton, sugarcane, maize, etc.) to fine rices; *iii*) by increasing total acreage for *kharif* cultivation; and *iv*) by raising the yield of fine rices through regular and adequate water supply, use of fertilizers, pest control, etc.

i) Shifting the Present Area under Medium and Coarse Rice to Fine Rice

From 1961-62 to 1963-64, in Lahore Division (Region A) nearly 51 per cent and in the districts of Hyderabad, Dadu, Thatta and Sukkar (Region B) nearly 5 per cent of the rice acreage was under fine rices (see, Table A-4). In Region A, if water supply and economic incentives are sufficient it is estimated that 90 per cent of the present rice acreage can be shifted to fine rices. However, a complete shift may not be possible due to water inaccessibility. On this basis, 8,00,000 acres could be transferred to fine rices, and on the basis of an assumed yield of

⁶ The information is based on a personal communication with Mr. Mohammad Shafi, Assistant Botanist, Rice Farm Kala Shah Kaku (District Sheikhpura).

⁷ The *kharif* season, approximately, runs through May to November.

11 maunds per acre, the production could be raised to 3,20,000 tons⁸. In Region B, however, the maximum possible shift is roughly estimated to be 70 per cent, as there are some low-lying areas (some 20 per cent) where cultivation is not possible. Thus, the potential area is 6,75,000 acres and production at 5.5 maunds per acre could be 1,24,850 tons⁹. There are some areas in Lyallpur, Montgomery, Gujrat, etc. where fine rices could be grown successfully. By making an allowance for such areas, the maximum potential production is increased to about 4,80,000 tons. This is almost twice the present estimated production of fine rices.

ii) *Shifting the Present Area under Alternate Kharif Crops to Fine Rice*

Among many crops cotton, sugarcane, and maize are the important ones competing with rice. Table A-3 summarises the average area under these crops, for the years 1961-62 to 1963-64. The total area under the competing crops in Regions A and B, is 8,17,000 acres, out of which 63 per cent is in Region A. By assuming the average yield of 11 maunds in the former Punjab areas, and 5.5 maunds per acre in the former Sind areas, sufficient water supply and economic incentives, the potential increase in the production of fine rices is estimated to be 2,70,000 tons. Sources i) and ii) combined could raise fine rice production to 7,50,000 tons, three times the present level.

iii) *Increasing Total Acreage for Kharif Cultivation*

It is difficult to say how many acres of land can be usefully cultivated with improved water availability and land development. It is certain, however, that the actual *kharif* area under cultivation is much lower than the cultivable area. In the Northern Zone, about 41 per cent of the *kharif* cultivable area was reported to be cultivated in 1960-61 *kharif* season. It is assumed that the proportion can be raised to 60 per cent or higher in future¹⁰. However, the future area under sugarcane, rice, cotton and foodgrains (jowar, bajra and maize) is calculated to be 77 per cent higher than the present. For the same crops, in the Southern Zone, the assumed future area is supposed to be 50 per cent higher.

Nothing precise can be deduced from these facts except that the total area available for *kharif* season can be tremendously increased through improved

⁸ Eleven maunds per acre was the average yield of cleaned rice in the Districts of Gujranwala and Sheikhpura (major fine rice growing areas), during 1961-62 to 1963-64.

⁹ In the former Sind areas, with late sowing of Basmati rice, it is estimated that the yields are reduced to one-half to one-third due to groundwater, pest and rice stem borer attack conditions. We use 5.5 maunds per acre (one-half of former Punjab areas) for estimating production. On the basis of the present proportion of production in areas of former Punjab except Lahore Division, an allowance is made for the potential production in the suitable areas of Lyallpur, Montgomery, Gujrat, etc., at 10 per cent of the production in Region A.

¹⁰ For the reported and assumed future intensity of cropping, refer to Harza Supporting Studies [21, Chapter II, Tables 11-7 and 11-8].

water supplies and land reclamation and development. Roughly a 50 per cent increase can take place in the present culturable *kharif* acreage. With this assumption, the potential production of fine rices estimated under *i*) and *ii*) can be increased by 50 per cent. This would raise the maximum production potential to 11,25,000 tons (4.5 times the present production).

iv) Raising the Average Yield of Fine Rice

The present rice yields are obviously low, because of untimely and inadequate water supplies and pests, inadequate use of fertilizers and manures, improper seeds, improper and exhaustive crop rotation, *etc.* It is estimated that rice yields as a result of the above inputs and measures can increase by 50 to 100 per cent [22;34]. By making an allowance for the potential increases in rice yields, the potential production of fine rices can increase to 16,88,000—22,50,000 tons.

The above estimates of potential supply (summarised in Table II) are based on several assumptions: *a*) that the water supply can be increased to any required quantity; *b*) that the necessary economic incentives can be created and made effective; *c*) that the programmes of land reclamation and development will increase the *kharif* cultivable area to the assumed extent; and *d*) that the measures and economic incentives will be available to make the assumed increase in rice yields feasible and profitable.

The estimates of maximum production potential serve *no* other purpose than to assure us that any plan to increase the production of fine rices two to three times is feasible, though serious efforts will have to be made to increase acreage and yields, and the increase may be at high economic costs.

(D) The Required Economic Incentives

By economic incentives we mean a shift in the price of fine rice relative to that of the competing crops including coarse rice. The required strength of economic incentives can only be determined by a reference to the relative costs and earnings per unit of land, water, and other resources in the various areas. Some of the factors that make the costs of producing fine rice higher than the coarse rice, are the following:

- i*) Production of fine rice is more water intensive than coarse rice¹¹.

¹¹ It is experienced that the total water requirements of late maturing fine rice are about 72 acre inches and that of early maturing coarse rice varieties about 60 acre inches (Footnote 6).

TABLE II
ESTIMATES OF POTENTIAL SUPPLY OF BASMATI RICE

Source of production (1)	Estimated potential production		
	Existing conditions (2)	Adequate water supply (3)	Increase in rice yields by 100 % (4)
	(.....000 tons.....)		
(1) Estimated present production ...	250	375	500
(2) Increased production through			
<i>i)</i> Shifting the medium and coarse rice acreage to fine rice:			
Region A	323	485	646
Region B	125	187	250
	448	672	896
<i>Plus</i> allowance for other areas in Region A	32	48	64
Total <i>i)</i> ...	480	720	960
<i>ii)</i> Shifting the acreage under alternate <i>kharif</i> crops to fine rice:			
Region A	209	314	418
Region B	61	91	122
Total <i>ii)</i> ...	270	405	540
Total <i>i)</i> and <i>ii)</i> ...	750	1,125	1,500
<i>iii)</i> increasing the <i>kharif</i> acreage by 50%	375	563	750
Total <i>i)</i> , <i>ii)</i> and <i>iii)</i> ...	1,125	1,688	2,250

Source: As explained in the text, Column (3) is computed from Column (2) on the assumption that with adequate water supply the rice yield will increase by 50 per cent.

- ii) Fine rices usually have longer maturing periods compared to those of the coarse and medium varieties [1, pp. 125-131]. The differences range from 15 to 45 days. This means higher water and labour costs.
- iii) Fine rices, in general, require water with more certainty and regularity.
- iv) As fine rices have longer maturing periods or have to be transplanted late, the sowing of the *rabi* (winter) crop is delayed or becomes impossible. When the sowing of *rabi* crop is delayed in areas of low rainfall (during October-December) and/or of non-perennial canal networks (such as the former Sind), the normal *rabi* yields fall due to low moisture content in the soil and lack of adequate water supply. Such lower *rabi* yields mean an additional opportunity cost for fine rices.
- v) Even in the case of early maturing varieties of fine rices, the transplantation sometimes is done late so that mild climate prevails at the time of ripening. With late transplantation, the fine rice yields fall in some areas. For instance, in the former Sind areas, the ideal time for rice transplantation is May-June, and late sowing (July-August) will reduce yields to one-half to one-third of the potential if transplantation could have taken place in June, due to less ideal climatic and water conditions and the more active attack of rice stem borer (during July-August) on young plants.
- vi) The coarse rices are more nearly impervious to less-than-ideal conditions, and the probability of loss in the normal yield on account of untimely and inadequate water supply and disease is much more in the case of fine rices.

