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IMPACT OF 'FREE RICE' ON LABOUR PRODUCTIVITY IN SRI LANKA

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Abstract: Food subsidy in most developing countries has been treated as a welfare measure. However, recent studies have shown that extra consumption of about 500 calories per day, by under-nourished workers, whose average daily intake is around 2000 calories, would result in an increase of about 30% in productivity. In Sri Lanka, skilled, semi-skilled and unskilled workers fall into this category. Consumption of two kilograms of rice per week, by these workers would increase the daily calorie intake by 900 calories, and if at least a 10% increase in productivity can be expected from this consumption, that would be more than sufficient to cover the total cost of importing rice for the whole population.

Introduction

Government subsidy on food, health and education services, is assumed to be not only non productive, but also an obstacle to economic development, even in a developing country where the majority of the people are poor, malnourished and destitute. The resources allocated for such welfare activities could well be used for more productive areas, such as investment on physical capital, the argument goes, and thereby the national income could be increased. Eventually the enhanced income 'trickles down' or could be allocated to provide income generating opportunities to under-privileged groups, so that sustainable growth could be ensured.

This had been the policy of certain governments and international donor agencies for quite some time. However, recently this policy has been changed and now it is believed that the welfare expenditure in a developing country serves some useful purpose for such poor under-nourished people and hence, such expenditure must be restricted only to the needy.

Since the Second World War Sri Lanka had a very comprehensive package of welfare measures by the state. This welfare package was virtually non-discriminatory between those who could afford the basic necessities or who were handicapped. In the 1960s and 1970s the welfare expenditure of the government was responsible on average, for about a third of the government's current expenditure. This package included among others, free medical benefits, free education up to and including the university level and free or subsidised food. Both foreign and local experts criticised these welfare measures as a severe burden on both the government budget and the balance of payments and a drag on the entire economic growth process itself. These measures were 'cut to the bones' in 1977 on the recommendation of the IMF-IBRD advisers.

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We do not intend to examine the impact of all the welfare expenditure of the government. Our main purpose here is to analyse the hitherto unexplored aspect of the food subsidy, in particular, the nutritional impact of increased consumption by manual labour made possible by such a welfare activity of the government.

Cost of food subsidies

The cost of the food subsidy can be categorised under:

a. domestic financial cost
b. effects on the balance of payments
c. implications for production incentives

The domestic financial cost is only a partial indicator of the economic cost. Table 1 places food subsidy in relation to the current expenditure and the budget deficit from 1951 to 1989. Prior to 1977 not only rice, the staple food, but also some other items such as, maldive fish and lentils were given at subsidised prices which were changed from time to time. In the case of rice, since 1966 a certain amount of the ration had been given free. Since 1978 the food subsidy was converted into a food stamp scheme in which people were categorised into three groups and a fixed amount per person given subject to a maximum amount per household.[1] This amount was not indexed and hence the price increases eroded into the real value of food stamps.

Some argued that the welfare expenditure of the government was the main causal factor of the continuing budget deficit and the removal of the former would virtually eradicate the latter. Let us examine this problem. As Table 1 shows, the reduction of expenditure on food subsidy has not paved the way to reduce the budget deficit. While admitting that welfare expenditure has an opportunity cost, and in some instances the social productivity in the alternative opportunities could be higher, our contention is that mere reduction or removal of welfare expenditure and in particular, food subsidy, would not by itself ensure a smaller budget deficit. Because, certain welfare expenditure, for instance expenditure on food subsidy and education are part of expenditure on human capital formation, reduction in food subsidy would reduce the nutrition intake by the poor and the most disadvantaged groups, and the productivity of those who are already employed among these groups will probably fall. This in turn lowers the expected returns from a given quantum of physical capital. Reduction in food subsidy would also stimulate the rapid spread of malnutrition making the government expenditure in other areas to swell.

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[1] The value of food stamps was based on age composition; children below 12 years were entitled to Rs. 25, other children Rs. 20 and an adult Rs. 15, per month. Only five persons in a family were eligible for food stamps.

