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Technical
Report

by

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WORKING CAPITAL REQUIREMENTS
AND CREDIT NEEDS FOR FOOD-
GRAINS DISTRIBUTION IN INDIA

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Name of the Author ........D.K..Desai.and.V.Ramachandran............

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ABSTRACT (within 250 words)

This paper attempts to estimate the working capital required for the
procurement and distribution of foodgrains. To arrive at the financial
requirements for foodgrains distribution, estimates of the marketed surplus
are needed. Instead of assuming a certain percentage of the total foodgrains
production as the marketed surplus, a different technique was employed to
estimate the marketed surplus. Based on the prices and stocks of foodgrains
required at the beginning of the months and the marketed surplus of foodgrains,
the working capital requirements were estimated for different years.

The estimates of working capital for foodgrains show that the available bank
credit met only 38 per cent of the maximum working capital required in 1972-73.
Hence bank credit cannot be blamed for making possible the hoarding of foodgrain
In fact, by not supplying the necessary working capital for foodgrains, the
banking system has forced foodgrain distribution to depend on non-banking
sources. It has thus increased the cost of financing the working capital
and helped the price increase of foodgrains.

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WORKING CAPITAL REQUIREMENTS AND CREDIT NEEDS
FOR FOODGRAINS DISTRIBUTION IN INDIA

By

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Introduction

Policies about the procurement and distribution of foodgrains
in India have attracted great attention. The policy for wheat has
shifted from complete take-over to the reinstation of wholesalers. In
the formation of these policies the financial implications to the
exchequer do not seem to have been taken into consideration. The general
assumption is that prices of foodgrains rise because of the tendency
to hoard on part of the middle-man; and hence this tendency should be
curbed. At one extreme it was considered necessary to remove the
middleman (wholesalers) and manage the distribution of wheat through the
public distribution system. It is now found that the task involved
is stupendous and hence it is considered desirable to allow the whole-
salers to play their role under stipulated conditions. Here also no
attempt is made to find out how the wholesalers will finance the
operation of the procurement and distribution of foodgrains. The
selective credit control policies of the Reserve Bank of India are
framed with a view to making it more difficult to take credit against
a hypothecation of foodgrains. It is necessary to examine the mag-
nitude of the working capital required for the procurement and distri-
bution of foodgrains, and from such an assessment to find out the
credit needs. This paper attempts to estimate the working capital
requirements of foodgrains particularly rice, wheat, and other coarse
grains.

Credit Given for Foodgrains' Distribution

The data obtained on advances for food procurement operations
from all banks reveal that the major share (75 per cent in 1972) of the
bank credit is used by the Food Corporation of India (Table 1).
The total advances for food procurement varied from 19 crores in
January 1966 to 542 crores in June 1972.

Table 1:   Average Monthly Advances for
                Food Procurement

(Rs. in crores)

Year	FCI	Total	% of Columns 1 to 2
1966	-	40.33	-
1967	0.68	29.82	2.28
1968	77.33	137.86	56.09
1969	103.49	167.17	61.90
1970	68.10	132.10	51.55
1971	232.23	318.96	72.81
1972	271.62	363.33	74.75
1973*	264.95	326.44	81.16

Source: Department of Economic Research, Bank of Baroda.

*The average is worked out for only 10 months.

The advances for foodgrains procurement formed 5.58 per cent of the total bank advances in 1972-73. They fluctuated between 2.9 per cent and 9.66 per cent between March 1971 and July 1973 (Table 2).

Table 2 : Advances for Foodgrains Procurement and Total Bank Advances

(Rs. in lakhs)

| Year | Advances | | % of advances for foodgrains to total advances |
	Foodgrains	Total	
1970-71	214.40	4683.83	4.57
1971-72	345.28	5263.36	6.56
1972-73	339.10	6066.06	5.58
March 1971	214.40	4807.52	4.45
October 1971	359.10	4941.48	7.26
December 1971	368.50	5168.93	7.12
March 1972	338.50	5343.66	6.32
June 1972	541.95	5609.35	9.66
September 1972	357.18	5292.92	6.74
December 1972	160.57	5527.50	2.90
January 1973	197.89	5747.44	3.44
February 1973	290.54	5763.32	5.16
March 1973	339.10	6269.34	5.40
April 1973	292.43	6339.92	4.60
May 1973	377.24	6440.66	5.85
June 1973	464.10	6527.53	7.11
July 1973	390.84	6436.27	6.07

Source: Reserve Bank of India Bulletins (January to December 1972 Excluding May 1972 and January to September 1973 excluding May 1973).

