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THE MARKETING OF RICE IN KENYA

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The Mwea - Tebere Irrigation Scheme and Rice Marketing in Kenya

The development of the Mwea - Tebere Irrigation Scheme over the last decade has had a marked effect on all aspects of the Kenyan rice economy. Although the Scheme is judged on many grounds to be a success, especially in terms of achieving a high net income for approximately 1,800 tenant farmers, it is doubtful whether the general Kenyan population has gained much benefit from the scheme, especially that sector of the population which has traditionally regarded rice as one of their staple foods. Indeed this scheme must be classified with so many other agricultural development plans in being production - orientated rather than market - orientated.

The three major faults of the marketing system have been the lack of any positive attempts to expand the market for rice, especially amongst African consumers, second the continuance of a cost - plus pricing system with no control over costs in the interest of the consumer, and third, the use of the marketing system as a source of finance not only by the National Irrigation Board but also by the Maize and Produce Board. The reasons for saying this are outlined in the following pages, together with recommendations for improving the situation in the future. First however, it is necessary to describe the recent history of rice paddy production and the pattern of trade in rice in Kenya.

The traditional areas of paddy production in Kenya before the Mwea - Tebere irrigation scheme came into large scale operation were, to a great extent, confined to the periphery of the country. To the west in Nyanza Province, rain-grown paddy was produced on the land lying close to Lake Victoria; and on the coast there was an irrigation scheme at Vanga, together with production of rain-grown paddy mainly from Tana River District. Central Province in which the Mwea-Tebere scheme is situated, also produced some rain-grown paddy but considerably less than the other two areas. For example, in 1957/58, before Mwea-Tebere had begun to market paddy in quantity, Nyanza Province marketed 4085 tons of paddy, the Coast Province 1460 tons, while the Central Province marketed only 400 tons.

This pattern of production changed rapidly with the increase in paddy production from Mwea-Tebere which reached 5849 tons in 1960, 11853 tons in 1963 and 13635 tons in 1967. By this time Nyanza Province production had decreased to 1368 tons although the production of rain-grown paddy there was expected to increase

in the following year (1968), while in 1967 the Coast Province production of paddy had reached negligible proportions, there being only 2 tons marketed in that year. The causes of this decline in the Coast region were the collapse of the Vanga irrigation scheme in the early 1960's, together with transport problems created by the Somali shifta. In the Nyanza Province it has been suggested that there may be three reasons for declining production; namely a general decline in rice paddy husbandry standards together with the relatively attractive producer price for maize and sugar, and more conjecturally, the rising level of Lake Victoria reducing the areas suitable for paddy production.

The location of rice mills in Kenya logically followed the former pattern of production because until 1961/2, when two mills were installed in Nairobi and Thika (some 30 miles from Nairobi) undoubtedly under the influence of the increasing production of the Mwea-Tebere scheme, the milling capacity of the country was represented by effectively 5 mills: three on the coast and two in Nyanza province.

The change in the pattern of production which began in the early 1960's, has meant that the coastal mills have had to rely to an increasing extent on Mwea paddy and the somewhat erratic imports from Tanzania (obviously rice from overseas is imported as milled rice and not as paddy). The Nyanza mills have been faced with decreasing supplies of paddy from local producers. However, production of paddy in Nyanza is likely to increase in the next few years with the launching of irrigation projects at Ahero and Yala Swamp.

Superimposed on this picture of a declining production from traditional paddy producing areas with its replacement by paddy from Mwea-Tebere, has been the opening of the Mwea Rice Mill Ltd. at Wanguru on the irrigation scheme itself in early 1968.

Following the opening of the Mwea mill, the Coast mills no longer receive paddy from Mwea, which is probably economically justified because of transport costs. The comparatively new mills at Thika and Nairobi will receive the former coastal allocation temporarily but by the early 1970's, it is envisaged that the single mill at Mwea will be capable of handling the irrigation scheme's entire paddy output which by them will exceed 20,000 tons per annum.

Thus within a little more than a decade, the structure of the rice economy in Kenya has changed from one of many individual

producing mainly rain-grown paddy for processing at five and subsequently seven mills, to one where the bulk of the crop is produced and processed in one single area. This transformation in the physical structure of the industry is likely to have far reaching effects on its costs structure and this will be examined later.

During the last decade when the influence on the Kenyan rice market of rice produced at Mwea-Tebere has been increasingly felt, the most important single factor which stands out has been the decline in the quantities of rice imported into the country from overseas. Thus whereas the average annual imports of rice over the three year period 1957-1959 was 8208 tons, the average amount imported annually during the three year period 1965-1967 was only 2375 tons.

Since 1959 at least, imports of rice into Kenya have been subject to import licencing, and since 1963 the Kenya National Trading Corporation has been the sole importer. Up to 1960 Siam was the main source of rice imports for Kenya, but in 1961 there was a sudden change and Pakistan became the main supplier. The size of the annual import quota has been decided by the Ministry of Commerce in consultation with the Ministry of Agriculture, and the main policy consideration appears to have been to keep total available supplies relatively constant. As there is no control of interterritorial transfers of rice and rice paddy between the three East African countries, this policy of stabilising supplies has only been moderately successful.

Kenya's exports of rice in the past naturally have been negligible being largely confined to the ships' chandling trade at Mombasa. However, transfers out of Kenya to other East African territories, notably Uganda, have been considerable in some years. This trade decreased very significantly during the drought years of 1965 and 1966 but 1967 saw these transfers approach their former level.

Thus over the past decade Kenya has steadily decreased her inports of rice. This should be welcomed in terms of achieving import substitution, but it has apparently had repercussions on rice consumption by the Asian population in Kenya.

TABLE 2 : Pattern of Trade in Rice and Availability of Supplies in Kenya 1957-67.

Year	Imports	Transfers in	Total in	Exports	Transfers out	Total Out	Net Movement (- Out, + In)		Domestic marketed Production tons	Available tons.	Supplies m.lbs	Domestic Production as % of available supplies
1957	9558	148	9706	17	1	18	+	9688	2755	12443	27.872	22.1
58	5222	1092	6314	13	1	14	+	6300	3520	9820	21.997	35.8
59	9845	902	10747	13	131	144	+	10603	2786	13389	29.991	20.9
60	4804	1516	6320	89	1313	1402	+	4918	5987	10905	24.427	54.9
61	3958	833	4791	69	3968	4037	+	754	9196	9950	22.288	92.4
62	4052	863	4915	20	3391	3411	+	1504	7391	8895	19.925	83.0
63	4500	1936	6436	20	2720	2740	+	3716	8056	11782	26.392	68.5
64	655	2568	3223	117	3009	3126	+	97	8191	8288	18.565	98.8
65	2062	1767	3829	172	375	547	+	3282	8719	12001	26.882	72.7
66	2064	622	2686	50	591	641	+	2045	10314	12359	27.684	83.5
67	(3000)	346	(3346)	139	2266	2405	+	(941)	9833	(10774)	24.133	91.3

1. Where movements of paddy took place, they have been converted to the rice equivalent.

2. Approximately 3000 tons of rice were imported but not recorded in the Trade Accounts.

The Consumption of Rice in Kenya

Owing to the paucity of food consumption data in Kenya an indirect approach to studying consumption patterns of rice has had to be used. The main problem lies in trying to isolate the consumption trends displayed by the Asian and African racial groups from the Arabs and Europeans and to examine each separately; the Asians who traditionally are the largest consumers of rice, and the Africans who are not likely to be eating much rice as individuals but as a group are likely to be consuming a significant amount. A report of the FAO[1] has shown that in the late 1950's early 1960's the average annual per caput consumption of rice in Europe was about 8.8 lbs and in the Arabian penisular about 26.4 lbs. As there is no better data these levels have been used to indicate the European and Arab rice consumption in Kenya on the admittedly over-simple assumption that it did not vary between years. This is because rice provides a relatively small proportion of total cereal consumption and therefore changes in the price of rice would not significantly affect the level of consumption by these racial groups.