Clearly, the change in the relative price of fine rices (Basmati) should be sufficient to make the area shift from medium and coarse rices to fine profitable. The main costs to be compensated are: water, loss in yields in the *rabi* crops, loss in yield due to late transplantation, and the risks of loss in normal yields. In the former Sind areas the change required in the relative price of fine rice will be much larger than that in the former Punjab areas, as the loss in yields due to late transplanting, late sowing of *rabi* crops, and rice stem borer attack are much higher. To make the hypothetical maximum acreage under fine rices effective (as estimated under (C) Sub-section i)) an increase of from 50 to 100 per cent in the price of fine rices, relative to medium and coarse rice, is essential¹².

Turning to the case of a shift of the area under the alternate *kharif* crops to the cultivation of fine rices, a substantial increase in the price of fine rice is a

¹² Based on Table A-5(b) in which we have shown the estimated opportunity cost of fine rice cultivation, through delayed *rabi* crop.

necessary, but not a sufficient, condition. The water supply will have to be increased to an enormous extent, since the water requirements for fine rice are more than double that required for cotton, and more than three times that of maize [2, p. 32].

Cotton yields are low on land with a high watertable (0-10 feet) and in future, with land reclamation projects which will lower the watertables, cotton yields will rise. Therefore, the increase in the price of fine rice relative to cotton will have to be much higher than that necessary at present. The exact magnitude of the changes in the relative price of fine rice depends on factors like cotton and other crop yields in particular areas and how they will change with land reclamation and development.

Finally, it should be noted that for an effective shift from coarse rice or/and alternate *kharif* crops, substantially increased and regular water supply is crucial. With limited water supplies, it is not advantageous (in terms of foreign exchange) to use water for more rice cultivation¹³.

Before discussing the rationality and desirability of increasing the production/export of Basmati rice, we wish to analyse the international demand potential for fine rices.

III: WORLD POTENTIAL DEMAND FOR FINE RICE (BASMATI)

In this section, we will discuss the world demand for fine rices in general and Basmati rice in particular. As a background, some facts regarding the world rice economy and international trade are presented first.

(A) Main Features of World Rice Economy and Trade

i) Rice is the most valuable primary product, surpassing not only other crops, such as wheat, maize, cotton and sugar but also coal, crude petroleum and pig-iron [29]. During 1959-60 to 1961-62, the average production of paddy was 236.4 million metric tons, equivalent to an estimated figure of 153.4 million metric tons of milled rice¹⁴. Over 90 per cent of the world production is concentrated in Asia (including Mainland China).

ii) The great bulk of the world rice is consumed in countries where it is grown, and only 3.6 per cent of the production (very low compared with other cereals) enters into the international trade¹⁵. Absolute trade quantities range from five to six million metric tons (*see*, Table B-3).

¹³ *See*, Ghulam Mohammad [20, pp. 512-513].

¹⁴ Converted at the average milling rate of 65 per cent (*see*, Table B-1).

¹⁵ For computing the percentage of rice traded, the average for the years 1951-53 is used, as data was easily available for these years (*see*, Table B-3).

iii) The number of countries that could be regarded as the major participants in rice trade is small. Nearly 70 per cent of the rice exports come from three countries: Burma, Thailand and the USA¹⁶. Nearly 63 per cent of the rice imports are in the Far East, concentrated in Indonesia, Malaysia, India, Ceylon and Hong Kong.

iv) Since few countries participate in rice trade and since rice production can vary significantly as a result of the changing weather conditions, the quantities traded and the prices fluctuate substantially.

v) Rice is a differentiated commodity, as the various kinds traded internationally differ very widely in shape, colour, cooking characteristics, type and degree of milling and the proportion of broken grains. Consumer preferences vary from country to country. Moreover, there is no international market on which a large number of varieties are traded fairly continuously. Along with other factors, changing conditions of trade contracts, barter deals and other linked business (security of markets or furtherance of foreign policy, *etc.*) makes it extremely difficult to compare rice prices or even to measure their movements.

vi) Most of the principal exporting countries sell through a national monopoly, while in the remaining cases, governments play an important role. Among the leading importing countries, nearly half have single purchasing agencies [18, pp. 4-10].

(B) Availability of Relevant Statistics

Our main interest is to analyse the world potential demand for a particular group of rices called fine rices and a special variety in this group called Basmati rice. Statistical data of all sorts are lacking. There are no published statistics showing the world production, trade and prices of fine rices. Moreover, there is no available information about the income and/or price elasticities of demand for fine rice.

Therefore, we will not be able to carry out any comprehensive and precise analysis of the shape of the demand curve for fine rice and the potential shifts in it. Nevertheless, we propose to discuss the shape and shift problems in general terms with available data and information. The discussion will help us to understand some economic characteristics of the international rice market and their implications for the fine group. It will be of particular use in assessing the sense of various projections made in connection with the exports of Basmati rice from Pakistan.

¹⁶ The relative shares of the market are, roughly, Burma 30 per cent, Thailand 25 per cent, and the USA 16 per cent [17].

(C) Potential Demand for Fine Rices including Basmati Rice

As indicated above, there are two main questions to be answered: *a*) what does the demand curve for fine rices and Basmati rice look like? (or putting the question in another form: how much would the price fall if Pakistan should try to sell more Basmati rice in the world market?); and *b*) how would the demand curve shift through time?

i) The Shape of the Demand Curve (Price-Quantity Relationships)

In the absence of data on quantities of fine rices, produced and traded, and on their prices, we are forced to adopt some indirect method to estimate the quantities of various groups of rice traded and the range of prices.

The first problem to be solved is the basis for classifying the rice traded internationally into groups. There are many physical characteristics like the length of kernels, length/breadth ratio, colour, type of processing, degree of processing, flavour, cooking time, water absorption, *etc.*, that could serve as the basis for classification. However, it will be impossible to use any single characteristic as a basis, because the rice traded has many different combinations of characteristics that affect the value of rice in the market. Moreover, since we do not possess detailed data about the physical, cooking, and other characteristics of the rices traded internationally, it becomes necessary to discard such characteristics as the basis for classification.

Instead, we propose to use four price ranges (less than \$ 110, \$110— \$ 130, \$ 130 — \$ 150, and \$ 150 — \$ 210), as the basis for classifying the quantities traded internationally into groups. The procedure is chosen on the assumption that rice is a highly differentiated commodity and the quality differentiation is reflected in prices. Such an assumption is substantiated by international price data indicating that a high price rice is the one which has, comparatively, a low proportion of brokens, more slenderness and non-stickiness¹⁷. Since Pakistan Basmati rice is slender and non-sticky, it is assumed that only other high price varieties of rice are substitutes¹⁸. We assign names to our four price groups of rice. They are:

- (A) Coarse rice (below \$ 110)
- (B) Low medium rice (\$ 110 — \$ 130)

¹⁷ Price differentials within the group may depend on colour, type and degree of milling, water absorption, *etc.*, and the markets in which sold. However, slenderness and non-stickiness are assumed to be the basic qualities responsible for high price.

International prices (1959 to 1961) for some of the varieties of rice appear in [11, Table 4, p. 32].

¹⁸ The price of Pakistan Basmati rice ranged from \$ 168 to \$ 210 (average \$ 192) during the period 1959-61. As Basmati rice has some special characteristics like a typical flavour and fineness of cooked grains, it commands some premium over other slender and non-sticky rices in the traditional markets (mainly Middle Eastern and Persian Gulf countries).