Table 1: Government Total Current Expenditure, Expenditure on Food Subsidy, Budget Deficit and Ration of Budget Deficit.

	(1)		(2)	(3)	
Year	Total Current Expenditure	(2)/(1)	Expenditure on Food Subsidy	Budget Deficit	(3)/(1)
	Rs. million	%			%
1951	841	27	239.3	255	30
1952	728	18	124.8	11	01
1953	710	02	18.6	83	11
1954	891	04	35.9	40	04
1955	1110	06	74.7	228	20
1956	1055	10	105.0	249	23
1957	1280	08	111.2	446	34
1958	1367	10	144.4	509	37
1959	1485	12	192.3	501	33
1960	1513	16	247.5	439	29
1961	1520	15	230.2	579	38
1962	1738	13	225.3	520	29
1963	1896	19	362.5	682	36
1964	2020	13	273.8	723	35
1965	2129	13	283.2	850	39
1966	2363	08	202.1	947	40
1967	2668	11	294.2	1150	43
1968	3032	11	343.2	1320	43
1969	3174	10	331.6	1707	53
1970	4263	12	537.3	1414	33
1971	3877	18	722.6	1982	51
1972	3990	16	676.0	1366	34
1973	3799	25	947.4	1425	37
1974	4565	10	952.1	1599	35
1975	5265	23	1230.4	2699	51
1976	5602	16	937.6	3576	63
1977	6533	21	1424.1	3074	47
1978	10521	20	2162.7	7164	68
1979	11588	20	2326.0	8791	75
1980	13249	-	304.6	16274	22
1981	17721	-		14866	83
1982	16005	10	1652.0	20091	25
1983	20110	07	1586.0	21606	07
1984	23963	06	1578.0	15861	66
1985	28926	05	1514.0	25676	88
1986	33842	04	1549.0	28071	82
1987	34777	04	1666.0	27342	78
1988	38816	04	1895.0	43241	111
1989	46613	09	4325.0	43995	94

Source: Central Bank of Sri Lanka - Annual Reports.

On the other hand, in Sri Lanka, the resources diverted from welfare activities were spent lavishly on other less productive sectors for sheer political expediency. (The World Bank warned the Sri Lankan government in the early 1980s against this type of expenditure). Consequently, not only were the benefits of the welfare expenditure lost but also unplanned diversion of resources brought in an inflationary situation. Second criticism was that the government not only set the price of the subsidised food items, but also tried to ensure availability at that price or specified the quantity at amounts greater than available domestic supply. This gave priority to food imports over other competing areas. Such actions, according to critics, exacerbated the already chronic balance of payments problem.

Another criticism levelled against welfare expenditure states that the food subsidies financed by fiscal and monetary measures, have implications for resource allocation and production incentives as well, depending upon the particular tax or monetary instrument used. If extra taxes are levied or funds borrowed from the banking sector for this purpose, capital availability for the private sector is reduced to that extent. On the other hand, if funds are borrowed from the banking sector it could be a contributory factor for inflation as well. When the government purchases or regulates the direct transfer of food from producers to consumers, a subsidy in favour of the consumer results. Even the government's domestic purchases in the free market do not change the situation significantly.

A general effect of the rice subsidy, which is often categorised as inflationary, is that by raising real income, it has released purchasing power for expenditure on other goods, particularly imports. An argument against the food subsidy put forward in the 50s and 60s, was that it contributed to worsen the adverse balance of payments by sustaining demand for imports. According to the Central Bank's Consumer Finance Survey, in January and February 1973, the real income of those with a monthly income of less than Rs. 200/=, was increased by free and subsidised food by 14%, while for those in the highest income group the comparable rise was 1%.

Another criticism of the food subsidy has been that it is a disincentive on the local producer, when rice is imported and sold at a subsidised price. This becomes a significant disincentive in the context of the prevailing low and unattractive producer margin in the production of paddy. However, as shown in the following para this criticism is unfounded.