(See current statistics).

Data on advances for foodgrains to the private sector are not available. The sectorwise break up of advances shows that the advances for wholesale trade including credit for food procurement formed 16 per cent of the outstanding advances by the end of April 1973 (Table 3). If the advances for the procurement of foodgrains are deducted from these advances, the percentage of advances for the wholesale trade (including foodgrains) will reduce to 11.4 per cent.

Table 3 :   Break up of Bank Advances

(Per cent)

Sector	Advances outstanding	
	October end 1972	October end 1973
1. Priority sectors (including small scale industry)	27.0	23.0
2. Large and medium industry	48.4	49.0
3. Wholesale trade (inlcuding credit for food procurement and public sector trading agencies)	15.8	16.0
4. Other sectors	11.8	12.0

Source: "Annual Report on Trend and Progress of Banking in India," Reserve Bank of India Bulletin (Supplement), (August 1973).

Data on advances from the scheduled banks against the security of foodgrains show that in June 1972 Rs.316.31 crores were advanced. This formed 6.54 per cent of the total advances (Table 4). If it is assumed that these advances were inclusive of the advances given to the private sector, the total advances for foodgrains do not seem to have exceeded 16.2 per cent in 1972. Because of the restrictive policies of advances against foodgrains to the private sector, these advances to the private sector must have declined since 1972. By 1973, the total advances for foodgrains will not have exceeded 15 per cent of the total bank advances (Table 2).

Table 4 : Scheduled Banks' Advances Against the
Securities of Foodgrains Outstanding

(Rs. in lakhs)

Outstanding as on	Paddy	Wheat	Other cerals/ pulses	Total food- grains
June 13, 1969	95.92	91.70	58.77	246.39
June 12, 1970	76.57	77.44	61.91	215.92
December 11, 1970	37.28	70.72	29.01	137.01
June 11, 1971	79.88	101.79	33.65	215.32
June 30, 1972	68.10	265.96	32.75	366.81

Source: Reserve Bank of India Bulletin, and Supplements, (August 1973).

To judge whether these advances help hoarding of foodgrains,
it will be useful to find out the financial requirements for foodgrains
distribution.

Estimates of Financial Requirements
for Foodgrains Distribution

To arrive at the financial requirements for foodgrains distribution,
estimates of marketed surplus are needed. Techniques used to estimate
marketed surplus and its working capital requirement are discussed in
this paper.

Production of foodgrains

During the decade of the 1960s, the production of foodgrains
varied from 72 million tonnes in 1965-66 to 108 million tonnes in
1970-71. The statistics of foodgrains production for the last three
years show that foodgrains production has crossed the 100 million
tonnes mark. Rice and wheat accounted for 66.5 per cent of the total
foodgrains production in 1972-73 (Table 5).

Table 5 : Production of Foodgrains

(In thousand tonnes)

Year	Total food-grains produced	Rice	Rice as % of total foodgrains produced	Wheat	Wheat as % of total foodgrains produced
1960-61	82,018	34,574	42.15	10,997	13.40
1961-62	82,706	35,663	43.12	12,072	14.59
1962-63	80,151	33,217	41.44	10,776	13.44
1963-64	80,642	36,998	45.87	9,853	12.21
1964-65	89,356	39,308	43.99	12,257	13.71
1965-66	72,347	30,589	42.28	10,394	14.36
1966-67	74,231	30,438	41.00	11,393	15.34
1967-68	95,052	37,612	39.56	16,540	17.40
1968-69	94,013	39,761	42.29	18,651	19.83
1969-70	99,501	40,430	40.63	20,093	20.19
1970-71	108,422	42,225	38.94	23,832	21.98
1971-72	104,656	42,735	40.83	26,477	25.29
1972-73	100,000	40,000	40.00	26,500	26.50

Source : Production figures upto 1969-70 are taken from Bulletin on Food Statistics, 1971, p.10. Production figures for 1970-71 and 1971-72 are taken from Reserve Bank of India Bulletins, (September 1972 and September 1973) (See Current Statistics). Production figures for 1972-73 are taken from Reserve Bank of India Bulletin, Supplement, (August 1973).