There are only very few clues available to indicate the likely level of consumption of rice by the African population. A survey of Africans living in Nairobi and earning about £180 per annum was carried out in 1957/58 and revealed that the average monthly expenditure on rice was Sh. 1.97 which represented 1.9% of food expenditure or 1.1% of total expenditure.[2] In another consumer survey carried out in 1963[3], an expenditure of Sh. 5.60 per month on rice is quoted which represented about 1.0% of total expenditure of African consumers earning an average of £400 per annum. These two surveys were undertaken in one urban area only - Nairobi - and the information on rural consumers is even more slender. This amount to a household survey which took place over the one year period from mid-February 1963 in Central Province[4]. Here it was estimated that expenditure on cereals accounted for 11.2% of total expenditure and of this, 5% was on rice. It is not known whether this was an arbitrary assessment of the expenditure on rice but if it is correct, then even these relatively affluent rural consumers only allocated about ½% of their total expenditure on rice. This is to be expected because not only is rice a relatively expensive cereal food but also it is not likely to be widely available in rural areas outside the rice producing districts.

Therefore, for the purposes of this exercise, it was decided to ignore the rural African consumer of rice and use the above estimates of consumption of rice by African wage earners in Nairobi to indicate the possible level of rice consumption by Africans in the 7 largest urban areas in Kenya. Thus the annual wage bill or these areas was obtained,[5] a somewhat arbitrary 15% was deducted to allow for taxes and insurance payments and 1% was taken of the remainder as an estimate of the actual total expenditure on rice. These annual expenditures were then divided by the average annual retail price of local rice to give the estimates of the quantity of rice annually consumed. The apparent rate of growth in consumption by urban Africans over this period is probably realistic. Over the period 1962-67 the urban population of Africans grew by 30 per cent, so that if the estimated African consumption of rice of 3.091 m.lb in 1962 was equivalent to 4.7lb per head, and the total African consumption of 7.057m.lb in 1967 was equivalent to consumption of 8.4lb per head, that is an increase of almost 80 per cent in per caput consumption. Now urban incomes have increased by 86 per cent per head over this same period, yielding an income elasticity of 0.93 which compares very favourably with the Massell/Heyer estimates of elasticity of demand for rice with respect to total expenditure of between 0.7 and 1.0.

These estimates of the annual total consumption of rice by the African, European and Arab racial groups were deducted from the estimates of the annual available supplies of rice (Table 1) and the residual were assumed to have been consumed by the Asian community. These annual estimates are shown in Table 2.

TABLE 2: Estimates of Rice Consumption Kenya, 1958 to 1967

Year	European[1]	Arab[2]	African[3]	Total Available[4]	Residual	Asian Population	Asian Consumption
	m.lbs	m.lbs	m.lbs	m.lbs	m.lbs	000	lbs/hd.
1958	0.519	0.845	2.410	24.935	21.161	161	131.4
9	0.528	0.871	2.600	25.994	21.995	165	133.3
60	0.537	0.898	2.720	27.209	23.324	169	138.0
1	0.519	0.898	2.960	23.358	18.981	173	109.7
2	0.493	0.898	3.091	21.107	16.625	176	94.5
3	0.466	0.924	3.940	23.659	18.329	180	101.8
4	0.431	0.950	5.539	22.479	15.559	183	85.0
5	0.370	0.977	6.041	22.724	15.336	185	82.9
6	0.378	1.003	5.748	27.283	20.154	188	107.2
7	0.370	1.030	7.057	25.907	17.450	192	90.9

Notes 1. Allowing of European rice consumption of 8.8 lbs/hd
2. " " Arab " " " 26.4 lbs/hd

(Source: FAO, 1963, The World Rice Economy, Vol. 11)

3. Based on 1% of total expenditure being spent on rice. Derived from African urban wage bill for main urban areas. Source: Statistical Abstracts, MEPD, 1958 to 1967.

4. Using a two year rolling average of domestic production, imports and transfers into Kenya, net of exports and transfers out of Kenya.

Although this method is admittedly very crude and the evidence on which it is based is slender in the extreme, nevertheless it does yield results which are plausible and instructive. Thus it is found that the level of per caput consumption by Asians in Kenya in the late 1950's is about 15-20 lbs less than the FAO estimate for India in the same period[6], namely 150 lbs. As rice consumption varies markedly in different parts of India, and as the majority of Kenyan Asians originate from Southern India where rice consumption is below average this figure seems to be reasonably realistic. However, the most striking result to emerge from this analysis is that since that time the per capita consumption of rice by the Asian community in Kenya has fallen markedly.

Simple economic theory suggests that there may be three reasons to explain this decline in rice consumption by the average Asian consumer. They are (1) changing price relationships between substitutable cereals, (2) the effect of increasing per caput income during the period and (3) their tastes and preferences for different types of rice. Each of these will be examined briefly in turn.

The first postulate requires that the retail price of rice has increased relative to other cereals during the past decade so that Asian consumers have been rationally substituting other cereals for rice; in this case wheat either as bread or as flour for the making of chapatis. It would seem that the average weighted price of rice has not increased relative to that of wheat except in the exceptional period of drought and its consequences in 1965 to 1966. Rather, during the period when the consumption of rice by the Asian population was decreasing most rapidly, 1961 to 1965, the weighted average retail price of rice was also falling. Certainly on this evidence price does not seem to be an important factor in influencing the consumption of rice by Kenyan Asians.

The second postulate requires that increases in the per capita income of the Asian community over the decade may have influenced the consumption of rice. In other words, Asians are eating less rice on average because their elasticity of demand for rice with respect to income or expenditure is negative and average incomes have been increasing. Now, the estimated per capita consumption of rice by Asians has fallen by about 45% between 1958 and 1967 while the estimated per capita incomes of Asian wage earners had increased by 35% during the period[7], this would imply that roughly the income elasticity of demand for rice is nearly - 1.6. According to FAO estimates[8], such a high negative income elasticity would not be expected.