(C) High medium rice (\$ 130 — \$ 150)

(D) Fine rice (\$ 150 — \$ 210)

On the basis of unit values, countries have been classified in the above-mentioned four groups; and taking a three-year average (1960-1962) for imports, an estimate has been made of the quantities imported in these groups. Table III summarises the average quantities imported in each group, during the period 1960-1962.

TABLE III
AN ESTIMATE OF WORLD RICE IMPORTS (AVERAGE 1960-62)

Name assigned	Price range	Average quantity imported	Proportion of total imports
	(\$ per ton)	(000 m. tons)	(percentage)
A. Coarse rice	below \$ 110	2,186	37.3
B. Low medium rice	\$ 110 - \$ 130	2,456	41.9
C. High medium rice	\$ 130 - \$ 150	709	12.1
D. Fine rice	\$ 150 - \$ 210	509	8.7

Source: Computed from [17].

The method of classifying countries into the four price groups on the basis of unit values, is a very crude one. It neglects the possibility that each country may not be buying exclusively one or the other type of rice, but some mix of them. In order to check the above estimate and to consider the possibility of rice imports of the mixed type, we use a slightly different method.

Taking the main geographical regions of the world, and classifying average imported quantities into our four price groups on the basis of unit values of imports we get:

Rice group	Quantity imported	Rice group	Quantity imported
	(000 m. tons)		(000 m. tons)
A. Coarse	3690	C. High	601
B. Low medium	1633	D. Fine	228

In Group A, it is highly unlikely that fine rice is mixed. However, in Groups B, C and D, the possibility is present. Assuming that only coarse and fine rices are imported at the average price of \$108 and \$180 per ton, respectively, the coarse and fine rices must be mixed in the ratio of 5:1 in case of Group B, 1:1 in case of Group C, and 1:2 in case of Group D to obtain the average price of \$120, \$140 and \$180¹⁹. On the basis of the mixture ratios, we have split the quantity of fine rice among each group (*i.e.*, fine rice content: 272 (Group B), 155 (Group C) and 152 (Group D) thousand metric tons). We arrive at a total of 579 (compared to 509, estimated in Table III) thousand metric tons.

For our purposes, we will use the average of both the estimates, that is 540 thousand metric tons. We also know from Table III that the quantity imported, in the next group (high medium) of rice, is 700 thousand metric tons.

On the basis of the estimated imported quantities of rice in Groups D and C, we can say that if the price of fine rice is reduced from the average level for fine group \$180, to the average level of the next lower group \$140 per ton, an additional quantity of 700 thousand tons could be sold, if consumers prefer to buy fine rice at the prices of high medium rice. This implies the value of price elasticity of demand for fine rice to be 3.14 between \$180 — \$140 a ton.

Pakistan Basmati rice earns a premium of \$20 — \$30 per ton over the average fine rice, in its present markets (mainly Middle East), due to its extra fineness and special flavour. Therefore, one should expect the demand elasticity for Basmati rice to be comparatively more elastic than that of rices within the fine group²⁰.

Pakistan's exports of fine rices (Basmati and Permal) averaged 87 thousand tons, during 1960-62, or 16 per cent of the world trade in fine rice group (*see*, Table C-2(a)). Plans to increase the exports of fine rices from Pakistan, in the short run, will raise Pakistan's share in the fine rice market. Other things being equal, Pakistan's increased share of the market will cause a loss of markets for other countries (the USA, Thailand, Madagascar, Australia, *etc.*) which export some high price rice, and increased competition can necessitate a price cut. However, as noted earlier, the price cuts will increase the foreign exchange earnings more than proportionately, as the world demand for Basmati rice within a certain price range, is quite elastic.

¹⁹ To split Group D, we have taken the price of super fine rice as \$210 per ton.

²⁰ When Basmati rice finds way to markets other than Middle East, it might not fetch any premium. In fact, it might have to be sold at a discount, since in most European and other countries, the special flavour is not liked or appreciated. Clean, well polished and packed slender rices with short cooking time might be more popular. Therefore, it is quite possible that Basmati rice would have to be sold at a discount.

To say, in precise terms, how much exports will increase with a specific price cut is very difficult. However Table V(b) shows the estimated 'off take' of Pakistan Basmati and fine rices, at various prices, on the assumption of constant world market share for Pakistan. Nearly 11 per cent price cut is accompanied by an increase of 45 thousand tons of Basmati and 56 thousand tons of all fine rices (Basmati and Permal). A price reduction of 22 per cent increases the exports of Basmati and of fine rices by 91 and 112 thousand tons, respectively.

Assuming that Pakistan's fine rice is superior to other fine rices and the Pakistan's share in the market can be increased, the increases in the quantities exported, as a result of price cuts, could be much more than those indicated above²¹.

In short, three conclusions emerge from the above analysis. *i)* The demand for fine rice group is quite elastic and the crude price elasticity is 3.14. The quantity sold in this group could be more than doubled, if the average price for this group is reduced by 22 per cent. *ii)* We should expect, in general, the demand for Pakistan Basmati rice to be comparatively more elastic than that of the entire fine rice group. *iii)* The market for fine rices is a differentiated one, hence, non-price factors are important. They might make Basmati rice a premium rice in certain markets and a discount rice in other markets.

ii) Shifts in the Demand Curve through Time

Due to the lack of data, it is not possible to estimate, for fine rice, income/consumption elasticity and the effect of population growth on consumption. However, we deal with the problem in three steps: *i)* concentrating on the world market for fine rice, and estimating the probable growth rate of potential demand; *ii)* estimating the "off take" for Pakistan Basmati and other fine rice, on some special assumption (*i.e.*, constant world market share); and *iii)* examining some of the projected/planned quantities of fine rice for exports.

a) Probable growth rate of potential demand: To begin with, we make two assumptions: the consumers' tastes, and the price of fine rice relative to the substitutes will remain constant. With these general assumptions, we are left with income and population growth as the main factors that will influence the potential demand.

Table IV(a) depicts the estimated quantities of fine rice imports in the various continents/regions, and on this basis, weights are given to the six con-

²¹ If, for Pakistan, selling more means selling outside Middle East and in markets where Basmati rice does not command premium, non-price measures like replacing Basmati with other suitable slender rices, proper cleaning and packing, good milling or parboiling and advertisement could aid in assuring competitiveness with other fine rices.

continent/regions of the world. Table IV(b) shows the FAO-assumed growth rates of population and GNP per capita [3, Table M-1, p. A-2]. By using the income elasticities of demand for cereals (given by the FAO), we have calculated the average weighted growth rate of potential demand on the basis of low and high assumed growth rates of GNP per capita. For potential demand, we used the formula $Y\Sigma(1+P)$ where Y = growth rate of GNP/caput, Σ = income elasticity of demand for, in this case, cereals, and P = population growth rate. The average of low and high growth rates of potential demand is 1.21 per cent per annum²².

TABLE IV (a)
ESTIMATED QUANTITIES OF WORLD FINE RICE IMPORTS
(AVERAGE: 1960-62)

Continent/Region	Estimated quantity of fine-rice imports	Proportion of total imports
	(000 metric tons)	(Percentage)
W. Europe	98	17
Africa	78	14
USSR	48	8
Eastern Europe	48	8
Near East	135	24
Oceania	20	24
North America	31	5
Latin America	121	21
	579	100

Source: [17]

Since rice is thought to be a superior cereal in most cases, there is a need for using a higher income elasticity of demand than that for other cereals. To meet this end, we picked the highest income elasticity for cereals in any continent/region of the world, and that is 0.5 for Asia and Far East²³. Using the income elasticity of 0.5, and following the above procedure, we have calculated an average growth rate of potential demand for fine rice, that is 2.5 per cent per annum.

