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GOVERNMENT OPERATIONS IN RICE— A CASE STUDY OF TAMIL NADU

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I

INTRODUCTION

The former Madras[1] State was deficit in food in the pre-Second World War period. This deficit got aggravated during the Second World War period. Rationing and Government distribution of food was in operation during the period in Madras State[2] and discontinued once the exigencies of the war was over. 1952 to 1963 was a period of derationing for the Madras State. The State was deficit in rice, and in the sixties became a marginally surplus State. An unprecedented food crisis developed in 1964 and prices started soaring high. In order to control the prices and to freeze the prices at the then prevailing level, the Government of Tamil Nadu started intervening in the paddy/rice marketing system.

From 1957, Madras State was part of the southern zone with the States of Kerala, Karnataka and Andhra Pradesh. In October 1964 Madras State was formed as a separate zone by the issue of the Southern States Regulation of Export of Rice Order 1964. Abolition of the southern zone led to the sealing of the State border, necessitating the Government to undertake the responsibility to ensure regular supply in the deficit districts of the State. A system of distribution through family cards was introduced in the urban areas in the deficit districts and the commitment thus entered into could be met only by procuring from within the State.

An attempt has been made in this paper to evaluate the Government's operations in foodgrains during the fourteen-year period, *i.e.*, 1965-66 to 1978-79 in terms of the objectives stated by the Government. All the operations of the Government, including imports, domestic purchases, fair price sales and maintenance of stocks, are to be viewed together because the quantities involved and the policy decisions about them are closely interlinked.

A formulation of the objectives of Government operations is given in the second section. The behaviour of the quantities involved in Government operations during the fourteen-year period is examined in the third section in order to assess the progress made in realising these objectives. In section four is presented a hypothetical, normative model of how these variables should have behaved if the policy determining them had conformed to the stated assumptions of the model. In view of the inter-relationships between different quantities and because of the fact that, within wide limits, it was possible for the Government to import, purchase, sell and stock more or

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1. Before States reorganization most parts of the present Tamil Nadu was included in the Madras State.

2. See for details, Measures of Food Control, Procurement and Controlled Distribution of Food and Their Effects on the Agrarian Economy, Agricultural Economics Research Centre, University of Madras, Madras, 1960.

less than it actually did, the construction of the normative models and their comparison with actual operations turn out to be the best way of evaluating Government policy. The distribution problem is discussed in the fifth section. The last section summarises the findings.

II

OBJECTIVES

Any evaluation of the Government's operations in foodgrains should begin with a clear formulation of the objectives of these operations. Statements of the objectives of the Government of India's operations are available in the various Foodgrains Policy Committee Reports. State Governments get guidelines for their objectives from the Central Government. For the present analysis the following objectives are considered:

(*1*) *Steady growth of consumption:* Per capita supply of foodgrains should be steadily growing; and year-to-year fluctuations in supply should be reduced.

(*2*) *Fair price distribution:* Government should provide an assured minimum supply at a fair price to an increasing proportion of the low income families in the State.

(*3*) *Socialisation of the surplus:* An increasing[3] proportion of the marketed surplus should be purchased and sold by the Government in order to realise the objective in (*2*).

The objectives are so designed that a quantitative indicator of the achievement of each objective is available. In the words of Raj Krishna: "The rate of growth of per capita supply can indicate how fast it is growing; and its annual variation can indicate how stable it is. The ratio of Government sales to estimated total demand or low-income demand can indicate the extent to which this demand is being met by the Government. The ratio of Government purchases to output or to the estimated marketed surplus can indicate the progress of socialisation of the surplus. And the ratio of imports and of domestic purchases to Government sales can indicate the progress towards self-sufficiency."[4]

The indicators suggested by Raj Krishna are used for our analysis.

III

ANALYSIS OF GOVERNMENT OPERATIONS IN RICE

Time-series of these indicators are tabulated in Tables I and II.

An examination of the supply data in Table I shows that there has been a statistically significant linear trend in per capita availability. But the availability has fluctuated widely around the mean of 275.5 grams per day. It was 4 to 32 per cent below the mean during the years 1965-66 to 1969-70

3. In the context of increasing production, even if the same proporton is purchased, the absolute quantity would be more. But, in the context of stagnating or falling production an increasing proportion is to be purchased.

4. Raj Krishna, "Government Operations in Foodgrains", *Economic and Political Weekly*, Vol II, No 37, September 16, 1967.