By a process of elimination it would appear that the third reason put forward for this changing pattern in rice consumption, the exercise by the consumer of his taste and preference, is the main one. Indeed, the evidence collected strongly supports this contention. The traditional rice consumer has a very decided preference for the type of rice he consumes. For example, the decline in the consumption of imported rice after 1960 may have been caused by the substitution of Pakistani rice for Siamese.[9] Although there is a surmised preference between types of imported rice, there is a more definite preference for imported rice over the locally produced article amounting to a decided antagonism towards locally produced rice because it produces an inferior cooked product unless cooking habits are suitably adapted. It seems that traditional rice eaters are not prepared to make this adaptation. Again, there is no doubt that local rice has been inferior to the imported article in terms of presentation. The quality of milling has been poor with samples frequently being dirty (much dust and other waste material) and having a high proportion of broken grains ('brokens'). As the first phase new mill at Mwea comes into full operation (11,500 tons of raw paddy processed to yield 7200 to 7600 tons of rice per annum) the effect on the average quality of locally produced rice should be significant.

If Asian rice consumers are expressing an antagonism towards the local product, the fact that the proportion of domestic rice in the total available supplies has been increasing over the past decade will account for the absolute decline in rice consumption. By combining the two known trends in the Kenyan rice economy during the past 10 years - the increasing importance of locally produced rice with rising domestic production and restrictions on imports, and the declining per caput rice consumption of the Asian community - it would appear that the

average Asian does not like local rice so that if imports are restricted he will eat less rice substituting other cereals, probably wheat. Now whether this trend in consumption is irreversible or whether a significant improvement in the quality of the local product will halt it, remains to be seen.

Of course, it could be arqued that the 'residual' method used in estimating Asian consumption is bound to lead to a declining consumption by this sector and from the available empirical evidence, one could equally well argued that the Asians have a stable consumption and that it is the other racial groups that have had a declining per caput consumption. There is, however, plenty of subjective evidence that Asians are refusing to consume much local rice. Additionally, declining African consumption would be difficult to reconcile with the very high elasticities of demand for rice with respect to total expenditure quoted by Massell and Heyer.

In conclusion it could be fairly said that a purely passive policy has been adopted over the past decade with respect to rice consumption, the main objective being to maintain supplies at a relatively stable level. In doing this the Asian consumer has been deprived of his customary source of rice, and more importantly, little attention has been paid to actively encouraging the African population to consume rice. If, as most people suspect, the demand for rice by Africans is highly price elastic, then if had measures been taken to reduce the price of rice, the African could have enjoyed a much more varied diet, the tenants of the Mwea - Tebere Irrigation scheme would have had a much greater market for their product, and there would have been less need to restrict those types of rice enjoyed by the Asian community.

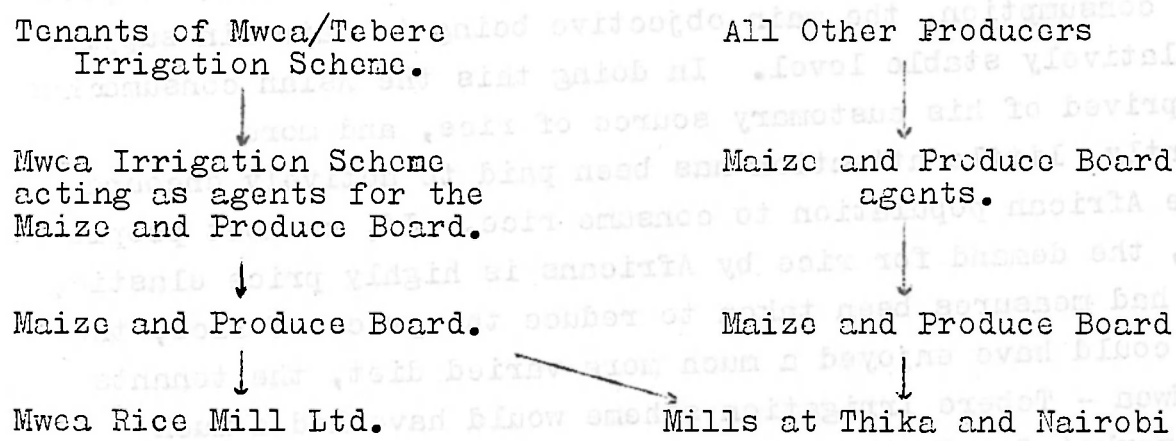
Given that the demand by Africans is likely to be extremely price elastic, it will instructive to consider how cheaply rice paddy could be marketed, milled and distributed to consumers. This method can then be compared with existing marketing system to illustrate why the present system is essentially a high cost one. Initially it will be useful to give a brief outline of the present system for marketing paddy.

In the space of a decade, the marketing of rice paddy from the Mwea/Tebere Scheme has been handled by no less than four organisations namely the Maize and Produce Control (up to 1959), the Central Province Marketing Board (1959-64), the Kenya

Agricultural Produce Marketing Board (1964-66) and the Maize and Produce Board (1966 onwards). This is not a reflection of competition between Marketing Boards, but simply indicates the conflict in marketing philosophy in Kenya in recent years between a commodity, a regional or a national organisation of boards.

Despite this continual change, the general pattern of paddy marketing (at least since 1960) has been the same. (Diagram 1) The Mwea Irrigation Scheme management have provided farmers with bags, receiving the paddy from farmers, weighing it and recording the moisture content, drying the paddy to a uniform moisture content of 14 per cent., rebagging the paddy in 160 lb. lots and calculating the amount to be paid to each tenant. The Marketing Board has taken the paddy from the Scheme after it has been bagged and reweighed and has been responsible for transporting it to stores and storing it until purchased by the mills.

DIAGRAM 1: Ownership of Rice Paddy



The Maize and Produce Board pay the Mwea Irrigation Scheme management (National Irrigation Board) monthly for dried and bagged paddy received at the reception centres. Starting with the 1962/3 harvest the Scheme have paid an advance to the tenant of 10s. per 180lb. bag of paddy on delivery at the reception centres to encourage rapid harvesting. After the harvest period the Scheme have calculated each tenant's revenue (net of the value of services they have received during the year); this process has normally taken approximately six weeks. The Scheme then pay the tenants the remainer of their net income.

Although paddy production is now largely centralised in one compact area, the present marketing system and its cost structure is identical to that used for marketing crops grown by individual producers scattered over wide areas. The actual

cost structure of paddy marketing in recent years is shown in Table 3. The opening of the Mwea Rice Mill Ltd on the Irrigation Scheme and its possible extension in 1970 to accommodate the whole of the rice paddy crop from Mwea/Tebere, provides an ideal opportunity for re-examining the whole of the marketing arrangements for the crop, in order to make the marketing system as efficient [10] as possible. One method of achieving this is described in the following section.