Marketed Surplus

   Various studies have indicated that marketed surplus varies
from 30 to 40 per cent of the foodgrains production.[1] Instead of
assuming a certain percentage of the total foodgrains production as
the marketed surplus, a different technique was employed to estimate
marketed surplus. Thamarajakshi estimated marketed surplus on the
basis of the expenditure on foodgrains consumed by the non-agricultural
sector.[2] The quantities of foodgrains consumed were derived from the
consumption expenditure on foodgrains. These were then adjusted for
the supplies of foodgrains to the non-agricultural sector through
imports to arrive at an estimate of marketed surplus from domestic
production of foodgrains. These estimates showed that the percentage
of marketed surplus to domestic production varied from 22.3 per cent
in 1965-66 to 34.5 per cent in 1955-56.

   In the technique used in this paper to estimate marketed surplus,
apart from the agricultural population, small cultivators and agricul-
tural labourers were also included in the population buying foodgrains
from the market. Several studies have shown that small farmers and
agricultural labourers buy foodgrains from the market because a) small
farmers do not produce enough for their consumption and b) all agricul-
tural labourers are not paid wages in kind.

Model for Marketed Surplus

   The assumptions used for arriving at an estimate of marketed surplus
were:

   1. The marketed foodgrains are supplied from the domestic
      production and imports.

   2. The market arrivals from the total domestic production
      will follow the same seasonal pattern as the market
      arrivals of foodgrains at the selected markets in
      India (Table 6).

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[1] Ralph W Cummings, Jr., Buffer Stocks, Seminar on Foodgrains Buffer
Stocks in India, (Seminar Series VIII; Bombay, Indian Society of
Agricultural Economics, 1969), pp.49-84.

[2] Thamarajakshi, "Prices, Production and Marketed Surplus of Foodgrains
in the Indian Economy, 1951-52-1965-66," Agricultural Situation,
25,10, (June 1970), pp.1047-1052.

Table 6: Arrivals of Foodgrains at Selected Markets in India

(in thousand tonnes)

Year	Wheat				Rice				Coarse grain*			
	April-June	July-Sept.	Oct.-Dec.	Jan.-March	April-June	July-Sept.	Oct.-Dec.	Jan.-March	April-June	July-Sept.	Oct.-Dec.	Jan.-March
1967-68	434.4	179.7	134.3	155.5	335.7	187.1	646.5	539.1	416.0	179.3	268.4	307.4
1968-69	1094.2	355.9	192.8	184.9	287.8	183.9	686.1	571.1	569.6	253.6	396.8	382.2
1969-70	1200.4	275.2	189.3	159.6	305.8	229.3	818.1	539.0	416.0	166.9	428.8	308.0
1970-71	1311.0	454.3	304.0	199.5	-	-	-	-	-	-	-	-

Coarse grain arrivals were calculated by adding the arrivals of jowar, bajra, maize, and barley

Source: Bulletin on Food Statistics, 1971, pp. 16-22

3. To arrive at the estimates of market arrivals by months within the season, the following procedure was used:

    a) Wheat: the pattern was evolved from a study of the monthly average arrivals of wheat in the markets in Rajasthan during 1959-70 (Table 7)

    b) Rice: a normal distribution was assumed for market arrivals from October to December for the kharif production and from January to March for the rabi production. For the rest of the months a uniform distribution was assumed.

    c) Other foodgrains: a uniform distribution pattern was assumed.