The imported price of rice (cif) and cif plus FEEC[2] value of rice (cif) and the Guaranteed Price (GPS) of rice were compared and it was found that only in a few years the GPS was lower than the cif price. (Wickramasinghe 1984) Hence, it is difficult to accept the rationale of the criticism of food subsidy on the basis have created an inflationary situation with all its distortions.

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2 FEEC was one of the rates of exchange of the dual exchange rate that prevailed from 1968 to 1977. FEEC rate was 45% to 65% above the official exchange rate.

Benefits of Food Subsidy

The benefits of the food subsidy can be examined from numerous angles. Firstly, it reduces income disparities. The impact of the subsidised rice can also be evaluated from the nutritional standpoint. This has two aspects. Firstly, raising the nutritional levels of those who are at or below the minimum subsistence level. They include the unemployed and very low income groups. Secondly, raising the nutritional levels of the under-nourished low income workers. (Under-nourishment is defined as a situation where available energy level is lower than the FAO minimum requirement for any type of work.) In the case of the first category, it is very hard to estimate the direct benefits of increased consumption of rice but in the case of the second category direct economic benefits can be quantified.

One important problem that has to be examined is trading in subsidised rice. There is no guarantee that the available amount of rice would actually be consumed by the recipient. The recipients of subsidised rice may trade them at a higher price in the open market in order to increase their money income. It is also not clear on what type of commodities such increased money income will be spent. Hence, a precise estimation of the nutritional impact of subsidised rice is not possible. This problem could be eliminated if sufficient rice is given to everyone so that the open market trade in subsidised rice would be brought to the minimum. The average requirement of rice per week per head has been estimated as 4 pounds or two kilograms. If all consumers are ensured this quantity that problem is most likely to be solved.

An important indirect benefit of subsidised rice is the eradication of malnutrition. Consumption of rice alone cannot remove the problem of malnutrition. However, it contributes to the removal of malnutrition at least in two ways, it supplies, among others, calories and protein, a direct effect and also raises money income permitting the consumption of more and better food, an indirect effect.

It is known that malnutrition impairs the physical, mental and psychological progress of infants and children. That might lead to increased mortality which would frustrate population controls. Higher infant mortality leads to giving birth to more than the desired number of children as the average survival rate is much lower than the total birth. Some studies have shown that damage to brain cells of infants below the age of six months is fatal, such cells cannot be rebuilt. (Winick 1969) Malnutrition generates numerous debilities among adults that productivity is kept at less than the optimal level.

The eradication of malnutrition reduces government expenditure on medical and health services. Availability of a healthy and contented labour force is another social benefit of reduction of malnutrition. Reduction of expenditure on health services in Sri Lanka would reduce the total budgetary outlays on free medical service.

The best appraisal of the welfare service policy, inclusive of food subsidy, in Sri Lanka, came from Sen, "Thus per capita income of Sri Lanka would have to be raised by a factor of 20.65 for it to have its actual life expectancy as its expected life expectancy based on income." (Sen 1981).

However, a criticism levelled against diverting resources for welfare measures inclusive of subsidy on consumption, is that such high consumption and ensuing nutritional effect has no relevance because there is widespread unemployment in the country. Although there is high unemployment in the country that does not prevent realising the productivity increases from those who are already employed.

It is not possible to quantify the indirect benefits of the subsidised rice so are the indirect social costs. Hence, we assume here that indirect costs are equal to indirect benefits. This would not affect the value of our exercise because our main interest here is to estimate the direct costs and benefits, more precisely the nutritional benefits from subsidised rice.

Direct Costs and Direct Benefits of Subsidised Rice

The direct cost of subsidised rice is the actual amount that has to be spent on purchasing rice, both foreign and local. One important problem associated with the estimation of cost is the price distortions in the domestic market. As rice is a tradeable the border prices can be used to value the cost of rice. (Little & Mirrlees 1974).

Next problem is whether the official exchange rate reflects the scarcity value of foreign exchange. The Sri Lankan Rupee in 1981 was overvalued between 18% - 35% as the deficit in the balance of payments in that year was unprecedently high (Wickramasinghe 1994). However, by 1985 the deficit in the balance of payments had reduced as a percentage of the GDP, hence overvaluation must also be smaller. Hence, rice whether locally produced or imported, is valued at 120% of the official exchange rate. The distribution and other related costs are ignored.