²² Since the income elasticity of demand for cereals is negative in the case of Western Europe, Mediterranean Europe, North America and Oceania, we have neglected the effect of income growth. Population growth is assumed to be the only factor influencing the demand for fine rice.

²³ The main cereal in Asia and Far East is rice.

TABLE IV(b)

ESTIMATED GROWTH RATE OF POTENTIAL DEMAND FOR FINE RICE BY 1970

Continents/Regions (1)	Estimated quantity imported rough weights (2)	Assumed rate of population growth (3)	Assumed rate of GNP/caput growth		Assumed income elasticity of demand for cereals (6)	Estimated growth rate of potential demand		Assumed income elasticity of demand for fine rice (9)	Estimated growth rate of potential demand	
			Low	High		Low	High		Low	High
			(4)	(5)		(7)	(8)		(10)	(11)
1. Near-East, Africa (S. Africa)	38	2.5	1.5	2.8	0.2	1.05	1.96	0.5	2.63	4.90
2. Latin America (Argentine)	21	2.7	2.0	2.8	0.14	1.04	1.45	0.5	3.70	5.18
3. Western Europe	17	0.4	2.3	3.3	-0.4	0.40	0.40	—	0.40	0.40
4. Mediterranean	16	1.0	3.9	5.2	-0.3	1.00	1.00	—	1.00	1.00
5. N. America Europe	5	1.8	1.3	2.5	-0.5	1.80	1.80	—	1.80	1.80
6. Oceania	3	2.0	1.0	2.0	-0.5	2.00	2.00	—	2.00	2.00
Average weighted growth rate of potential demand						.99	1.43		2.15	2.95
Average of high and low rates						1.21			2.5	

Sources: Column (2) is based on Table IV(a); Columns (3) to (5) are based on [3, Table M-1, p. A-2].

World import trade quantities of 540 and 1,240 thousand metric tons (at average prices of \$180 and \$140, respectively) are projected for 1970 at the rates of 1.21 per cent (Estimate 1) and 2.5 per cent (Estimate 2) per annum. The results are summarised in Table V(a).

b) 'Off Take' of Pakistan Basmati and All Fine Rices: On the assumption that Pakistan's share in the international market (during 1960-62: 13 per cent for Basmati and 16 per cent for Basmati and Permal), will remain constant, we project the 'off take' for Basmati in Table V(b) and for all fine rices in Table V(c). If Pakistan's share in the international fine rice market could be raised, the 'off take' would be more than those indicated in Tables V(b) and V(c)²⁴. However, the projected 'off take' helps us to examine the commonsense of some of the projections and plans to export Basmati rice, during the Third Five Year Plan.

TABLE V(a)

PROJECTED QUANTITIES OF FINE RICE, TRADED INTERNATIONALLY

Price per ton	1961	1970 (Potential)	
		Estimate 1	Estimate 2
1. \$ 180	5.40	6.20	6.70
2. \$ 170	7.15	8.10	8.90
3. \$ 160	8.90	10.00	11.10
4. \$ 150	10.65	11.90	13.30
5. \$ 140	12.40	13.80	15.50

Source: Computed on the basis of growth rates of potential demands calculated in Table III.

²⁴ There are indications for an increase as well as a decrease in Pakistan's share of the world fine rice market. The factors that can reduce Pakistan's share of the market are: possibility of India's and UAR's entry into the fine rice market, USA's plans to increase exports of high price rice, need for Pakistan to sell outside the shallow market of Middle East and the possible emergence of economic and/or political trade partnerships adverse to Pakistan's trade interests.

TABLE V(b)

PROJECTED 'OFF TAKE' OF PAKISTAN FINE RICE (BASMATI)
AT CONSTANT MARKET SHARE

Price per ton	1961	1970 (Potential)	
		Estimate 1	Estimate 2
\$ 180	0.70	0.81	0.87
\$ 170	0.93	1.05	1.16
\$ 160	1.15	1.30	1.44
\$ 150	1.38	1.54	1.73
\$ 140	1.61	1.79	2.02

Source: Computed from Table V(a) by taking 13 per cent of the quantities shown against the price: \$180—\$140.

TABLE V(c)

PROJECTED 'OFF TAKE' OF PAKISTAN FINE RICE (BASMATI)
AND (PERMAL) AT CONSTANT MARKET SHARE

Price per ton	1961	1970 (Potential)	
		Estimate 1	Estimate 2
\$ 180	0.86	0.99	1.07
\$ 170	1.1	1.29	1.42
\$ 160	1.42	1.60	1.77
\$ 150	1.70	1.90	2.12
\$ 140	1.98	2.21	2.48

Source: Computed from Table V(a) taking 16 per cent of the quantities shown against the prices: \$180—\$140.

c) *Examination of Some of the Projected or Planned Quantities of Fine Rice for Exports (1970):* We would like to examine three figures: a) 1,75,000; b) 2,50,000; c) 6,00,000 tons, which have been put forward as the targets for fine rice exports till 1970²⁵. Comparing these figures with the projected 'off take' shown in Table V(c), it is obvious that export of quantities of 1,75,000, and perhaps, of 2,50,000 tons, seems reasonable, though at reduced prices. Table VI indicates the estimated price and the total earnings from the export of the above quantities.

²⁵ Some of these projected/planned quantities for exports are published, others unpublished. For example, the Planning Commission has envisaged, 1,75,000 tons of Basmati rice exports (out of a total of 3,00,000 tons) at Rs. 1,000 a ton, during the Third Five Year Plan. See [26, p. 70].

TABLE VI
ESTIMATED VALUE OF FINE RICE 'OFF TAKE'—1970 BASED ON
PAKISTAN'S WORLD MARKET SHARE: 1960-62

Quantity	Estimate 1		Estimate 2	
	Price	Earnings	Price	Earnings
(ton)	(Rs. per ton)	(million Rs.)	(Rs. per ton)	(million Rs.)
(a) 1,75,000	714	125	761	133
(b) 2,50,000	—	—	667	167
(c) 6,00,000	—	—	—	—

Source: Computed on the basis of Table V(c).

Notes: For quantity (a), the price per maund is Rs. 26.25 (Estimate 1) and Rs. 27.98 (Estimate 2).
 For quantity (b), the price per maund is Rs. 24.52 (Estimate 2).

A quantity of 1,75,000 tons of fine rice exported is shown to earn Rs. 125-133 million. Assuming that the Pakistan fine rices will earn a premium of about 10 per cent over other fine rices, the earnings from the export of quantity (a) increases to 138-146 million rupees²⁶.

Quantity (b) would earn 167 million rupees, compared to others' estimates of 186 million rupees.

Whole of the quantity (c) could not be sold at or above \$ 140 per ton. At the price of \$ 140, an excess supply of 3,52,000 to 3,79,000 tons is created. In order to sell the excess quantities, either the price will have to be cut below \$ 140 per ton or/and Pakistan's share in the international market will have to rise from its present level of 16 to the order of 23 to 28 per cent²⁷.

It must be understood, that our projected 'off take' does not rule out the possibility of exporting more than those quantities that we have indicated. However, it implies that this can only happen, provided: *i*) Pakistan's share in the world fine rice market is raised to a level higher than its present level; and/or, *ii*) with increased quantity exported, the new markets enable the Pakistan rice to earn a higher premium over other rices; and *iii*) tastes and the price of fine rice relative to substitutes change in a way that the world demand for fine rice becomes more than that of our estimates, and that Pakistan gets a share.

²⁶ Planning Commission envisages the export earnings from 1,75,000 tons of fine rice to be 175 million rupees, which exceeds our estimate by 29 to 27 million rupees.

²⁷ See Footnote 24.