Notations[*]:

The following notations were used for the model:

N_i =   Total population

I_i =   Quantity of imported foodgrains

A_i =   Availability of foodgrains

C_i =   Per capita availability of foodgrains

L_i =   Population buying foodgrains

N_{1i} =   Non-agricultural population

N_{2i} =   Population of cultivators with operational holdings less than 2.02 hectares in size

N_{3i} =   Population of agricultural labourers

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[*]Unless otherwise specified

    i   varies from 1 to 8 years
    j   varies from 1 to 12 months
    k   varies from 1 to 5 types of foodgrains
    l   varies from 1 to 2 types of foodgrains

Table 7 : Monthly Average Arrivals of Wheat in the
Markets in Rajasthan: 1959 to 1971

Month	Wheat arrivals (quintals)
January	4115.16
February	3621.14
March	6923.39
April	7504.13
May	20102.89
June	25039.55
July	7363.03
August	5058.83
September	3845.29
October	4181.09
November	4210.69
December	3513.47

Source: K.K.S. Chauhan and R.V.Singh, Marketing of Wheat in
Rajasthan, (Udaipur: University of Udaipur, S.K.N. College
of Agriculture) 1973, p.167.

N_{ik} = Production of a particular type of foodgrain

M_{ik} = Marketed surplus of a particular type of foodgrain

M_i = Total marketed surplus of all foodgrains

Equations :

$$L_i = N_{1i} + .5 N_{2i} + .5 N_{3i}^{*}$$

$$C_i = \frac{A_i}{N_i}$$

$$M_{ik} = X_{ik} \times \frac{M_i}{\Sigma X_{ik}} \quad \text{where} \quad M_i = \Sigma M_{ik}$$

$$M_i = C_i L_i - X_i$$

The population buying foodgrains from the market is composed of a) the non-agricultural population, b) small farmers having operational holdings of less than 2.02 hectares, and c) agricultural labourers. Only 50 per cent of the foodgrain requirements of small farmers and agricultural labourers will be met by the marketed surplus; the rest will be met from the farm production and wages paid in kind.

The population figures for different years from 1965-66 onwards were arrived at by assuming a 2.466 per cent linear growth with the base year (1961) population as 433.07 millions. The non-agricultural population plus half of the small farmers and half of the agricultural population formed 57.7 per cent of the total population of 1971 (Table 8). This per centage was applied to the total population for different years from 1965-66 onwards to arrive at the figures of the population buying foodgrains (Table 9).

The per capita availability of foodgrains per day was arrived at by dividing the net availability of foodgrains by the population figures (Table 10). The quantity of foodgrains purchased by the population buying foodgrains was arrived at by multiplying the figures of this population with the per capita availability. From this quantity, imports were subtracted to arrive at the marketed surplus (Table 11). The per cent of the marketed surplus to the total production of foodgrains varied from 44 in 1965-66 to 55.5 in 1969-70 (Table 12.) These estimates are very different from those obtained by Thamarajakshi and others.

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* It is assumed that 50 per cent of the total foodgrain requirements of small farmers and agricultural labourers will be met from the marketed surplus.

Table 8: Estimation of the Foodgrains Buying Population from the Total Population

Class of workers	Total workers (millions)	Percentage to the total	Population corresponding to these workers (millions)	Percentage of population buying foodgrains to total population in col.4	Population buying foodgrains (millions)	Population buying foodgrains as % of the total population
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Cultivators	78.7	42.9	234.64	31.16*	73.11	13.4
Agricultural labourers	47.3	25.8	141.02	50.00	70.50	12.9
Other workers	57.6	31.3	171.74	100.00	171.74	31.4
Total	183.6	100.0	547.4	-	315.35	57.7

* Percentage of cultivators having operational holding size less than 2.02 hectares was 62.31 according to 1971 census. 50% of their purchase was assumed to be from the open market.

Source: Basic data taken from Indian Agriculture in Brief, (September 1971), p.6

Table 9 :   Population Buying Foodgrains

(In millions)

Year	Total Population	Population buying foodgrains *
1965-66	483.42	278.40
1966-67	493.25	284.65
1967-68	504.08	290.90
1968-69	514.91	297.15
1969-70	525.74	303.40
1970-71	536.57	309.65
1971-72	547.40	315.90
1972-73	558.23	322.15

*Population buying foodgrains formed 57.7 per cent of the total population.