The Initial Stages of Marketing

Under the present marketing system, the Mwea Irrigation Scheme charge the tenants 1.33s. per bag for performing the tasks in the initial stages of marketing. This is adequate to cover the cost of these services. They then receive an Agency fee of 1.50s. per bag from the Maize and Produce Board for acting as the Board's agents in bulking the crop - this is the same fee which is paid to all the Board's agents. Thus on the 300,000 bag crop expected in 1968/9, the Mwea Irrigation Scheme will collect, in total, £42,500 for providing initial marketing services of which a considerable proportion is a surplus which will be used to meet other expenses of the National Irrigation Board. Thus an immediate saving of 1.50s. per bag of paddy could be made by removing the agency fee paid by the Marketing Board to the National Irrigation Board. Another saving could be made by instituting a bag hiring scheme for paddy. At present new bags are used each year for paddy harvested from the Mwea/Tebere Irrigation Scheme. In 1968/9 these will cost £45,000. The Maize and Produce Board will not recirculate used bags, and they are not really suitable for milled rice which being a human foodstuff should be packed in clean bags, although it is reported that mills other than the Mwea Rice Mill Ltd. do use used paddy bags for rice. Thus apart from a limited quantity of bags which are used for by-products, most of the 160,000 paddy bags entering Mwea Rice Mill in 1969 will have to be sold for approximately 1.20s. each, giving the mill a "loss" of 1.80s. per bag of paddy or £14,400 per annum which is recouped eventually from the consumer.

If the Mwea Irrigation Scheme operated a bag hiring service, it is estimated that the average length of life of a bag under these conditions would be three years. This should reduce the entire annual cost of sacks to £15,000 with a strong possibility that with prudent management the cost could be reduced still further. Thus even allowing for depreciation of a store and administration, etc., the cost need be no more than 1.15s.

TABLE 3: COSTS OF MARKETING PADDY FROM THE MWEA/TEBERE IRRIGATION SCHEME 1959-1967

Year	Quantity of Paddy Handled (bags)	Net Producer price s. per bag.	Agency Fees etc. s. per bag	Board's Purchase Price s. per bag	Apportioned Overheads s. per bag	Total £	Payment to Rice Stabilisation Fund s. per bag	Total £	Allocation Price to Mills.
1959-60	79,167	32	10.64	42.64	-	-	-	-	38.40[a]
1960-61	149,039	32	7.94	39.90	2.75	19.122	1.86	13,844	38.86[b]
1961-62	159,223	32	8.92	40.92	2.13	16,938	4.42	35,196	47.57
1962-63	167,570	32	9.00	41.00	1.85	15.510	6.52	54,623	49.37
1963-64	177,394	32	c	c	c	c	7.13	63,276	c
1964-65	173,501	32	4.08	36.08	2.75	23,824	6.37	55,280	45.20
1965-66	197,206	32	7.58	39.58	2.90	28.576	9.50	93,629	51.98
1966-67	188,595	32.20	6.50	41.70	3.44	32,399	6.83	64,403	51.97

a. Loss made up by Government subsidy of 5.26s. per bag.

b. Loss made up by Government subsidy of 4.75s. per bag.

c. Information unknown.

per bag of paddy harvested.

The development of milling facilities at Mwea has led to a marked change in the transport requirements for paddy. In the years immediately prior to the Mwea Rice Mill being erected, all paddy was allocated to rice mills at Thika, Nairobi and Mombasa. It was therefore logical to store all paddy at Sagana, 16 miles from the Scheme where there are direct road and rail links with these mills. With the advent of the Mwea Rice Mill at Wanguru, new paddy stores were built on the Mwea/Tebere scheme at Nguka and at the mill. These two stores hold sufficient paddy to supply the existing mill capacity in the nine months after harvest; paddy being delivered directly to the mill from the Thiba reception centre during harvest. The Maize and Produce Board currently deliver paddy to the Mwea Mill from the Nguka store for 45 cents per bag. As the mileage from the reception centres to the stores at Wanguru and Nguka is no greater than the distance between Nguka and Wanguru, a reasonable charge for delivering paddy from the reception centres to the stores would seem to be 45 cents per lb.

The Mwea Mill is currently charged 1.20s. per lb. bag for transporting rice from the mill to Sagana. Thus a charge of 90 cents per bag of paddy would seem reasonable for paddy moved from the Scheme reception centres to the Sagana store. Paddy has to be insured during storage mainly against fire and theft. As on average, paddy is stored for about five months a cost of 30 cents per bag (1 per cent of purchased value) for insurance would seem more than adequate.

A charge of 90 cents per bag is currently made for unloading and store handling. It is not known if this is a realistic charge, but if this is accepted as reasonable one could expect rice paddy to delivered to the Mwea Mill for 38s15 per bag, and could be sold ex-store Sagana to other mills for 38s75.

Until recently, the Maize and Produce Board allocated paddy to all mills at 53s. per bag. The Mwea Rice Mill Ltd have recently negotiated an allocation price of 46s. per bag for paddy which they mill whilst other millers are still apparently paying 53s. per bag. These prices compare markedly with the cost structure which could be attained if the proposals discussed above were adopted. A large proportion of the gap between the proposed allocation prices and the existing ones is explained by other charges which are made on the paddy marketing system, and these are discussed in the next section.

Marketing Board Overheads

Marketing Boards allocate their overheads to different crops in proportion to the number of bags of the crop handled relative to the total number of bags handled. The Maize and Produce Board have separate accounts for paddy from Mwea and that from other areas. Apportioned overheads for Mwea paddy have risen steeply over the past few years until in 1966/7 they were equivalent to 3.44s. per bag of paddy, (£32,000) whereas in 1964/5 they were only 2.7s. per bag and were as low as 1.85s. per bag in 1962/3 (Table 3). If similar functions were performed for each crop this system of allocating overheads would be perfectly reasonable. It is however questionable whether this system is fair when so little administration is required to handle the Mwea rice paddy - their main task seems to be to look after the paddy in two of the stores and to arrange transport as it is required for the mill. Their other function is to provide credit facilities, it has been estimated that this can cost no more £13,000 per annum.

Rearranging the crop finance arrangements could eliminate this cost. There might be a good case for eliminating the Maize and Produce Board entirely from the paddy marketing operation and thus effecting a saving in the region of £30,000 per annum. They do however provide specialist services in fumigation, stacking bags etc., but even these do not justify the current overhead charge made against rice paddy from the Mwea scheme.

The Rice Paddy Stabilisation Fund

In the early years of the Mwea Irrigation Scheme, difficulties were experienced in selling paddy to the millers as they were accustomed to receiving their supplies from Tanzania. In both 1959/60 and 1960/61 Tanzanian paddy was available at very low prices and rice paddy from the Mwea scheme was sold at a lower price than the purchase price (including all agency fees) and a Government subsidy totalling £40,807 was given to the Marketing Board to balance the difference.