Provision *ii*) is highly unlikely, because new consumers' taste are not believed to be as favourable as they are now in Middle Eastern and Persian Gulf countries. But efforts in the direction of Provisions *i*) and *iii*) will definitely help to sell more with or without price reductions.

IV: POLICY AND INSTITUTIONAL FRAMEWORK FOR THE PROCUREMENT AND EXPORT OF FINE RICE

We divide the discussion into two subsections: *A*) procurement of fine rices; and *B*) export of fine rices.

A) Procurement of Fine Rices

The rice procurement scheme was first enforced in the former Sind on 1st October, 1949 and in the former Punjab on 1st October, 1952. The policy was pursued intermittently and was designed to secure food from the surplus producing areas in order to supply areas where food shortage was acute.

More recently (1st October, 1958), the Monopoly Procurement Scheme was introduced in some of the areas of former Punjab and Sind with a double objective: to secure rice for shipment to East Pakistan and to secure fine and medium-quality rice for exports. For the year 1964-65, the areas controlled for the procurement of quality rice are: Districts of Gujrat, Gujranwala, Sialkot and Sheikhpura, Jaraḥwala Tehsil (of Lyallpur District) and the prescribed Revenue Estates of Lahore District²⁸. Procurement operations are carried out by the Provincial Government of West Pakistan on behalf of the Central Government of Pakistan.

About May each year, the Government of West Pakistan announces the targets of procurement for the various varieties of rice and fixes procurement prices for each variety. Announcement is also made about the quantity which, after the completion of procurement, will be given pro rate as free release to the millers for sale anywhere in West Pakistan in the free market.

In order to procure rice, the government puts a ban on the movement of rice from the controlled areas to a place outside, and fixes the price at which the desired quantities could be sold to the authorised rice dealers. Essentially, the procurement operations prevent dispersal of production by localization and encourage the flow to the procurement centres.

²⁸ The Revenue Estates of Lahore districts include: Shahdra, Kot Mohibbu, Kot Begum Nain Sukh, Saggian Kalanwar and Shahdara Parao of Lahore Tehsil.

For coarse rice, the controlled acres are: Larkana, Jacobabad, Sukkur and Dadu Districts. See [31].

After the harvest, the farmer brings paddy to the market where the rice miller/middleman, keeping in mind the procurement target, the free quota and the procurement price, purchases the paddy at a certain price.

Then the rice miller enters into a contract with the Provincial Government to supply a certain quantity of rice through the authorised agents. Ninety per cent of the price is paid at the rail heads. The rest of the payment is made after the results of samples are received from the Provincial Food Laboratory, Lahore. If the quality of the rice purchased is up to the specifications, the supplier gets the full payment (Rs. 28 per maund, for Basmati).

From the economic point of view, the procurement operations in no way force the farmers to cultivate certain area or to surrender a certain quantity of rice. The farmers make their own choice about acreage, quantity to retain and to sell, freely; however the farmers cannot choose their market and, therefore, the price at which the produce could be sold. Thus, when the free market prices outside the controlled areas are higher than the government fixed procurement prices, the farmers are deprived of the gains which could accrue to them. Lower prices tend to put brakes on increased production. Consumers pay a price higher than that which should prevail if there was no monopoly procurement and exports of rice.

Hence, the groups that lose are rice producers and consumers. Moreover, since the fine and medium quality rice exporters get an export bonus (bonus vouchers in the amount of 20 per cent of the value of rice exported) against which imports of various goods are made, further distribution implications follow.

Table C-1 depicts the average prices of fine and coarse rice (for the harvest season November-February) both in the procurement and non-procurement areas, for the period 1953-54 to 1963-64. Procurement prices for Basmati rice have gone up from Rs. 24 (1960-61) to Rs. 25 (1961-62), Rs. 26 (1962-63) and Rs. 28 (1963-64 and 1964-65), but the procurement price for coarse rice has remained unchanged. The increase in the free market prices of fine rice outside the procurement areas is notable since 1959-60, and as the proportion of quantity procured in the production of fine rice increased, the difference between the free market price and the procurement price increased. During the period 1960-61 to 1962-63, it is estimated that the average free market price was higher than the procurement price by 70 per cent in the case of fine rice, and 25 per cent in case of coarse rice.

Table C-2(b) shows the estimated production, marketable surplus, and the absorption of fine rice into the non-procurement areas of West Pakistan. Marketable surplus is taken to be three-fourths of the production, as one-fourth is

estimated to be the requirement for seeds and farmers' consumption. The absorption of fine rice in the non-procurement areas is calculated by deducting the quantities of Basmati and Permal rice that were procured, from the marketable surplus.

The extent of export surplus of fine rice is mainly influenced by three factors: the actual production of fine rice, the effectiveness of the localization of sale through the procurement operations, and the price at which the rice is purchased by the procurement authority.

(B) Exports of Fine Rice

Until the recent past, the procedure was that an exporter who had taken the contract (to export rice at a certain agreed price) purchased the rice from the Ministry of Food, which arranged loading when the ship was available to the exporter. When the ship left the port, payments were made to the Food Ministry.

More recently, the government have entered into a three-year agreement with Messrs Pakistan Rice Merchants Syndicate Limited, Karachi, for the export of Basmati rice and settled both export prices and the quantities to be exported as follows:

- i) £74/5/- + Rs. 150 per ton F.O.B. Karachi for 86,000 tons for the first year.
- ii) £75/5/- + Rs. 150 per ton F.O.B. Karachi for 1,05,000 tons for the second year.
- iii) £77/5/- + Rs. 150 per ton F.O.B. Karachi for 1,17,000 tons for the third year.

The exporters get a 20 per cent bonus on the value of rice exported which they can sell in the free market for bonus vouchers at a premium (currently 140 to 150 per cent).

At the present contract export price for Basmati (£74/5+Rs. 150 per ton) the exporter earns (and pays) Rs. 41.90 per maund, and with a 20 per cent export bonus (if sold at 150 per cent premium), he earns Rs. 10.42 per maund more. From the export of one maund of Basmati, the government and the exporters should be earning Rs. 52.32 per maund. At the procurement price of Rs. 28, this implies a gross profit of Rs. 24.32 per maund, ignoring the procurement, carriage, storage, and export expenses, and underselling²⁹. The net profit to

²⁹ The gross profit for the government is the difference between the procurement price (Rs. 28.00) and the contract export price (Rs. 41.90), that is Rs. 13.90 per maund.

the government and exporter depends on the extent of expenses and of under-selling. Nevertheless, it seems to be quite a profitable business.

Could the present quantity of Basmati rice exported be secured in the free market? Since the present contract export price (Rs. 41.90) is close to the free market price in non-procurement areas (Rs. 42.38) and well above the price in procurement areas (Rs. 28), there is no reason to prefer procurement operations to the free market. The usual argument that the free Basmati rice market will not be able to create the existing level of exportable surplus is inconsistent with the existing prices for the three segments of the market.

When the free market price exceeds the procurement price, the farmers will be able to secure higher prices for their produce, resulting into *i*) increased production, *ii*) reduced absorption in procurement areas, and *iii*) increased absorption in non-procurement areas (if price is less than Rs. 42.38 per maund)³⁰. Factors *i*) and *ii*) will increase the potential exportable surplus and factor *iii*) will reduce it. It is likely that the free Basmati rice market will insure increased or at least the existing exportable surplus at a price not exceeding Rs. 42.38 per maund. Currently, the export prices are fixed by the contract though the actual sale price can vary somewhat, as the export bonus enables the exporter to sell below the contract price within a certain range. In case the contract price is fixed at a level higher than that necessary to export some specific quantity, there could be shortfalls in quantity exported. A built-in *rigidity* of export prices causes a national loss of foreign exchange earnings when the demand for Basmati rice is elastic.