Table 10 : Population, Net availability, and
Per capita Availability of Foodgrains

Year	Population* (millions)	Net availability (thousand tonnes)**	Availability per capita per day (gms)
1965-66	482.42	73,478	417
1966-67	493.25	73,889	410
1967-68	504.08	86,716	471
1968-69	514.91	85,721	457
1969-70	525.74	89,447	466
1970-71	536.57	97,033@	509
1971-72	547.40	93,774@	480
1972-73	558.23	89,566@	452

* The population figures were arrived at by assuming a 2.466%
  linear growth, with the base year (1961) population as 439.07
  millions.
** The net availability figures are taken from Bulletin on
  Bulletin on Food Statistics (1971), p.163.

@ From the production figures, net production was worked
  out as given in Footnote 2 in Bulletin on Food Statistics,
  (1971), p.163. To this were added the figures of net
  imports.

15

Table 11 :   <u>Marketed Surplus of Foodgrains</u>

(In thousand tonnes)

Year	Foodgrains bought by the population buying food‑grains	Net imports of foodgrains	Marketed surplus
1965-66	42,734	10,311	32,423
1966-67	42,597	8,659	33,938
1967-68	50,010	5,671	44,339
1968-69	49,566	3,824	45,742
1969-70	51,605	3,563	48,042
1970-71	57,528	2,758	54,770
1971-72	55,300	2,054	53,246
1972-73	53,097	2,446	50,651

<u>Source</u>: Net imports figures are taken from Bulletin on <u>Food Statistics</u>, (1971), p.163.

Table 12: Percentage of Marketed Surplus
to the Total Production

Year	Total domestic Production[*]	Marketed surplus	Percentage of marketed surplus to total domestic production
1965-66	72,347	32,423	44.8
1966-67	74,231	33,938	45.7
1967-68	95,052	44,339	46.6
1968-69	94,013	45,742	48.6
1969-70	99,507	48,042	55.5
1970-71	108,422	54,770	50.5
1071-72	104,656	53,246	50.9
1972-73	100,000	50,651	50.7

[*] Source : Production figures upto 1969-70 are taken from Bulletin
on Food Statistics, 1971, p.10. Production figures for
1970-71 and 1971-72 are taken from Reserve Bank of India
Bulletins, (September 1972, and September 1973) (See
Current Statistics). Production figures for 1972-73 are
taken from Reserve Bank of India Bulletin, Supplement,
August 1973).

Working Capital Requirement

Having obtained the estimates of marketed surplus, the working capital requirements for the marketed surplus can be estimated.

Assumptions

1. The arrivals of the marketed surplus for different months will be according to the pattern described earlier.

2. The purchases of foodgrains made by the foodgrains buying population will be uniform in all the months.

3. The stocks at the beginning of the month required to meet the demand for foodgrains will vary according to the following two situations:

   a) The minimum stocks required to meet the demand of the foodgrains buying population at least for 60 days; and

   b) The minimum stocks required to meet the demand of the foodgrains buying population at least for 90 days.

   The quantities required for these two situations will vary considerably and the finances required for these stocks will form the working capital requirements for foodgrains distribution.

4. It is assumed that the cost of handling, storage, and marketing of foodgrains will be covered by the prevailing wholesale prices.

5. The prices of foodgrains for different months were calculated as follows:

   The prices prevailing in January 1971 were obtained for different foodgrains. The wholesale price indice of wheat, rice, and cereals for different months and different years were obtained.. Using these prices indice, the actual prices for different foodgrains were calculated.