TABLE I—AVAILABILITY OF RICE: TAMIL NADU

Year*	Availability of rice per capita per day (grams)	Deviation from the mean (per cent)	Change from preceding year (per cent)
(1)	(2)	(3)	(4)
1965-66	237	—16·24	—
1966-67	250	—10·20	5·49
1967-68	250	—10·20	0·00
1968-69	227	—21·36	—9·20
1969-70	254	—8·46	11·89
1970-71	316	12·82	24·40
1971-72	317	13·09	0·32
1972-73	330	16·52	4·10
1973-74	316	12·81	—4·24
1974-75	208	—32·45	—34·17
1975-76	263	—4·75	26·44
1976-77	265	—3·96	0·76
1977-78	321	14·17	21·13
1978-79	303	9·07	—5·60
Coefficient of variation (percentage) ..	14		

For *Source:* See Table II.

Notes:—* Agricultural year—July to June.
Minimum =208.
Maximum =330.
Mean =275·5.
Linear growth rate grams per year 9·16.
Rate of growth per cent per year 3·32.

and 1974-75 to 1976-77. It was 9 to 16 per cent above the mean during 1970-71 to 1973-74 and 1977-78 to 1978-79. Year-to-year variations have also been substantial. The supply could increase as much as 5 to 26 per cent and fall as much as 4 to 34 per cent in a single year. The coefficient of variation in per capita per day availability for the period under consideration is 14 per cent. Net output was short of demand for rice in the years 1965-66, 1968-69, 1974-75 and 1976-77. Government purchase was low when output has been on the increase (see col. 6 and col. 2 in Table II for the years 1970-71 to 1973-74). On the other hand, Government purchase was more when output fell drastically (*i.e.*, for the year 1974-75, see Table II). There does not seem to be a consistent policy regarding Government purchase and stock building.

TABLE II—GOVERNMENT OPERATIONS IN RICE—SOME IMPORTANT INFORMATION AND RATIOS

(lakh tonnes except as otherwise indicated)

Year	Net production of rice excluding procurement	Ration offtake of rice	Net availability of rice (col. 2+ col. 3)	Per capita per day availability (grams)	Quantity of rice procured	Ration off-take as a percentage of net availability	Procurement/ output ratio	Procure-ment/ ration offtake	Ration offtake/ demand*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1965-66	24·37	7·01	31·38	237	8·06	22·34	22·87	114·97	22·35
1966-67	27·86	5·85	33·71	250	7·02	17·35	18·51	120·00	18·27
1967-68	27·29	7·15	34·44	250	8·10	20·76	21·06	113·28	21·85
1968-69	25·53	6·43	31·96	227	7·13	20·11	20·08	110·88	19·21
1969-70	32·22	4·37	36·59	254	4·70	11·94	11·71	107·55	12·74
1970-71	45·12	1·50	46·62	316	0·95	3·22	1·89	63·33	4·28
1971-72	42·17	0·79	47·96	317	1·61	1·65	3·04	203·79	2·19
1972-73	49·95	0·83	50·78	330	1·29	1·63	2·32	155·42	2·26
1973-74	48·29	1·30	49·59	316	2·85	2·62	5·12	219·23	3·46
1974-75	28·70	4·64	33·30	208	4·19	13·93	11·72	90·30	12·12
1975-76	38·96	3·94	42·90	263	8·90	9·18	17·10	225·88	10·08
1976-77	37·19	6·72	43·91	265	1·58	15·30	3·75	23·51	16·90
1977-78	51·36	2·63	53·99	321	1·12	4·87	1·96	42·58	6·51
1978-79	50·71	0·95	51·66	303	0·43	1·84	0·77	45·26	2·32
Average	—	—	—	—	4·13	—	10·14	—	—

Source: Col. 1 : Directorate of Statistics, Madras.
Col. 3 and col. 6 : Office of the Commissioner of Civil Supplies, Madras.

Notes:—1. Net production is arrived at by subtracting 12·5 per cent for seed, feed and wastage from gross production.
2. Col. 8 : Procurement/output ratio = as percentage of gross output.
3. Col. 5 : Net availability divided by population. Mid-year population taken.

* Col. 10 : See Demand in Table III.