In order to achieve flexibility in the export prices, private trade with export bonus would be more suitable than the present system. However, it is commonly argued that with private export trade the quality of Basmati rice will deteriorate as a result of the mixing of some low priced varieties of rice. Such an argument holds only when the profit margin for the exporter is very wide, as it could be the case when the rice is procured from the farmers at low prices and is sold at high prices in the international market by the private traders³¹. The problem arises because of high profit per unit and closed entry which encourages some persons to do the business for a short time to make money and not to care about their own goodwill. If all the varieties of rice permitted for export carry

³⁰ The rice acreage and yields will respond to price increases. See [20]. Since Basmati rice is not the staple food of the areas in reference, and the farmers cultivate Basmati as a commercial crop, there is every reason to believe that the marketed surplus will increase with the increase in the price for the farmers.

³¹ Another similar situation could be when the government procures rice at low prices and though sells some limited quantities at high prices to a few private traders for export, yet allows a percentage of export bonus which makes the business highly profitable.

the same export bonus and the domestic as well as the international trade is run by private trade (with free entry), then in the long run only the genuine traders will participate and there will remain no special incentive for mixing the low priced varieties with the high priced ones.

Whenever there are restrictions to export trade regarding prices/quantity or persons, the chances of bad practices increase because of high short run profitability.

To summarise, some of the benefits of free Basmati market and open private export trade are: domestic prices move in line with the international prices, higher farm prices and higher production, flexible export prices and lower profit margin on export which in the long run limit the entry to genuine traders who would be interested in improving the quality of the product and the cultivation of the international market.

Moreover, with free entry and flexible prices, the profit maximisation motive on the part of the private traders would help to make the best use of the domestic resources to earn foreign exchange.

Since the level of export bonus influences the profitability of exporting Basmati rice, the quantity exported can be manipulated through the export bonus. As a next step, we would like to discuss the economically desirable level of exports and the level of export bonus.

V: RATIONALITY OF INCREASING THE PRODUCTION AND EXPORTS OF FINE RICE

In the light of our discussion in the previous two sections, it seems obvious that the question about the economic desirability of increasing the production and exports of fine rice to various levels can be answered by a reference to the relative costs and benefits involved.

Starting from the world market side, we estimated in Table VI that the price for exporting a quantity of 1,75,000 tons is Rs. 26.25 to Rs. 27.98 per maund. Supposing the carriage, storage, handling, *etc.*, charges for moving the rice to on board ship are Rs. 5.00 per maund and allowing Rs. 1.00 as the profit to the exporter, the price that could be paid to the farmer would be Rs. 20.25—Rs. 21.98. These prices are lower than those the farmers get at present. Without a subsidy, such quantities of fine rice cannot be exported.

At present, rice exports are subsidised through an export bonus of 20 per cent. With 20 per cent export bonus, the exporter should be able to receive Rs. 34.12 to Rs. 36.37 per maund, and allowing for export expenses and profits, the farmer could be paid up to Rs. 28.12 to Rs. 30.37. If the price necessary

to create an exportable surplus of 1,75,000 tons falls within the range of Rs. 28.12 to Rs. 30.37, the rice exports need no more subsidy than its present level.

However, in order to create an exportable surplus of 1,75,000 tons, the present estimated production of fine rice (2,50,000 tons) must increase by roughly 50 per cent on the assumption that three-fourths of the increase in production is exported³². The crucial question is whether the present production level of fine rice could be increased by 50 per cent with a price increase of Rs. 00.12 to Rs. 2.37 per maund or through other factors.

It is currently estimated that, during the Third Five Year Plan period, the water supply in the Northern Zone will be increasing by 50 per cent, as a result of the development of surface and groundwater. Assuming that the water supply increases by 50 per cent, the fine rice acreage or yields in Region A can be supposed to increase proportionately³³. A 50 per cent increase in fine rice acreage or yields, due to the increased water supply, will be sufficient to create an exportable surplus of 1,75,000 tons without any change in the present price paid to the farmers. Therefore, it can be said that the Planning Commission's target of 1,75,000 tons of fine rice exports seems feasible in the light of the assumed supply and demand conditions by 1970.

However, for any fine rice export target substantially higher than the Planning Commission's target, (*i.e.*, 2,50,000 and 60,000 tons) to be feasible from the supply side the present price paid to the farmers must increase. If our projected 'off take' of Pakistan fine rice are of the right orders of magnitude, it would not be possible for the exporters to pay the farmers even the present procurement price. For example, to dispose of 2,50,000 tons of fine rice, the international price is estimated to be Rs. 24.52 (Table VI). Allowing Rs. 6 for carriage, handling, and other expenses, and profit, the exporter will be able to pay the farmers, a maximum price of Rs. 24.08 per maund at 20 per cent bonus (assuming the premium on bonus vouchers to be 150 per cent).

One way of enabling the exporters to pay the farmers more than the present price could be to raise the export bonus from its present level of 20 per cent. A bonus of 30 per cent will enable the exporter to pay the farmers, Rs. 26.85 and a bonus of 50 per cent, Rs. 32.41. The ability of the exporter to pay more and more to the farmer increases as the export bonus is increased.

³² One-fourth of the production is assumed sufficient to meet seed requirements and farmers' consumption.

³³ It is believed that adequate and controlled water supply (alone) can raise the average rice yields by roughly 50 per cent in Region A.

Whether it is desirable to increase the production and export of fine rice to a level higher than 1,75,000 tons depends upon the maximum export bonus percentage that could be offered, and this depends upon the shadow price of the foreign exchange. At present, the rupee is estimated (crudely) to be overvalued by from 50 to 55 per cent, and it may be argued that this justifies an export bonus of 33.3 to 36.6 per cent³⁴. But the important thing to know is how much the rupee will be overvalued by 1970? So long as the economic cost of creating exportable surplus is equal to or falls short of the economic benefits from the additional foreign exchange earnings, the increased production and export are justified.

We have discussed the planned quantity of 1,75,000 tons. Our discussion can be extended to levels higher than that, however. Quantities much larger than the above level are bound to be enormously costly in terms of domestic and foreign exchange resources. Therefore, the aim of exporting higher quantities seems unjustified at our present level of knowledge.

VI: CONCLUSION

The information presented in this paper shows that the production of fine rices could be raised substantially through creating adequate water supply and sufficient economic incentives. However, it was noted that the costs of increasing the production of fine rices to levels more than two to three times the present level will be very high in terms of water, foreign exchange and other crop alternatives.

On the international demand side, we estimated the price elasticity of demand for fine rices to be elastic within the price range of \$180 to \$140 per ton. We found the Planning Commission's target of exporting 1,75,000 tons of fine rice to be feasible though the foreign exchange earnings would fall short, unless concerted efforts are made to cultivate the international market, to improve the quality of the product, and to adopt more suitable organisational and procedural arrangements for exports.

Our analysis raises serious economic questions about increasing the production and exports of fine rices to levels much higher than the Planning Commission's target.

It is clear from our discussion that the present policy and institutional framework for the procurement and exports of rice leads to low prices for the growers, and to rigidity of export prices. Rigidity of the export prices is likely

³⁴ See [28, p. 11].

to cause national loss of foreign exchange, since the demand for fine rice is elastic. The present policy and institutional framework should change in favour of a free domestic rice market and an open private export trade. Such a change would incorporate better prices to the growers, a likely increase in the exportable surplus, flexibility in the export prices, introduction of other varieties of rice in the international market, improvement of the quality of the product and the incentives to cultivate the world market in favour of Pakistan.