Model for the Estimation of Working Capital

   Based on the prices and the stocks of foodgrains required at the beginning of the months, the working capital requirements were estimated. The notations used for the model to estimate the working capital requirements were:

R_{ijk} = Arrival of foodgrains

D_{ijk} = Purchase of foodgrains by the foodgrains buying population

Z_{ijkl} = Minimum stock of foodgrains at the beginning of the month

P_{ijk} = Price of foodgrains

V_{ijkl} = Value of Z_{ijkl}

Equations :

$$R_{ijk} = r_j (M_{ik}) \ldots \text{ where } r_j < 1$$

$$D_{ijk} = \frac{1}{12} (M_{ik})$$

$$Z_{ijkl} = F (R_{ijk}, D_{ijkl}) \text{ as described in the flow chart.}$$

$$V_{ijkl} = P_{ijkl} \times Z_{ijkl}$$

R_{ijk} the market arrival of a particular type of foodgrain for a particular month in a particular year is dependent on the total market surplus and the pattern of market arrivals. The patterns of market arrivals for different types of foodgrains are described earlier. D_{ijk} the purchase of a particular type of foodgrain for a particular month in a particular year is assumed to be one-twelfth of the total marketed surplus. Z_{ijkl} is a buffer stock required to meet the demand of foodgrains for varying conditions.

The flow chart which was used in the computer programme to obtain the figures of V_{ijkl} is given in Exhibit 1. This programme was run on a HP 2000A computer at the Indian Institute of Management, Ahmedabad.

Interpretation of Results

In the model for working capital, two situations were assumed. These were:

1. The stocks of foodgrains at the beginning of each month will be sufficient to meet the demand of foodgrains at least for a period of 60 days. As the total marketed surplus from the domestic production was based on the total annual purchase of foodgrains and the monthly purchase pattern was assumed to be uniform, the initial stock at the beginning of the year will be at least equal to next two months purchase of foodgrains. The stocks at the beginning of other months will be this initial stock plus the difference between the arrivals and disposal of foodgrains for the subsequent two months.

2. In the second situation, the initial stocks should meet the demand for at least 90 days. The stocks at the beginning of other months will be this initial stock plus the difference between the arrivals and disposals of foodgrains for the subsequent three months.

The values of these stocks at the prevailing wholesale prices indicate the working capital requirements. The monthly requirements of working capital for 1972-73 for 60 day and 90 day inventories are given in Table 13. For a 60 day inventory the maximum working capital requirement was Rs.1,909 crores in July 1972 and the minimum working capital requirement was Rs.973 crores in October 1972. For a 90 day inventory the maximum and minimum requirements of working capital were Rs.2,401 crores in June 1972 and Rs.1,355 crores in September 1972. From December 1972 to March 1973 the monthly working capital requirements for 60 day and 90 day inventories remained at a stable level with minor fluctuations.

Table 13: Working Capital Requirements for Total
Foodgrains During 1972-73

(Rs. in crores)

Month	60 day inventory	90 day inventory
April	1250.92	1779.46
May	1409.98	2107.35
June	1830.24	2400.61
July	1909.06	2288.58
August	1601.38	1759.9
September	1142.45	1355.17
October	973.46	1405.2
November	1245.4	1713.67
December	1500.7	1912.91
January	1551.91	2000.95
February	1559.02	1971.88
March	1578.13	2016.59

Table 14 gives the working capital required for a 60 day inventory for the years 1965-66 to 1972-73. The average working capital varied from Rs.479 crores in 1965-66 to Rs.1463 crores in 1972-73. The working capital increased from Rs.610 crores in 1966-67 to Rs.1000 crores in 1967-68 because of wheat revolution.

The working capital required for/ wheat increased from Rs.225 crores in 1966-67 to Rs.425 crores in 1967-68. Since 1967-68, there has been a steady rise in the working capital required for foodgrains as a whole. This is mainly due to the steady rise in the working capital required for wheat and rice. The working capital required for coarse grains remained at a stable level with minor fluctuations from 1967 onwards.

The maximum working capital required for foodgrains as a whole during a year varied from Rs.602 crores in 1965-66 to Rs.1909 crores in 1972-73, while the minimum working capital required varied from Rs.234 crores in 1965-66 to Rs.973 crores in 1972-73.

In Table 15 Data are presented with the base inventory changed from 60 to 90 days. For a 90 day inventory, the average working capital required varied from Rs.643 crores in 1965-66 to Rs.1892 crores in 1972-73. The maximum working capital required for a 90 day inventory in 1972-73 (which was the highest in the eight years considered) was Rs.2401 crores. The minimum working capital required for a 90 day inventory in 1972-73 (which was the highest in the eight years considered) was Rs.1355 crores.