From Table II, col. 10 we could note that Government sales have met 18.88 per cent of the demand for rice during the period 1965-66 to 1969-70. In the period 1970-71 to 1973-74 they catered to an even smaller proportion (3.04 per cent) of demand. In the period 1974-75 to 1976-77 Government sales have met 13.03 per cent of the demand for rice. For the years 1977-78 and 1978-79 Government sales have met only 4.41 per cent of demand. The objective of providing price relief to the low income groups has been realised only to a limited extent. Estimation of low income demand may not be less than 50 per cent of the total. But Government operations have not met even half of this demand during the fourteen-year period considered (see col. 3 in Table II for actual ration offtake and col. 4 in Table IV for low income demand).

Another important indicator of policy is the ratio of Government purchases to domestic output. From Table II (col. 8) it could be seen that this ratio declined from 22.87 in 1965-66 to 1.89 in 1970-71 and recovered upto 17.10 in 1975-76 and again declined to 0.77 in 1978-79. Thus the Government has not even been purchasing a constant proportion of domestic ouput. Government should have been purchasing a rising proportion of output[5] to provide relief to an increasing number of people especially the low income group.

Assuming that the marketed surplus to production ratio has been 30 per cent throughout the period[6] (though strictly speaking the ratio is not constant), the behaviour of the purchase/output ratio implies that the purchase fluctuated between 76.76 per cent and 2.57 per cent of the marketed surplus. Purchase/marketed surplus ratio was 76.76 per cent in 1965-66 and it declined to 5.96 per cent in 1970-71 but recovered upto 56.97 per cent in 1975-76 and again declined to 2.57 per cent in 1978-79. Wide fluctuations are therefore found. These figures hardly indicate progress towards socialisation of the grain surplus. A steady policy towards purchase is also hardly found.

From col. 9 in Table II, it could be noted that internal procurement had contributed to public distribution in this State excepting for 5 years out of the 14 years considered. This shows that the dependence of this State on external sources, *i.e.*, the Central Government or other States is minimum. Total procurement in the fourteen-year period exceeded total ration offtake by 3.83 lakh tonnes. Hence even though in some years the procurement was less than the ration offtake, there should have been stock with the Government to meet the ration offtake.

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5. In the context of increasing production, the same proportion of purchase may lead to an increase in the absolute quantity of stock. When production stagnates or declines (as is the case with Tamil Nadu after 1972-73), an increasing proportion of output is to be purchased. Stock building in the context of a marginally surplus State depends on purchase by the Government within the State.

6. A study of the marketed surplus of paddy and millets is carried out every year by the Department of Statistics, Government of Tamil Nadu. As per the survey reports of the Department of Statistics, marketed surplus of paddy has not exceeded 30 per cent of paddy production.

IV

ALTERNATIVE MODELS

The inter-relationship between different operations of the Government could be summarised in the simple identity:

1. Opening Stock + Purchases + Import = Sales + Closing Stock.
2. Purchases + Imports = Sales + Stock Change.

In the context of a State Government, imports would mean the quantity purchased from the Central Government (Central allotment) and other State Governments and private traders. The identity shows that within limits any three of the four variables, *i.e.*, purchases, imports, sales and stock could be free decision variables for the Government. Therefore in order to programme an operation, the objectives need to be translated into restrictions on the behaviour of these variables.

An attempt is made to construct some feasible alternative programmes on the assumption that the primary objective was to provide a given level of per capita consumption. It is assumed that total supply would provide for the effect of population growth as well as the growth of per capita income on the demand for rice.

In the absence of data on opening stock[7] and insignificant role of imports, it is assumed that supply is equal to purchase. This State seems to be a net exporter than an importer.[8] For any year, given the population and the desired per capita supply, the aggregate demand could be estimated. Given the estimated demand and net output, the total deficit/surplus could be estimated.

A hypothetical model, tracing the time path of all the variables according to this logic is given in Table III. This model does not include the distributional objective. Later, the required 'distributive' sales and purchases are added to the sales and purchases given in the model.

It is assumed that the population and net output are known. The per capita availability has been calculated on the assumption that the population throughout the fourteen-year period is fed from domestic output or internal production of the State. The model provides for an annual growth of 0.102 per cent per capita consumption. This would be the growth required if the income elasticity of demand for rice is assumed to be 0.1[9] and per capita income to be growing at the actual rate of 1.02 per cent per annum. The base year consumption for the model is the actual consumption of 1965-66 equal to 237 grams per capita per day.

A comparison of the model with the actual time-series data provided important insights about alternative policies that were feasible during the fourteen-year period.