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33. West Pakistan, Water and Power Development Authority (WAPDA), *Salinity Control and Reclamation Project Number One: Investigations and Background Information*. (Lahore: WAPDA, January 1959).
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Appendix A

TABLE A-1(a)

MEAN TEMPERATURE (MAY TO DECEMBER) AND ITS SUITABILITY FOR
BASMATI GROWTH (EARLY AND LATE)

Center	May	June	Early growth suitability for May-June	July	August	Early growth suitability for July-August	September	October	November	Flowering and ripening suitability for October-November	December	Flowering and ripening suitability for November-December	Suitable transplanting time	Late sowing and yield
1. Lahore	88.9	93.6	Satisfactory	89.5	87.7	Satisfactory	86.0	77.9	65.9	Satisfactory	57.6	No	Jul-Aug.	—
2. Lyallpur	88.0	93.7	Satisfactory	90.4	89.1	Satisfactory	86.7	78.6	66.7	Satisfactory	58.0	No	Jul-Aug.	—
3. Jhelum	87.2	92.4	Satisfactory	88.2	85.7	Satisfactory	85.1	76.6	64.7	Satisfactory	56.3	No	Jul-Aug.	—
4. Montgomery	91.5	94.0	Very good	91.7	89.8	Satisfactory	86.7	79.6	77.5	Satisfactory	57.2	No	Jul-Aug.	Loss in yield
5. Hyderabad	92.9	93.6	Very good	90.4	88.5	Satisfactory	87.4	84.8	75.7	No	67.1	Satisfactory	Aug-Sep.	Loss in yield
6. Sukkur	92.7	96.4	Very good	93.4	91.5	Good	89.3	83.0	72.2	No	63.5	Satisfactory	Aug-Sep.	Loss in yield
7. Karachi	87.3	88.5	Satisfactory	85.9	84.0	Satisfactory	83.9	81.5	74.4	No	66.0	Satisfactory	Aug-Sep.	—
8. Jacobabad	95.4	99.4	Satisfactory	96.8	93.4	Very good	90.0	81.4	69.7	No	60.2	Satisfactory	Aug-Sep.	—
9. Multan	91.1	95.7	Very good	94.0	90.9	Good	88.2	79.0	66.9	Satisfactory	57.6	No	Jul-Aug.	Loss in yield
10. Khushab	90.0	94.4	Very good	92.3	90.4	Good	87.4	78.5	76.3	Satisfactory	56.6	No	Jul-Aug.	Loss in yield
11. D. I. Khan	89.1	94.6	Satisfactory	93.0	90.8	Very good	87.5	77.5	65.3	Satisfactory	56.4	No	Jul-Aug.	—

Note: Mean temperature is in degrees Fahrenheit, and is an average for the period 1951-60.

Source: Mean temperature data are from the Meteorological Department, Government of Pakistan Karachi.

TABLE A-1(b)
AVERAGE RELATIVE HUMIDITY

Center	Average (September- November)	Range (September- November)	Remarks Suitability for the ripening season of Basmati rice
(..... per cent.....)			
Hyderabad	60	53—69	Suitable but more humid
Sukkur	63	58—71	Not suitable, too humid
Jacobabad	61	57—70	Not suitable, too humid
Multan	36	33—40	Not suitable, dry
Khushab	32	30—36	Not suitable, dry
Dera Ismail Khan	65	61—69	Not suitable, too humid
Lahore	42	37—47	Suitable
Lyallpur	37	35—43	Not suitable, little dry
Montgomery	64	60—69	Not suitable, too humid

Source: [2, Table No. 6].

TABLE A-2(a)

PERCENTAGE COMPOSITION OF RICE PRODUCTION/AREA

Area group	District	Fine quality (Basmati, Hansraj, Mushkan, Permal)	Medium quality (Begmi)	Coarse (red rice, etc.)
(.....Percentages.....)				
1.	Gujranwala	60 to 65	30 to 35	5—10
	Sheikhupura	55 to 60	30 to 35	10—15
2.	Sialkot	35—35	40—50	25—30
	Lahore	"	"	"
	Gujrat	"	"	"
	Montgomery	"	"	"
	Lyalpur	"	"	"
	Jhang	"	"	"
3.	Multan	20—25	40—50	35—40
4.	Bahawalpur	10—15	20—25	60—65
	Bahawalnagar	"	"	"
	Rahim Yar Khan	"	"	"
		(Sugdasi)		(Joshi & Kangni)
5.	Dadu	5—10	—	90—95
	Larkana	"	—	"
	Jacobabad	"	—	"
	Sukkur	"	—	"
6.	Khairpur	2—3	—	97—98
	Hyderabad	"	—	"
	Nawabshah	"	—	"
7.	Sanghar	—	—	100
	Tharparkar	—	—	

Source: Based on a survey conducted in 1963 by the Marketing Department of the Ministry of Food and Agriculture, Government of Pakistan, Karachi.

TABLE A-2(b)

ESTIMATED PRODUCTION OF FINE RICE IN WEST PAKISTAN

District	Production of rice (all kinds)						Production of fine rice					
	1957-58	1958-59	1959-60	1960-61	1961-62	1962-63	1957-58	1958-59	1959-60	1960-61	1961-62	1962-63
(..... in 000 tons)												
1. Gujranwala Sheikhupura	95.1 56.5	110.4 90.9	113.1 82.2	144.5 90.3	133.5 101.0	149.3 90.7	57.0 31.0	66.2 49.9	67.8 45.2	86.7 49.6	80.1 55.5	89.5 49.9
2. Sialkot, Lahore Gujrat, Montgomery, Lyallpur and Jhang	114.0	151.2	175.1	207.0	215.3	220.2	34.2	45.3	52.5	62.1	64.5	66.0
3. Multan	7.1	6.2	6.2	8.3	9.4	8.4	1.4	1.2	1.2	1.6	1.8	1.8
4. Bahawalpur, Bhawal- nagar, and Rahim Yar Khan	16.1	12.9	15.6	15.7	15.8	18.8	1.6	1.3	1.6	1.6	1.6	1.8
5. Dadu, Larkana Jacobabad, & Sukkur	397.1	419.0	321.4	370.9	438.1	408.9	19.8	20.9	16.0	18.5	21.9	20.4
6. Khairpur, Hyderabad and Nawabshah	70.3	81.0	95.6	82.3	94.2	66.2	1.4	1.6	1.9	1.6	1.8	1.3
7. Sanghar and Thar- parker	16.8	17.0	16.6	9.9	13.4	16.6	—	—	—	—	—	—
Total	773.0	888.6	825.8	928.9	1020.7	979.1	146.4	186.4	186.2	221.7	227.2	230.7
Rice procured	—	—	—	—	—	—	—	74.8	—	97.7	93.2	104.2

Source: Computed on the basis of Appendix Table A-2(a).

TABLE A-3
ACREAGE UNDER THE MAIN KHARIF CROPS
(AVERAGE: 1961-62—1963-64)

District (1)	Rice (all kinds) (2)	Rice (fine) (3)	Cotton (4)	Sugarcane (5)	Maize (6)
(.....00 acres.....)					
Region A:					
1. Sialkot	2085	730	246	540	452
2. Gujranwala	3579	2147	294	354	114
3. Sheikhpura	2364	1300	555	505	336
4. Lahore	856	300	920	574	210
<i>Total:</i>	8883	4476	2097	1972	1113
Region B:					
1. Hyderabad	2749	83	2564	205	23
2. Dadu	1405	70	28	65	
3. Thatta	2527	126		10	20
4. Sukkur	2139	107	73	18	8
<i>Total:</i>	8820	386	2666	299	45

Sources: i) Bulletins issued by the Department of Marketing Intelligence and Agricultural Statistics, Ministry of Food and Agriculture, Rawalpindi.

ii) Column (3): computed on the basis of Appendix Table A-2(a).