Relationship of Bank Credit with Working Capital Requirements for Foodgrains

If it is estimated that on an average 15 per cent of the total bank advances were available for foodgrains, the credit available from 1969-70 to 1972-73 would be as shown in Table 16.

Table 14: Working Capital Requirements for Foodgrains Distribution
(Based on a 60 Day Inventory)

(Rs. in crores)

Year	Wheat			Rice			Coarse grains			Total Foodgra...		
	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	A
1965-66	276.15	51.45	172.32	418.62	1.97	223.78	140.76	16.67	82.91	601.54	234.65	479
1966-67	338.86	56.90	225.29	510.66	2.45	279.96	178.24	20.41	104.49	779.90	297.73	609
1967-68	723.28	119.08	422.47	704.00	3.87	413.57	303.04	33.51	163.92	1410.15	578.52	99?
1968-69	724.86	134.60	467.84	750.61	4.25	447.56	258.23	29.41	140.71	1400.39	638.23	1056
1969-70	964.57	165.60	602.89	896.65	4.88	522.06	327.73	36.41	180.90	1741.94	788.64	1305
1970-71	1021.35	194.97	632.91	852.09	4.73	509.42	332.14	35.47	179.43	1787.85	827.56	1321
1971-72	1099.71	207.20	704.85	914.02	4.92	527.12	266.55	30.82	151.11	1814.75	917.40	138?
1972-73	1162.12	208.58	749.30	1006.73	5.35	553.41	276.42	33.40	159.99	1909.06	973.46	146?

ble **15:** Working Capital Requirements for Foodgrains Distribution:
(Based on a 90 day Inventory)

(Rs. in crores)

Year	Wheat			Rice			Coarse grains			Total Foodgrains		
	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.
1965-66	341.89	45.78	197.36	625.73	29.82	334.73	186.30	25.01	111.21	822.06	349.41	643.31
1966-67	419.53	74.60	253.29	763.31	36.55	418.43	231.82	30.61	140.64	1042.40	422.37	812.37
1967-68	895.16	104.95	485.30	1052.31	60.95	615.92	387.22	50.26	218.21	1773.51	839.56	1317.45
1968-69	897.41	126.45	534.66	1082.84	64.70	663.41	340.85	44.12	188.45	1827.01	928.05	1386.53
1969-70	1194.19	177.90	685.49	1340.28	74.77	776.34	418.77	54.62	241.88	2247.06	1133.12	1704.73
1970-71	1264.49	168.69	726.90	1275.68	72.43	756.34	436.44	53.21	240.11	2339.87	1177.16	1723.57
1971-72	1361.49	196.10	805.81	1366.26	75.65	784.89	351.79	46.23	202.52	2334.26	1293.8	1793.25
1972-73	1438.76	217.02	851.84	1504.82	80.37	826.44	360.07	50.10	214.40	2800.61	1355.17	1892.69

Table 16: Available Credit and Working Capital

(Rs.in crores)

Available Credit	1969-70	1970-71	1971-72	1972-73
	595.7	702.6	790.2	909.9

Situations

Working Capital based on a 60 day inventory

	1969-70	1970-71	1971-72	1972-73
Maximum	1741.94	1787.85	1814.75	1909.06
Minimum	788.64	827.57	917.41	973.46
Average	1305.87	1321.77	1383.09	1462.72

Working Capital based on a 90 day inventory

	1969-70	1970-71	1971-72	1972-73
Maximum	2247.06	2339.87	2334.26	2400.61
Minimum	1133.12	1117.16	1293.80	1355.17
Average	1704.73	1723.37	1793.25	1892.69

The data of credit available during the last four years show that the average requirement of working capital for a 60 day inventory cannot be met. At the most, the minimum requirement of the working capital can be met. For a 90 day inventory, the credit available cannot meet even 50 per cent of the average requirement of working capital.