Direct economic benefits are associated with the productivity improvements that arise out of increased consumption. It is well known that the calorie intake of unskilled labour in developing countries is lower than the minimum requirement to offer the optimal effort. In Sri Lanka the calorie intake of this category of workers was between 1900 and 2500 calories per day. In 1979, about 10% of calories in the urban sector and about 15% of the calories in the rural sector came from the rationed rice. This means between 190 to 250 calories per day in the urban sector and 285 to 375 calories per day in the rural sector came from rationed rice.

A large number of studies have shown that increased calorie intake of such undernourished labour results in increased productivity value which is much higher than the resources used for increased consumption. Among others, Key *et al.* (1950), FAO (1962), ILO (1965), Batawia (1967), ILO (1968), Blanc (1975), Strauss (1986), Deolalihar (1988), Edmundson & Edmundson (1988), Shan & Adelman (1988), and Hadda & Boris (1991), have shown that increased consumption of undernourished labour has resulted in enhanced productivity.

The nutritional effect is found only on those workers who are undernourished and also whose output is determined mainly by physical energy. This means that the nutritional effect can be expected mainly among, unskilled labour and skilled and semi-skilled labour who exert physical energy, in developing countries.

The economists have so far failed to give serious consideration to this nutritional effect (productive effect of consumption) as they have been misdirected by devaluing its significance by assigning an unwarranted prominence to the possibility of wide variations in energy intake and work output of individuals. In certain instances, it has been shown that the human body can adapt itself to low energy intake without affecting work output. (Edmundson & Edmundson).

So-called individual variations in energy intake and work output and ensuing non-homogeneity of factors of production is nothing new to economic theory. Even in the traditional theory labour is assumed to be homogeneous, while in actual fact, each unit of labour differs from one another in terms of productivity. Although individual energy intake and expenditure showed wide differences, the average energy intake and expenditure in almost all studies cited above, were more or less the same. This means that when a large number of workers are taken together their average work output shows a strong positive correlation with the changes in the energy intake. This phenomenon has to be taken serious notice of.

Table 2: Apparent Availability of Nutrients in One Kilogram of Rice.

Calorie	3448.9
Protein	68.5 g
Fat	14.8 g
Carbohydrate	762.3 g
Calcium	99.0 mg
Iron	18.9 mg
Thiamine	2.5 mg

Source: Table of Representative Value of Food commonly Used in Tropical Countries.

Table 3: Cost of Providing Two Kilograms of Rice Per Week Per Person and Expected Increase in output as a Result of 'Nutritional Effect" of Consumption of Rice (1985).

Mid Year Population		15.837 million
COST		
Total requirment of rice to provide two kilograms per week per person		1.615374 m Mt.
Price of a Mt of rice (cif)		Rs 5153
Total expenditure on rice		
a. cif value (official exchange rate)		Rs 8324 million
b. on the assumption of 10% overvaluation of Sri Lankan Rupee		Rs 9156 million
c. on the assumption of 20% overvaluation of Sri Lankan Rupee		Rs 9989 million
EXPECTED INCREASE IN OUTPUT		
Agriculture and allied sectors		
Employment (unskilled workers)		2.438266 million
Wage (Marginal Productivity)		Rs 960 per month
		Rs 11523 per annum
Labour share (β)		0.536
Average product (mp/β)		Rs 21498 per annum
Expected increase in output if,		
productivity increases by	30%	Rs 15724 m per annum
	20%	Rs 10484 m per annum
	15%	Rs 7863 m per annum
	10%	Rs 5242 m per annum
Production related workers		
Employment (unskilled workers)		1.420889 m
Wage (marginal productivity)	Rs 1030 per month	
	Rs 12361 per annum	
Labour share (b)		0.536
Average product (mp/b)		Rs 23063 per annum
Expected increase in output if,		
productivity increases by	30%	Rs 9831 m per annum
	20%	Rs 6554 m per annum
	15%	Rs 4916 m per annum
	10%	Rs 3277 m per annum

Source: Labour Force and Socio-Economic Survey 1985/86 & Statistical Abstracts 1986.