TABLE A-4

ACTUAL AND THE MAXIMUM POTENTIAL ACREAGE UNDER FINE RICES*

Region (1)	Rice acreage (Average: 1961-62— 1963-64)		Proportion of fine rices (4)	Estimated potential proportion of fine rice (5)	Potential acreage (6)	Approximate yield per acre (7)	Potential production (8)	Total potential production with an allowance for other areas (9)
	All kinds (2)	Fine varieties (3)			Col. (2) × Col. (5) (6)			
	(.....00 acres.....)		(.....per cent.....)		(00 acres)	(maunds)	(.....00 tons.....)	
Region A	8884	4531	51	90	7995	11	3233	3556
Region B	8821	441	5	70	6175	5.5	1248	1248
Total	17705	4972	28	80	14170	—	4481	4804

* The maximum potential acreage is estimated on the assumption that a shift from medium and coarse rice will be feasible to the extent as to make the proportions of fine rices in the total acreage equal to those shown in Column (5).

Source: Acreage data is from the bulletins issued by the Department of Marketing Intelligence and Agricultural Statistics, Ministry of Food and Agriculture, Rawalpindi.

TABLE A-5(a)
ROUGH YIELDS OF FINE AND COARSE RICE

Area	Fine rice	Coarse rice
	(.....maunds per acre.....)	
1. Kala Shah Kaku (District Sheikhpura)	40	60
2. Former Sind Areas	30	40

TABLE A-5(b)
ROUGH GAINS FROM CULTIVATING EARLY MATURING
COARSE RICES IN FORMER SIND AREAS

Revenue	Late maturing fine rice	Early manuring coarse rice
(a) Yield (paddy)	30 maunds	40 maunds
Average price	Rs. 15 per maund	Rs. 10 per maund
Revenue	Rs. 450	Rs. 400
Difference	Rs. 50	—
(b) <i>Second Crop (gram)</i>		
Yield	5 maunds	15 maunds
Revenue	Rs. 115	Rs. 345
Gross revenue	Rs. 565	Rs. 745
Difference	—	+ Rs. 180

Source: Personal interviews with the Rice Botanists/Incharge rice farms at Kala Shah Kaku (District Sheikhpura) and Dokri (District Larkana).

Appendix B

TABLE B-1
WORLD RICE ACREAGE AND PRODUCTION
(AVERAGE: 1960-62)

Region/Continent	Acreage		Production	
	000 acres	Percentage	000 metric tons	Percentage
World total	292,732	100.00	236,367	100.00
Far East	193,257	66.01	134,150	56.75
China (Mainland)	77,594	26.51	84,300	35.66
Latin America	10,914	3.72	7,953	3.36
Africa	6,358	2.17	2,960	1.25
Near East	2,256	0.77	2,567	1.09
North and Central America	1,137	0.39	2,457	1.04
Europe	865	0.30	1,580	0.67
USSR	247	0.08	230	0.10
Oceania	74	0.02	153	0.07

Source: [10]

TABLE B-2
EXPORTS, IMPORTS AND THE UNIT VALUE OF IMPORTS
(AVERAGE: 1960-62)

Region/Continent	Exports		Imports		Unit value of imports U.S. \$ per metric ton
	00 metric tons	Percentage	00 metric tons	percentage	
World total	55,597	100.00	58,617	100.00	120.2
W. Europe	3,058	5.50	5,857	9.99	128.9
E. Europe	220	0.40	2,904	4.95	141.3
USSR	118	0.02	2,861	4.88	134.1
North America	9,130	16.42	470	0.80	181.8
Latin America	2,227	4.00	1,810	3.09	164.0
Near East	2,489	4.48	2,704	4.61	138.7
Far East	37,398	67.24	36,902	62.92	111.5
Africa	480	0.86	4,710	8.03	123.5
Oceania	556	1.00	400	0.68	15.9

Source: [17]

TABLE B-3(a)
 QUANTITY TRADED INTERNATIONALLY, AS A PROPORTION OF THE
 QUANTITY PRODUCED
 (PERCENTAGE)

Cereal (1)	Average 1934-38 (2)	Average 1951-53 (3)	Average 1960-62 (4)
Rice	8.5	5.0	3.6
Wheat	13.0	17.0	18.3

Note: USSR is excluded from world totals. Source: Columns (2) and (3) from [16, pp. 11-12] and Column (4) from [10].

TABLE B-3(b)
 GROSS WORLD EXPORTS OF RICE AND WHEAT

Cereal (1)	Average 1934-38 (2)	Average 1948-50 (3)	Average 1960-62 (4)
	(.....000 metric tons.....)		
Rice	9,650	4,050	5,560
Wheat	11,558	21,635	32,423

Source: Columns (2) and (3): Same as Table B-2(a) and [17].

TABLE B-3(c)
 POST-WAR AND PRE-WAR PRODUCTION OF RICE AND WHEAT

Cereal (1)	Average 1934-38 (2)	Average 1948-49 to 1952-53 (3)	Average 1959-60 to 1961-62 (4)
	(.....000 metric tons.....)		
Rice	971,100	106,859	153,500
Wheat	88,910	127,267	177,040

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Rice	100	110	158
Wheat	100	143	199

Note: Production figures exclude USSR in case of both cereals. Source: Col. (2) from [30].

TABLE C-2(a)
PROCUREMENT PRICES AND THE QUANTITIES OF RICE PROCURED AND EXPORTED
(1958-59—1962-63)

Year	Basmati			Permal			Begmi			Kangni			Joshi			Total	
	Price in Rs. per maund	Procurement	Exports	Price in Rs. per maund	Procurement	Exports	Price in Rs. per maund	Procurement	Exports	Price in Rs. per maund	Procurement	Exports	Price in Rs. per maund	Procurement	Exports	Procurement	Exports
1958-59	25.00	51,794	42,264	20.00	21,176	14,214	17.00	32,340	27,395	16.00	47,156	—	15.00	156,112	6,999	358,578	100,872
1959-60	—	—	66,675	—	—	20,206	—	—	23,466	15.00	38,453	88	14.50	82,136	—	120,589	110,435
1960-61	25.00	76,926	74,963	19.00	20,782	18,917	16.00	22,521	20,517	16.00	35,711	—	15.50	140,515	10,682	296,455	127,042
1961-62	25.00	76,103	72,204	18.00	17,838	15,084	16.00	20,248	27,788	16.00	47,758	9,948	15.00	162,497	44,419	324,444	173,443
1962-63	26.00	87,129	64,511	18.00	17,958	16,201	16.00	30,203	29,178	16.00	68,900	—	15.50	182,480	6,009	386,670	115,899
1963-64	28.00	94,689	N.A.	18.00	14,186	N.A.	16.00	27,174	N.A.	16.00	65,219	—	15.50	152,798	N.A.	354,057	N.A.

Source: Based on the communication with the Ministry of Agriculture and Work (Food & Agriculture Division), Food Wing, Government of Pakistan, Rawalpindi.

TABLE C-2(b)

POTENTIAL MARKETABLE SURPLUS AND THE ABSORPTION OF
RICE (BASMATI) & PERMAL) IN NON-PROCUREMENT AREAS
OF WEST PAKISTAN

Year	Estimated production	Estimated marketable surplus 3/4 of Col. (2)	Procurement	Absorption Col. (3) minus Col. (4) (5)	Quantity procured as a proportion of qty. produced	Difference between Non-procurement & procurement prices (7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
		(.....000 tons.....)			(Percentage)	(Rs. per md)
1957-58	146.4	109.8	—	109.8	—	—
1958-59	186.4	139.8	73.0	66.8	39.2	0.88
1959-60	186.2	139.7	86.9*	—	—	6.74
1960-61	221.7	166.3	97.7	68.6	44.1*	20.63
1961-62	227.2	170.4	105.1	65.3	46.3	17.89
1962-63	230.7	173.0	108.9	64.1	47.2	17.44

Note: The changes are computed by dividing the difference by the previous figures.

Source: Based on Appendix Tables A-2(b) and C-2(a).

*During 1959-60, there was no official procurement of Basmati and Permal rice. But a quantity of 86.9 thousand tons was exported.