If the estimates of working capital requirements are near reality and if the available credit for foodgrains does not exceed 15 per cent

of the total bank advances, it implies that the private sector meets the additional requirement from the non-banking sources. This additional requirement amounts to a minimum of Rs.445 crores and a maximum of Rs.1491 crores in 1972. The cost of finance from the non-banking sources is likely to be much higher than the cost from the banking sources. Is it a wise policy to force foodgrains distribution to depend on the non-banking sources? Does the selective credit control on foodgrains achieve the objective of bringing down foodgrains prices? By providing adequate credit to foodgrains business it is possible to bring better discipline and control on the stocks and the tendency to hoard can be curbed. It will also decrease the cost of financing.

Take-over of Foodgrain Trade

At the time of wheat take-over, no estimates of the working capital requirements seemed to have been made. The working capital requirements for 1972-73 according to these estimates are given in Table 17.

Table 17: Working Capital Requirements for Wheat During 1972-73

Month	60 day inventory	90 day inventory
April, 1972	208.59	312.88
May	429.57	136.40
June	917.78	1239.00
July	1162.12	1438.76
August	1149.97	1380.63
September	1032.77	1207.99
October	934.70	1057.71
November	842.24	909.35
December	762.12	710.95
January, 1973	665.34	588.80
February	523.14	372.60
March, 1973	363.34	217.03
Average	749.31	851.84

In 1972-73 the average working capital required for wheat for a 60 day and 90 day inventory was Rs.749 and Rs.852 crores respectively. For a 90 day inventory the average working capital requirement for wheat is 94 per cent of the available credit of Rs.910 crores for foodgrains as a whole. Based on the past figure if a projection of the working capital required in 1973 was made when the policy of the wheat trade take-over came into operation, its implication on the banking system would have been obvious. In a way the non-implementation of the policy of wheat trade take-over has saved the situation.

Conclusions

The estimates of working capital for foodgrains clearly indicate that the available bank credit met only 38 per cent of the maximum working capital required during 1972-73. Hence bank credit cannot be blamed for boosting the hoarding of foodgrains. By not supplying the legitimate working capital for foodgrains, the banking system has forced foodgrain distribution to depend on non-banking sources and has thus increased the cost of financing working capital and helped the price increase of foodgrains.

Exhibit 1

FLOW CHART FOR AN INVENTORY MODEL

NOTATIONS

Z_{ijkl} = Stock at the beginning of month j for the ith foodgrain, kth year and with inventory equal to 30 (i + 1) days.

R_{ijk} = Market arrival of the ith foodgrain in the jth month at the kth year.

M_{ik} = Market surplus of the ith foodgrain at the kth year.

T = TRUE

F = FALSE

INPUT

$J \leftarrow 1$
$Z_{ijkl} \leftarrow \dfrac{L \cdot M_{ik}}{12}$

$J \leftarrow 2$

$L < 2$ T   F

$Z_{ijkl} \leftarrow Z_{i(j-1)kl} + R_{i(j-1)} + R_{ijk} - 2\,M_{ik}/12$

$Z_{ijkl} \leftarrow Z_{i(j-1)\,kl} + R_{i(j-1)k} + R_{ijk} + R_{i(j+1)k} - 3\,M_{ik}/12$

$Z_{ijkl} < 2\,M_{ik}/12$ T

$Z_{ijkl} < 3\,M_{ik}/12$ T

$J = 13$ T

$J = 13$ T

$Z_{i1kl} \leftarrow Z_{i1kl} + 2\,\dfrac{M_{ik}}{12} - R_{i(j-1)\,k} - R_{ijk}$
&
$Z_{ijkl} \leftarrow Z_{i(j-1)kl} + R_{i(j-1)k} + R_{ijk} - 2\,\dfrac{M_{ik}}{12}$

$Z_{i1kl} \leftarrow Z_{i1kl} - R_{i(j-1)k} - R_{ijk} + 3\,M_{ik}/12$
&
$Z_{ijkl} \leftarrow Z_{i(j-1)kl} + R_{i(j-1)k} + R_{ijk} + R_{i(j-1)k} - 3\,M_{ik}/12$

$J \leftarrow J + 1$

$J \leftarrow J + 1$

$J \leftarrow J + 1$

$J \leftarrow J + 1$

OUTPUT