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7. Published data on opening stock of rice with the Government are not available.
8. Available figures on export and import of rice indicates that this State is a net exporter. Inland movement of cereals is available in the Bulletin on Food Statistics, Directorate of Economics and Statistics, Ministry of Agriculture, Government of India, New Delhi.
9. The income elasticity of demand for rice for Tamil Nadu is 0·1 as per our estimation. Methodology of our estimation is explained in the Appendix.

TABLE III—GOVERNMENT OPERATIONS IN RICE—MODEL

(lakh tonnes)

Year	Per capita daily consumption of rice (grams)	Demand for rice	Net output of rice	Purchase= Surplus (col. 4— col. 3)	Sale= Deficit (col. 3— col. 4)
(1)	(2)	(3)	(4)	(5)	(6)
1965-66	237·00	31·36	30·83	0·00	0·53
1966-67	237·24	32·01	33·17	1·16	0·00
1967-68	237·48	32·71	33·66	0·95	0·00
1968-69	237·72	33·47	31·06	0·00	2·41
1969-70	237·97	34·29	35·10	0·81	0·00
1970-71	238·21	35·02	43·89	8·87	0·00
1971-72	238·45	36·03	46·40	10·37	0·00
1972-73	238·69	36·77	48·73	11·96	0·00
1973-74	238·94	37·53	48·64	11·14	0·00
1974-75	239·18	38·28	31·29	0·00	6·99
1975-76	239·42	39·05	45·52	6·47	0·00
1976-77	239·66	39·74	36·88	0·00	2·86
1977-78	239·90	40·34	49·91	9·57	0·00
1978-79	240·15	40·94	48·64	7·70	0·00
Total			563·65	68·97	12·79

Note:—1. Demand estimates are made on the assumption that the actual per capita consumption of 237 grams in 1965-66 grows at the rate of 0·102 per cent per year. 0·102 is estimated as 1·02 per cent per annum growth of per capita real income multiplied by the income elasticity of consumption of rice equal to 0·1 for Tamil Nadu.

2. Net output is 87·5 per cent of gross output.

The actual purchase in the model (see Table III, cols. 5 and 6) exceeded the sales by 56.18 lakh tonnes. Thus even if the full effect of per capita income growth on consumption had to be provided, purchases could have been very much less than the actual, *i.e.*, by more than one-fifth. With a slower growth of per capita consumption, purchases could have been reduced still further.

V

THE DISTRIBUTION PROBLEM

The discussion in the previous section was oriented to the objective of stabilising consumption with domestic output.

Next, an attempt is made to consider distributive operations designed to make sure that the low income population does get the intended average per capita consumption. This is the rationale of fair price system (FPS). The need for this system arises from the fact that even when the total supply permits a given average consumption, many sections of the population cannot in fact get this consumption at going market prices, because their income is low.

It is assumed that the FPS system is meant to sell rice at a fair price (subsidised) only to the low income families and the rest of the population is expected to purchase its rice requirements in the open market.

The criteria for determining the number of people deserving price relief have been different in different studies.[10] For our analysis, it is assumed that the income-tax paying families and cultivator families would not be served by FPS. The average number of family members is assumed to be five. The number of persons not entitled to the FPS service is estimated as five times the number of income-tax paying individuals and families (8.3 lakhs) plus five times the number of cultivating males (201.32 lakhs) in 1971. If these people are excluded, there would have been 202.8 lakh people out of a total population of 411.99 lakhs, deserving price relief in 1971. In other words, the FPS system should have served about 49 per cent of the population. Table IV shows the total sales and purchases required if 49 per cent of the population was to be continuously supplied the target per capita consumption of the model every year.

By subtracting the sales in the model from the total sales in Table IV, we get the required additional 'distributive' sales. By adding the 'distributive' sales to the purchases in the model we get the total purchases that should have been made.

Table IV shows that in order to serve 49 per cent of the population, the FPS system should have been selling an average quantity of about 17.76 lakh tonnes of grain every year instead of 3.86 lakh tonnes. And the Government should have purchased, on the average, about 53.55 per cent of domestic output, instead of only 10.14 per cent.

Our estimation of the purchase required may seem to be at a higher level due to the following reason. It is assumed that the Government supports the whole of the low income group with full requirement of rice. The low income group may have families preferring millets for rice and therefore a fraction of this low income group gets rice in fair price shops.