Blanc (1975) has calculated different productivity levels in which under modest activity conditions, 2500 and 2000 calories per day corresponds to 58 and 27 per cent productivity levels respectively. This is an increase of about 500 calories per day per person which could result in an increase in productivity of about 30%. Blanc's estimates tally with an earlier study in Germany in which an increase of 400 calories per day for miners resulted in about 37% increase in productivity; 22% in steel workers; and 32% in railway track workers. (Kraut & Muller 1964) In fact Fei & Chiang (1966) have developed a model showing the relationship between consumption and labour productivity.

In Sri Lanka an increase of 900 calories per day can be expected if 2 measures or 2 kilograms of rice per week is given to each person (Table 2). This increase is more than sufficient to generate 30% increase in productivity among the unskilled labour.

Our estimates in Sri lanka refer to 1985 in which year *Labour Force and Socio-Economic Survey* was conducted by the Department of Census and Statistics. Employment figures of the unskilled labour in various sectors are presented in Table 3. The wage rates are not given in that report. Wages were taken from the *Statistical abstracts* of1986 published by the same department.

The Cobb-Douglas production function is assumed for each sector. Assuming that the employee's income represents his marginal productivity, the average productivity of workers can be estimated by Cobb-Douglas production function, thus;

$$Y = AL\ \beta, \text{ where } \beta \text{ is labour share}$$

$$\delta Y/\delta L = \beta AL - \beta Y/L$$

$$MPL = \beta Y/L$$

$$Y/L = MPL/\beta$$

MP = marginal product
L = labour
Y = income

As stated earlier the nutritional level of the workers before subsidy was about 1710 to 2250 calories per day in the urban sector and 1515 to 2125 calories per day in the rural sector.[3] When 2 extra kilograms of rice is given to such under-nourished labour the energy level would increase by about 900 calories per day.

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[3] These figures were arrived at by subtracting the calorie intake from rationed rice from average daily calorie intake.

The estimated increase in output as a result of increase in consumption of rice up to 2 kilograms a week is 30%. Accordingly 30% of the average product of the worker can be expected to be increased.

However, there is a further problem that needs to be investigated. When the marginal productivity of labour improves optimal capital/labour ratio changes, less labour is now employed. Even if 10% of labour is displaced as a result of this change in capital/labour ratio our results hold.

The requirement of rice in 1985, assuming that 2 kilograms are to be given to every one, the cost of importing such a quantity and the expected increase in value of output on the assumption of different percentages of increase in productivity are presented in Table 3.

If 10% improvement of productivity could be expected, which is more likely to occur, that would cover the total cost of rice estimated at the official exchange rate.However, if productivity increases by 15% as a result of 'nutritional effect', which again is quite probable, the value of the output increase resulting from 'nutritional effect' is quite sufficient to cover the total cost of rice even at an exchange rate 20% higher than what prevailed in 1985. Hence, it is important that when development projects are formulated in developing countries the 'nutritional effect' must also be considered as an objective.

Concluding Note

In most countries welfare measures, such as food subsidy, are treated as an end in itself. But according to recent research increased consumption of under-nourished workers results in enhanced productivity. Hence, such activities are treated as human capital formation. According to our analysis consumption of 'free rice' by underfed workers in Sri Lanka, mostly skilled, semi-skilled and unskilled workers, whose productivity is determined to a great degree, by the physical stamina, could generate higher productivity whose value is more than sufficient to cover the cost of rice.

Hence, 'nutritional effect' must also be taken into account when development projects are formulated in developing countries. Such measures would ensure economic growth with equity. Hitherto, the general belief was that consumption could be increased only after growth had been achieved. This 'trickle down' version of development has to be discarded and an effort must be made to achieve both growth and equity simultaneously.

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