Apparently, soon after this the Government reduced the 'intervention price' for paddy to 17 cents per lb. As a proportion of the paddy at this time was sold to millers by auction there was a possibility that the price of paddy could fluctuate annually and provisions for price stabilisation were probably considered desirable. However, the auction system only lasted

about one year, and since then the Marketing Board have been able to sell all of the paddy at a fixed price to the mills, this price easily covering all their costs. Therefore ever since 1960, there has been no need for a stabilisation fund and yet since that date £380,251 has been accumulated. Of this total, the Ministry of Agriculture (in whose name the fund is held) has allocated £205,000 since July 1966 to the National Irrigation Board to establish a depreciation fund for the moveable assets of the Mwea Irrigation Scheme.

The presence of this fund has acted, in effect, as a tax on consumers because under the cost-plus pricing system which operates, the cost of the fund have been passed on to the mills and thence on to the consumers. The 1966/7 contribution to the fund was equivalent to almost 6,8 cents per lb. of rice. Given that the demand for rice by Africans is extremely price elastic, and that the possibility of Kenyan rice production exceeding local demand at current prices has been foreseen for some years, it is difficult to see why this fund has been kept in existence for so long, unless this is considered an appropriate method of raising development funds.

If this is the express purpose of the fund, it would seem more honest to call it a Development Fund, and to state whether it is to be used only for the development of the Mwea Irrigation Scheme, for irrigation schemes in general (including schemes for onion and cotton growing), for improvements in rice marketing, or for general development purposes. It would then be easier to assess whether the present incidence of the consumer tax is the appropriate one.

If the intended purpose of the fund is still that of stabilisation, it might be argu ed on equity grounds that the money remaining in the fund should be distributed to consumers in the form of a subsidy on rice. However, as other methods are proposed for reducing consumer prices, it is suggested that this sum should be made available to the National Irrigation Board or the Mwea Irrigation Scheme over the next 5 years for improving the rice marketing from the Mwea Irrigation Scheme. Some specific proposals are consumer education on the nutritive value of parboiled rice, the financing of a sack hiring scheme, providing a fund for crop finance purposes and providing extensions to the Mwea Rice Mill.

It has also been suggested that there is an urgent need for the establishment of a Disaster Fund, as the Mwea Irrigation

Scheme is extremely vulnerable to a variety of natural hazards, locust invasion being the most dangerous and topical one. The rapid spread of a plant virus disease would create a similar devastating effect.

Rice Paddy Marketing - Summary.

The present time is a transition period in the marketing of rice paddy, for by the early 1970's it is planned that all paddy grown on the Mwea/Tebere Irrigation Scheme will be milled by Mwea Rice Mill Ltd. However, even at the present time it is patently obvious that the allocation price of paddy to mills could be reduced drastically.

One may question the value of the Maize and Produce Board in the marketing process as many of the marketing function are performed by the Mwea Irrigation Scheme. Indeed there is a good case for suggesting that the Mwea Irrigation Scheme management should be made entirely responsible for the marketing of Mwea paddy, hiring specialist services from the Maize and Produce Board when required.

If it is Government policy to make the paddy marketing system as efficient as possible, perhaps the best method would be to raise the gross producer price to 24 cents per lb. of paddy (38.40s. per bag) and make this also the allocation price to the Mwea Rice Mill Ltd and for sale ex-store Sagana for other mills. The Mwea Irrigation Scheme would then have to deduct the costs of its marketing operations from the gross producer price, and would seemingly have every incentive to keep its costs as low as possible in order to keep producer's revenue at its present level.

Rice Paddy Milling

Mwea Rice Mill Ltd

Mwea Rice Mill Ltd is jointly owned by the National Irrigation Board and tenants of the Mwea/Tebere Irrigation Scheme through their credit co-operative. 60 per cent of the equity capital is provided by the National Irrigation Board, 40 per cent by the tenants. The first phase of the mill involved a total capital expenditure of £175,000 on roads, building and equipment. The equipment consists of two parallel mills and a parboiling plant. The mill has been in operation since January, 1968 and the mill manager has had to train all mill hands and get the plant into full service. The manufacture of parboiled rice

is expected to start in early 1969. The mill should then be working virtually at capacity, that is for 285 days per annum at 14 hours per day worked in two continuous shifts. When this stage is reached the mill will be processing 11,500 tons of rice paddy per annum.

Although the mill has been working for a relatively short time, it is possible to build a tentative estimate of its total annual costs. (Table 5).

At the moment there is some uncertainty concerning the extra operating costs associated with parboiling, and thus these estimates may have to be changed when the operating costs of the parboiling plant are known. In addition to the fixed and operating costs a return of 20 per cent per annum on invested capital has been allowed in the calculations.

It may be argued that one is not justified in selecting a suitable rate of return in such an arbitrary manner, but it is considered better than being accused of forgetting to allow a return on capital invested. However, it does raise the wide issue of the rate of return to be allowed to quasimonopolistic organisations who are price makers in the domestic market.

The value of by-products, estimated at £5,000 per annum, is not shown in the calculations. If they were included the surplus before taxation would amount to £40,000 per annum which would allow a divided of 13.7 per cent to be paid to the shareholders after corporate taxation at 40 per cent. This would seem a generous return for such a safe investment. Every 5 percentage points reduction in the gross dividend will reduce milling costs by 2.28s. per bag of rice, or just over 1 cent per lb.

If this estimate of the cost structure is realistic and if the present ex-mill price of rice is left unaltered, Mwea Rice Mill Ltd can be expected to make a profit before tax of around £120,000 with a full years operations, that is, a return on capital invested (before tax) of over 70 per cent.

TABLE 5: Estimated Annual Costs of First Phase of the Mwea Rice Mill Ltd.

Operating Costs	£K per annum	
Wages	10,500	
Electricity	5,545	
Fuel for parboiling	2,245	
Water filtration	150	
Ash and husk disposal	1,000	
Maintenance	2,000	
Cost of bags at 3.05s. each	11,700	
Total operating costs		33,140
Overhead costs		
Depreciation	20,000	
Interest on capital borrowed	3,900	
Insurance	1,950	
Administration (Nat. Irrig. Board)	3,500	
Directors fees	800	
Audit	400	
Travelling	780	
Use of Land Rover	600	
Sundries	4,500	
Total overhead costs		35,930
Total costs		69,070
20 per cent return on capital		35,000
		104,070

It is envisaged that when fully operational one of the mills will be used for producing white milled rice, the other milling parboiled rice. Assuming that 6,000 tons of paddy are milled for white rice and 5,500 tons for parboiled rice and with an extraction rate of 63 per cent on white rice milling but of 68 per cent on parboiled rice, on average one may expect one 220 lb. bag of rice from 2.10 x 160 lb. bags of paddy. Thus the average cost of a bag of rice ex-mill Mwea (including bag) should be as follows:-

	s.	c.
Rice paddy 2.10 x 38.40s.	80	64
Cost of milling $\frac{20 \times 104,070 \times 2.10}{160,000}$	27	32
	107	96

This is equivalent to 49.07 cents per lb ex-mill Mwea.

Transport into Nairobi should cost no more than 1.80s. per bag of rice, or 0.82 cents per lb. bringing the ex-store Nairobi price to 49.9 cents per lb.