10. (*i*) National Commission on Agriculture, Interim Report on Agricultural Price Policy, Government of India, New Delhi, February 1975; (*ii*) I. S. Gulati and T. N. Krishnan, "Public Distribution and Procurement of Foodgrains: A Proposal", *Economic and Political Weekly*, Vol. X, No. 21, May 24, 1975; and (*iii*) V. S. Vyas and S.C. Bandyopadhyay, "National Food Policy in the Framework of a National Food Budget", *Economic and Political Weekly*, Vol. X, No. 13, March 29 1975.

TABLE IV—GOVERNMENT OPERATIONS IN RICE-MODEL INCLUDING DISTRIBUTION OPERATIONS

Year	Number of persons to be served by public distribution system (lakhs)	Per capita daily consumption provided (grams)	Total sales required (lakh tonnes)	Additional purchase required (lakh tonnes)	Total purchase required (lakh tonnes)	Total purchase/ output (per cent)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1965-66	177·7	237·00	15·37	15·37	15·37	49·85
1966-67	181·2	237·24	15·69	15·69	16·85	50·79
1967-68	184·9	237·48	16·02	16·02	16·97	50·41
1968-69	189·0	237·72	16·39	13·98	13·98	45·00
1969-70	193·4	237·97	16·79	16·79	17·60	56·77
1970-71	198·2	238·21	17·23	17·23	26·10	59·56
1971-72	202·9	238·45	17·65	17·65	28·02	60·38
1972-73	206·9	238·69	18·02	18·02	29·98	61·52
1973-74	210·9	238·94	18·39	18·39	29·50	60·64
1974-75	214·9	239·18	18·76	11·77	11·77	37·61
1975-76	218·9	239·42	19·12	19·12	25·59	56·21
1976-77	222·6	239·66	19·47	16·61	16·61	45·03
1977-78	225·8	239·90	19·77	19·77	29·34	58·78
1978-79	228·9	240·15	20·06	20·06	27·76	57·07
Total ..			248·73	236·47	305·44	
Average ..			17·76			53·55

Note:— Col. 2 : This is assumed to be 49 per cent of the population.
Col. 5 : Total sales minus stability sales of the model.
Col. 6 : Additional purchases plus stability purchases of the model.

VI

SUMMARY AND CONCLUSIONS

Our brief survey of State trading in rice in the last 14 years shows that the performance had been poorer than promise in Tamil Nadu State. The growth of average consumption has not been stabilised. The marketed surplus does not seem to be socialised. A steady policy towards purchase is also not observed. As Raj Krishna noted: "the 'daridra-narayana' had not been identified and regularly provided with his minimum supplies."[11]

11. Raj Krishna, *op. cit.*

Our analysis shows that considerable progress would have been made by now to realise the objectives, if objectives had been defined clearly and consistently and Government operations had been quantitatively determined by them. Instead of allowing per capita consumption to fluctuate widely from year to year with fluctuations of output, the Government could have stabilised it at a reasonable level and let it grow steadily.

APPENDIX

There are two ways by which an estimate of the value of the income elasticity coefficient can be worked out. One is on the basis of time-series data relating, preferably, to the recent past. The other is on the basis of cross-section data relating to a recent period. The terms 'net availability' and 'consumption' are used synonymously in our estimation. The figures relating to net availability of rice was worked out by adjusting the total production of rice for seed, feed and wastage. We have subtracted procurement from net production and added public distribution. Procurement by the State Government may not be consumed fully within the State. Net changes in the stocks held by the Government, farmers and private traders have not been taken into account since no published data are available to make this desirable adjustment. As consumers base their purchases on retail prices, the retail price index has been used. The per capita income at current prices has been used in the analysis. Data on per capita income and retail price were obtained from published sources of Department of Statistics, Government of Tamil Nadu. Data relate to the years 1965-66 to 1977-78.

The demand relationship studied for the purpose of estimating the income elasticity of demand is as follows:

$$\text{Log } D_i = \log\alpha + B_1 \log P_i + B_2 \log Y$$

where D_i = per capita availability of the ith commodity, *i.e.*, rice,
P_i = retail price index of the ith commodity, *i.e.*, rice,
Y = consumer's income expressed as per capita income.

Commodity	Constant (Logα)	Regression coefficient		R^2
		B_1	B_2	
Rice ..	4·804	—0·0019NS (0·0080)	0·1122* (0·0119)	0·98*

where B_1 = price, index,
B_2 = per capita income.
* Significant at 1 per cent level.
NS = Not significant.
Figures in brackets denote standard errors.