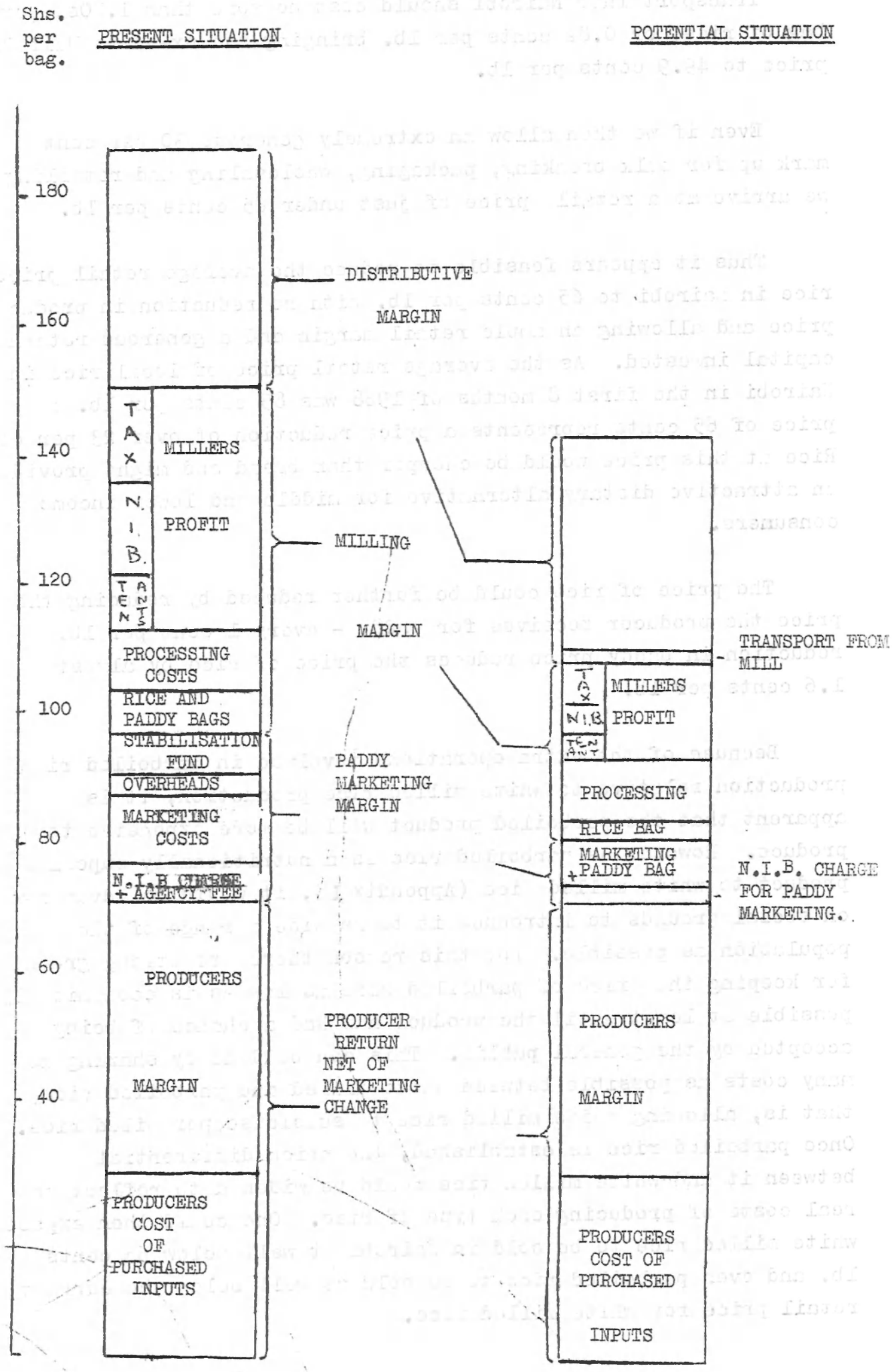
Even if we then allow an extremely generous 30 per cent mark up for bulk breaking, packaging, wholesaling and retailing we arrive at a retail price of just under 65 cents per lb.

Thus it appears feasible to reduce the average retail price of rice in Nairobi to 65 cents per lb. with no reduction in producer price and allowing an ample retail margin and a generous return on capital invested. As the average retail price of local rice in Nairobi in the first 8 months of 1968 was 85 cents per lb. a price of 65 cents represents a price reduction of over 23 per cent. Rice at this price would be cheaper than bread and might provide an attractive dietary alternative for middle and lower income consumers.

The price of rice could be further reduced by reducing the price the producer receives for paddy - every 1 cent per lb. reduction in paddy price reduces the price of rice by almost 1.6 cents per lb.

Because of the extra operations involved in parboiled rice production relative to white milled rice production, it is apparent that the parboiled product will be more expensive to produce. However as parboiled rice is a nutritionally superior product to white milled rice (Appendix I), it would be advantageous on social grounds to introduce it to as wide a range of the population as possible. For this reason there are strong grounds for keeping the price of parboiled rice as low as is economically possible at least until the product has had a chance of being accepted by the general public. This can be done by sharing as many costs as possible between white milled and parboiled rice, that is, allowing white milled rice to subsidise parboiled rice. Once parboiled rice is established, the price differential between it and white milled rice could be widened to reflect the real costs of producing each type of rice. One could then expect white milled rice to be sold in Nairobi at well below 65 cents per lb. and even parboiled rice to be sold at well below the current retail price for white milled rice.

THE COST STRUCTURE OF RICE



Extension of the Mwea Rice Mill.

When the first phase of the Mwea Rice Mill Ltd was build, there was already sufficient capacity within Kenya to deal with the whole of the crop, The main justifications for building the Mwea Rice Mill were first, the saving in transport costs in not sending paddy from Mwea to the Coast. Secondly, none of the existing mills is equipped to produce parboiled rice which is nutritionally superior to white milled rice. Third, although there was already existing excess capacity in the milling industry, (and the mills at Thika, Nairobi were built in 1961/2 with Government approval to handle the Mwea crop, it was considered to be in the long term interests of the industry to rationalise the milling sector. Additionally, after seeing the handsome profits being made by the existing mills (even working at below 30 per cent capacity) it was considered that a mill on the Mwea Scheme would be a useful method of increasing the income of Mwea tenants.

It is now envisaged that the mill at Mwea will be extended to a capacity of 25,000 tons paddy per annum in the early 1970's, that is it will be capable of handling all of the paddy produced at Mwea. This will put the mill in an extremely dominant position, as the only supplies available for other millers will be from Nyanza rain grown rice, the Ahero Pilot Project Irrigation Scheme, and the Yala Swamp Reclaimation Project. It could be that the existing rice mills will mill the paddy from these schemes, but following the success of the Mwea Rice Mill Ltd., these schemes may wish to establish their own mills. This is a problem which will have to be resolved in the near future as production of paddy at Ahero will start shortly.

The benefits of allowing the extension to the Mwea Rice Mill Ltd is that given the existing standards of management, one can expect a further lowering of rice milling costs. This will derive from three sources. First, the anticipated capital costs of the extension are £150,000 to provide extra capacity of 13,500 tons of paddy per annum. Because of the high capital costs of the parboiling plant, the first phase cost £170,000 for a capacity of only 11,500 tons. It is hoped that much of the finance for the extension will derive from long term foreign capital loans at low rates of interest, so the interest charges and annual repayments will be relatively low. Second, one can expect a further lowering of rice milling costs leading from a spreading of overheads and ability to increase labour productivity. Third there will be further savings from not transporting paddy from

Mwea/Tebere to Thika and Nairobi. Thus one might hopefully anticipate that retail price of local rice could be even lower than 65 cents per lb. when the second phase of the Mwea Rice Mill is brought into operation. However, if the standard of management at Mwea Rice Mill Ltd. were to deteriorate, or if there was no effective cost control we would find the price of rice rising again. In this respect it would have been beneficial to allow the mills at Thika and Nairobi to remain in existence and to compete for paddy supplies, and also to compete for a place in the retail market. Even under this system one might have experienced collusion between all three mills to raise the ex-mill price.

To guard against any possibility of cost inflation through inefficiency of lack of competition, it seems imperative to derive methods of protecting the consumers interest when the Mwea extension commences operations.

The Marketing of Rice.

In the past millers of rice have been responsible for their own marketing, selling either through agents of wholesalers. Apparently when most of Kenya's rice requirements were imported, the trade was dominated by a handful of importers but we have been told that their grip has loosened as imports become a smaller proportion of total availability. This might explain the reduction in the mark up on imported rice in the period 1961-65. When the Mwea Rice Mill Ltd started operations it was decided that the Maize and Produce Board would sell their rice for them, presumably either on a commission basis or an agency fee basis.

At the moment the retail price of rice is controlled by the Government at the following prices:-

Super	90 cents per lb.
Grade I	85 cents per lb.
Grade II	80 cents per lb.
All other grades	55 cents per lb.

Although the ex-mill price is officially fixed, the Maize Produce Board have to sell at the best price which retailers are willing to offer, bearing in mind that the market has to be cleared. At the moment (November, 1968) they are paying Mwea Rice Mill Ltd the following prices:-

			% Mark up to official price.
Super	157/50 per bag	71.6 cents per lb.	25.7
Grade I	147/50	67.0	26.9
Grade II	137/-	62.3	28.4
Brokens	87/-	39.5	39.2

for rice (ex-store Sagana or ex-mill Mwea.) If the controlled prices were adhered to the wholesale and retail mark ups would appear reasonable (although they are slightly larger than the percentages shown as the retailer retains the bag which can be resold). However, there is ample evidence that price control is being evaded through the lack of effective implementation of the grading scheme.

The grading scheme at present in force is based solely on one characteristic, namely the percentage of broken grains in a given sample of rice. The actual grade boundaries are set at:-

Super<5 per cent broken grains by weight
Grade 1 5 per cent and<10 per cent broken grains by weight
Grade 11 10 per cent and<20 per cent broken grains by weight
'Brokens' 20 per cent and more broken grains by weight

Broken grains are selected as a grading characteristic because ther presence results in 'free' starch in the cooking process and increases the possibility of coagulation between grains - producing the undesired 'stodgy' effect. However, the present grading scheme ignores equally important aspects such as the presence of dirt or impurities in the sample, and the presence of loose starch dust on the grains which can cause coagulation in cooking even in the absence of broken grains.

Not only is the present grading system too limited in its criteria but it also encourages open abuse of the existing price control. At the moment there is a tremendous temptation for wholesalers and/or retailers to buy Grade II rice at 137/- per bag and sell it as Super rice at 90 cents per lb. thereby enjoying a gross mark up of 44 per cent on the purchased price. Retailers probably regularly engage in this practice as the chances of being 'caught' by the Government inspectorate are extremely small and few consumers are sufficiently aware of the grading criteria to know that they have been misled in their purchases. This situation will be aggravated with the presence of Grade II Mwea rice on the market because in terms of cleanlin

and freedom from dust it is equal to the Super grade and the possibilities of misrepresentation become even greater.

This leads one to question the value of a grading scheme in its present form. Seen from a consumers point of view the chief value of a grading scheme lies in the enhanced ability of the consumer to purchase a product with the characteristics he or she desires. From a producers point of view the value lies in the opportunity to divide a single but heterogenous market into several sub-markets in order to exploit the varying demand conditions which exist. It is hoped thereby to expand overall demand for the product by meeting consumer satisfaction more precisely and/or to increase revenue by "charging what the market will bear".

In this case it appears that the existing grading scheme is giving rise to a situation diametrically opposed to its original intention. It does not benefit consumers, first as it is debatable whether the percentage of broken grains alone in a sample makes a sufficient difference to cooking quality; second, because the characteristics of rice not covered by the grading scheme, namely cleanliness, freedom from dirt and dust etc. are of equal or greater importance to these included in the scheme; and third, because the consumer in her ignorance is having to pay an inflated price for an 'inferior' product.

It is also doubtful if the millers benefit from the scheme. At the moment, with the arbitrary 10s. per bag differential between grades, one is faced with the ludicrous position that the Mwea Rice Mill Ltd and the Maize and Produce Board, their selling agents, find it impossible to sell Super grade rice and are therefore producing only Grade II rice although Super grade rice could be produced almost as easily.

This, of course, arises because the wholesale and retail trade are aware of the ineffectiveness of the implementation of Grade standards. In this case it would seem to be in the producers and consumers interests either to scrap the existing standards and sell rice of a f.a.q. or g.a.q. standard only, or to thoroughly revise the grading system and place it on a broader basis and ensure that it is implemented.

Another major problem at the moment is that rice is not being 'marketed' it is simply being sold. For instance, rice produced by the mill at Mwea is undoubtedly of superior quality (less dust and broken grains) than that from other mills. However, there is no way of distinguishing this rice at the retail level. Nor is there any incentive to differentiate it given

controlled prices, because to pack the rice in say 1 lb. polythene bags would probably cost in total up to 20 cents per lb. Any scheme less elaborate than this, e.g. using ordinary paper bags stamped "Mwea Rice Mills Ltd." would probably be abused, traders printing their own supplies of bags and filling them with rice from other sources.

Unless some method is found of distinguishing between well-milled and poorly milled rice, Kenyan grown rice in general will be branded as being of poor quality. One alternative to branding might be to improve the Government inspectorate and to introduce more rigorous standards for rice quality.

Rice Marketing in the Future.

The problem of controlled prices is only one of several which needs to be discussed in the context of future rice marketing when the Mwea Rice Mill is the dominant rice miller.

If prices are controlled one of two things may occur. If the price is set too low it will be disregarded - retailers will argue that it is not worth stocking rice at this price. If the price is set too high there will be a tendency to use the controlled price as a minimum price.

Under normal conditions the retail trade in Kenya is extremely competitive - most 'price ramps' have been perpetrated by importers and wholesalers, and not by retailers. Thus one might expect that in the absence of price control and in the presence of an effective grading scheme (or failing this, in the absence of a grading scheme), the retailers profit margin would tend to a normal level.

What will happen with the removal of price control assuming that producers receive a gross guaranteed price identical to the allocation price of paddy to the mills and the present restriction of imports remains? Initially, at the feasible retail price of 65 cents per lb., demand is likely to exceed supply and market prices will rise. Given the structure of the industry the increase in revenue should accrue to the mills, or after 1970, to Mwea Rice Mill Ltd alone. In the latter case, if we assume that profits were increased by the amount of the revenue increase and that a flat rate corporation tax of 40 per cent applies, then we would find the price increase split eventually in the ratio 40 : 36 : 24 between the Goverment, the National Irrigation Board and tenants of the Mwea/Tebere Scheme who are shareholders in Mwea

Rice Mill Ltd.

There are two methods by which any tendency for the Mwea Rice Mill Ltd to exploit its monopoly powers can be checked. The first would be to prevent the exports or transfer of Kenyan rice to any country at a price below the ex-mill price charged to domestic consumers. (A monopolist would export rice providing the price he received in the infinitely elastic export market exceeded the marginal revenue obtained in the domestic market). The other method would be to construct a mechanism whereby imports of rice would be allowed if the ex-mill price of rice rose above the import parity price of rice of a similar quality.

Given this safeguard price controls for rice could be abolished. As the Mwea Rice Mill Ltd will have a dominant share of the market its selling agents (the Maize and Produce Board) will be the effective price setters in the domestic market. Price ramps would then best be avoided if the Maize and Produce Board advertised their weekly selling price for rice.

Long Term Market Prospects for Kenya Rice.

With Kenya now being virtually self-sufficient in rice, if the declining trend in rice consumption of the Asian population is to be held or reversed clearly the quality of the milling process will have to be improved and possibly the quality of the paddy as well. The introduction of parboiled rice from the Mwea Mill may be a significant factor here. However, future production plans for Mwea-Tebere and schemes at Ahero and the Yala Swamps show that by 1972 when the Mwea-Tebere Scheme will have reached its limit of 25000 tons of paddy produced per annum plus say 5000 tons of paddy from irrigation pilot schemes and the rain grown crop in Nyanza, the Kenyan annual output of paddy may be 30,000 tons or 18,900 tons of rice. And production will be increasing. Even if the Asians increase their rice consumption to say 120 lbs per head with the Arabs and Europeans maintaining former consumption levels, there will be a surplus of 8200 tons which will either have to be consumed by Kenyan Africans, mostly in urban areas, or exported. With an estimated 800,000 Africans in the main urban areas by 1972, 8200 tons of rice represents a per capita consumption of about 23 lbs compared with a current consumption estimated is being about 10 lbs,[11] an annual increase of about 20%.

Now in parts of West Africa rice consumption is about 15 kilos per capita and therefore a consumption of 23 lbs per capita in Kenya is feasible but thought to be unlikely. There is a

tradition of rice consumption in West Africa, Ghana particularly, which does not exist in East Africa. Even a drastic reduction in the retail price of rice is unlikely to cause this degree of substitution between cereals by the urban African consumer although, it must be admitted, no allowances have been made in these estimates for rice consumption by rural Africans.

Failing a reduction in price, an annual increase in per capita consumption of about 20 %, even with the reported relatively high elasticity of demand with respect to income of 0.8 to 1.0 [12], bespeaks of an annual increment in per capita income which even the most optimistic planner would not forecast. Even with the recommended reduction in retail price, it is highly probable on present production trends that Kenya may become a regular exporter of rice.

With a world market price for top-grade rice of about £90 per ton f.o.b. Thailand in May 1968, Kenya producers should have no difficulty in competing in the world market providing that Kenya Sinh no rice is acceptable both as to the quality of the raw paddy (will it be too 'chalky' for the basumati-spoiled palate or will it be just right for the chopstick market?) [18] and the quality of processing. Both of these factors are under the control of the Kenyan rice industry to a greater or lesser degree, as are the means by which marketing costs to the port of loading are kept to a minimum. But there is one vital factor which faces all small exporters - as Kenya is - in a very large world market which they cannot control: falling world prices. Recent research in rice genetics and husbandry has revealed the very real possibility of a transformation in the world rice situation where traditional rice importers may become self-sufficient in the cereal within the next few years. Such a transformation has the inevitable concomitant of a decline in trade in rice and market prices. While this prospective situation undoubtedly is to be welcomed from the consumers view point, from the point of [illegible] possible shifts in supply

... Division, MEPD. Source: Statistical Abstracts MEPD, 1967.

3. Massell, Benton F. and Heyer, J. May 1967. Household Expenditure in Nairobi: a Statistical Analysis of Consum Behaviour. Occasional Paper No. 2 Institute for Develop Studies, Nairobi.

4. Massell, Benton F. (1968) Determinants of Household Expenditure in Rural Kenya, Food Research Institure, Stanford University.

5. Source, Statistical Abstracts, MEPD, 1958-1967.

6. FAO (1965) op. cit. Also FAO (1967) Agricultural Commodities-Projections for 1975 and 1985.

7. Source, Statistical Abstracts, MEPD, 1958 - 1967.

8. FAO (1965) op. cit.

9. Alternatively it could have been caused by a reduction in import quotas

10. Defined simply as maximising (our subjective valuation of) consumers satisfaction at minimum cost, with the proviso in this case, of not making producers any worse off than they are at present.

11. It is suggested that the estimated urban African consumption of rice in 1966 at about 16 lbs per capita was an exception caused by the peculiar market conditions of that drought-affected time.

12. Massell, Benton F. and Heyer, J. (1967) op. cit.

APPENDIX 1: RELATIVE NUTRITIVE VALUES OF CEREAL FOODSTUFFS

Foodstuff	Cals/100 gm	Protein %	Fat %	Ca,	Fe,	Thiamin,	Riboflavin	Niacin
				mg per 100 gms				
Wheat, hard, flour Medium Extraction[1]	350	13.4	1.4	24	2.4	0.34	0.13	5.4
Wheat, soft, flour Medium Extraction[1]	349	9.8	1.3	24	2.4	0.30	0.06	1.3
Bread, white[2]	250	8.0	1.4	90*	1.9	0.18	-	-
Rice, Parboiled[1]	359	7.1	1.1	14	1.0	0.22	0.04	3.8
Rice, milled, white[1]	360	6.7	0.7	10	0.9	0.08	0.03	1.6
Maize, grain or Wholemeal, white[1]	356	9.5	4.3	7	2.3	0.45	0.11	2.0
Maize, sifted Cornmeal, white[2]	348	6.0	1.0	11	1.0	0.08	0.04	0.4

Note * Enriched

Source: 1. FAO (1965), The Economic Relationships Between Grains and Rice. Commodity Bulletin Series, 39.

2. Composition of Foods, Special Report Series No. 297, Medical Research Council, HMSO, 1960.